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on General Thoracic Surgery**

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**MONDAY, 28 MAY 2018****08:30 - 10:30****BROMPTON SESSION****B-001****HIATAL HERNIA AFTER ESOPHAGECTOMY: A LARGE MULTICENTER EUROPEAN SURVEY**

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Objectives:

Hiatal Hernia after Esophagectomy (HHE) is a rare complication. Time to occurrence, clinical presentation, risk factors and surgical management are not well understood.

Methods:

We conducted a retrospective multicenter study between 2000 and 2016 among 19 French-speaking centers. Among 6608 esophagectomies (mean 21 procedures/centre/year), all patients operated for a HHE were reviewed. Demographics, clinical parameters and surgical details of the initial procedure were recorded. Time to occurrence, risk factors, surgical management and long-term outcome of the HHE were analysed.

Results:

Seventy-eight patients (1,2%) operated for a HHE were reviewed. HHE appeared within 90 days in 17 patients (21.5%; emergency n=13); between 90 and 365 days in 20 patients (26,6%; emergency n=13), after the first year in 41 patients (51,9%; emergency n=17). HHE were more frequent and appeared earlier after laparoscopy (1,4%; mean time 525 ± 556 days) compared to laparotomy (0,73%; mean time 1024 ± 1231 days) ($p=0,03$; $p=0,02$ respectively). Surgical management of HHE included abdominal approaches for 54 patients (69%; laparotomy n=35, laparoscopy n=19) and transthoracic approaches for 24 patients (31%; thoracoscopy n=3, thoracotomy n=10, left thoracoabdominal n=11). Forty-three patients (55%) were managed in emergency and 9 patients required bowel resection through laparotomy. Postoperative complications occurred in 36 patients (46%). There was one death (1.2 %). A centre effect was observed in the management of HHE. Thirteen patients (16%) required revisional surgeries. During long-term outcome, 8 patients presented recurrences ranging from 6 days to 26 months. All of them previously had abdominal approaches. No recurrence was identified after transthoracic approaches.

Conclusion:

Majority of HHE develop within the first year and occur preferentially when laparoscopy is performed. Over 50 % of patients are in an emergency situation at diagnosis. HHE surgical management includes both abdominal approaches, especially when bowel resection is required, and transthoracic approaches resulting in better long-term outcome.

Disclosure: No significant relationships.

Keywords: esophagectomy, surgery, complications, diaphragmatic hernia



B-002

QUALITY CONTROL IN ANATOMICAL LUNG RESECTION. MAJOR POSTOPERATIVE COMPLICATIONS VS FAILURE TO RESCUE

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Objectives:

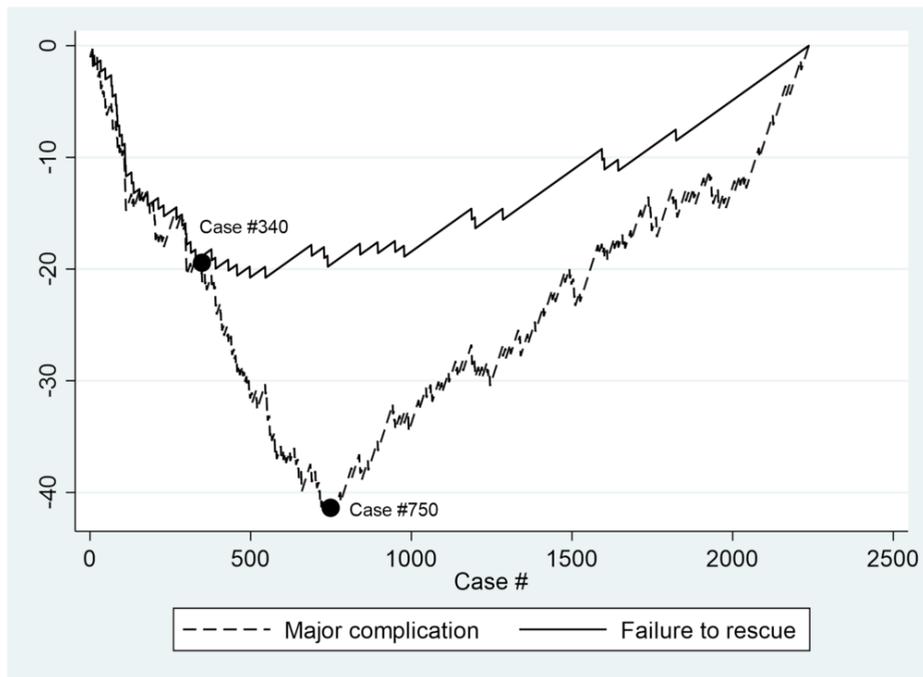
Failure to rescue can be defined by the number of deaths among patients experiencing major complications after surgery. This parameter has been proposed as a better marker for hospital performance. In this report we are proposing failure to rescue metric to be included as a routine parameter offered to members by the ESTS database and apply a CUSUM (cumulative sum control chart) methodology for monitoring performance in a large series of operated lung carcinoma patients.

Methods:

Prospectively stored records of 2237 consecutive cases undergoing anatomical lung resection in one single center were reviewed. Postoperative adverse events were coded according to the Clavien-Dindo systematic classification as a binary variable (major: IIIA to V, or minor complications: I and II score). The occurrence of 30-day mortality was recorded. Patients dying after suffering major complications were considered as failures to rescuing. Cases were arranged on time series in ascending order of their date of surgery and CUSUM graphs were constructed for major complications and failure to rescue. Points of plateauing or trend inversion were checked to detect intentional or non-adverted changes in the process of care.

Results:

Trending plots are shown in Figure 1. To note is the improvement in the postoperative process of patient care demonstrated by the decreasing occurrence of rescue failures after case #340 while improvement in the rate of major complications was delayed until case #750. Plateauing of the trending in rescue failure happened after reviewing and standardizing all postoperative medical therapies and the complication curve was reversed after implementing an intensive routine of physiotherapy.

**Conclusion:**

This methodology can be easily implemented in surgical practice allowing early detection of changes in team performance which can be correlated to variations in medical or nursing routines. Besides, failure to rescue offers a complementary view to classical outcomes (morbidity and mortality) for quality assessment in Thoracic Surgery.

Disclosure: No significant relationships.

Keywords: mortality, failure to rescue, hospital performance, lung cancer, surgery, morbidity



B-003

PREVALENCE AND RISK FACTORS FOR EPIDERMOID CARCINOMA DEVELOPMENT IN ACHALASIA PATIENTS

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Objectives:

Esophageal achalasia is a precancerous condition for epidermoid carcinoma; prevalence and risk factors for cancer development are not defined. Aim of the study was to determine these parameters.

Methods:

Since 1973 achalasia patients observed in the period 1955-2016 were periodically submitted to clinical assessment, barium swallow (esophageal diameter and residual barium column were measured), endoscopy, according to a prospective protocol. In this study we included patients with a minimum 12 months follow-up, endoscopy or radiology at the last control.

N	sex	Age at diagnosis of achalasia	Duration of achalasia symptoms	Diameter at diagnosis (cm)	Column at diagnosis (cm)	Treatment of achalasia AM: abdominal myotomy TM: thoracic myotomy HD:Heller-Dor PD: Pneumatic dilation M: medical therapy	Diameter at the last control (mm)	Column at the last control (cm)	Dysphagia at the last control	Age at diagnosis of cancer	Treatment for cancer
1	M	27	318	71	25	AM+AM	55	18	D2	45	esophagectomy
2	M	37	582	74	24	AM	45	11	D3	73	esophagectomy
3	M	39	575	68	24	AM	40	15	D3	73	esophagectomy
4	F	33	486	68	25	AM+AM+TM	41	14	D3	62	chemotherapy
5	M	34	572	90	14	HD	60	12	D3	66	chemotherapy
6	M	51	394	70	22	HD	40	6	D3	71	esophagectomy
7	M	56	280	95	32	AM+HD	75	15	D2	72	esophagectomy
8	F	45	428	72	23	AM	40	14	D2	65	esophagectomy
9	M	31	627	72	24	AM	41	14	D3	68	esophagectomy
10	M	56	362	72	22	AM	40	15	D3	60	chemotherapy
11	F	59	502	72	23	AM	40	14	D3	70	chemotherapy
12	M	45	339	72	24	PD	78	25	D2	54	esophagectomy
13	M	65	384	65	19	HD	63	16	D3	78	chemoirradiation
14	F	32	390	72	24	M	77	26	D2	48	esophagectomy
15	M	35	297	72	24	PD	79	27	D2	46	chemotherapy
16	M	9	792	72	24	AM	40	15	D3	67	esophagectomy
17	M	40	546	72	24	PD	79	25	D2	47	esophagectomy
18	M	51	288	65	28	HD	35	12	D3	61	esophagectomy

Results:

Five hundred and seventy-three of 681 cases were considered. The median follow-up was 147.13 months (IQR 70.42-257.82 months); 17 epidermoid, 1 carcinosarcoma were diagnosed (3.14%) (Table). At multivariate analysis esophageal diameter ($p<0.001$), residual barium column ($p<0.01$) and duration of dysphagia ($p<0.01$) were independent risk factors. Regression trees estimated that the risk of cancer development was higher for esophageal diameter >71 mm, residual barium column >23 cm and duration of dysphagia > 23.2 years. According to classification tree, patients with severe dysphagia at the last clinical-radiological control and sigmoid esophagus experienced a risk of epidermoid carcinoma development equal to 52.9%. Among 119 patients with sigmoid achalasia submitted to surgical myotomy, patients with severe dysphagia had higher residual barium column compared with patients with mild or no dysphagia (14 cm; IQR:11.5-16.5 cm VS 6.35 cm; IQR:5-13 cm) ($p<0.001$); epidermoid carcinoma was detected only in the first group ($p<0.001$).

Conclusion:

End-stage achalasia, dysphagia lasting longer than 22 years are risk factors for development of epidermoid cancer. Effective Heller myotomy can interrupt the carcinogenetic process in the presence of end stage achalasia. Patients, who overcome the risk parameters, should be offered esophagectomy or conservative treatment followed by strict endoscopic surveillance.

Disclosure: No significant relationships.

Keywords: endoscopic surveillance, esophageal diameter, residual barium column, duration of dysphagia, achalasia, epidermoid carcinoma.

B-004**TEN YEARS OF LUNG CANCER SCREENING EXPERIENCE IN GDANSK, POLAND - A COMPARATIVE STUDY OF DIAGNOSTIC WORK-UP AND SURGERY IN 11200 PARTICIPANTS OF TWO LUNG CANCER SCREENING PROGRAMMES**

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Objectives:

European Society of Thoracic Surgeons' recent recommendations confirm the advent of lung cancer (LC) screening implementation in Europe. Optimal inclusion criteria increase benefits and decrease harm caused by inappropriate medical interventions. In this study we compared two screening programmes performed in one center – Pomeranian Lung Cancer Screening Programme (PPP) and Moltest Bis (Moltest).

Methods:

Between 2009-2011, 8649 healthy volunteers (aged 50-75, smoking history >20 pack-years) entered PPP. Between January 2016-July 2017, 4645 healthy volunteers (aged 50-79, smoking history >30 pack-years) entered Moltest, which had narrower inclusion criteria, i.e. age and smoking history. Mid-results of Moltest are presented as it is still active. Participants with nodule diameter of >10mm or with suspected tumor morphology underwent diagnostic work-up.

Results:

LC was diagnosed in 107 (1.24%) PPP and 76 (1.64%) Moltest patients ($p=0.0599$). There were 300 (3.5%) PPP and 153 (3.3%) Moltest patients referred for further diagnostic work-up ($p=0.5967$). Surgical resection underwent 125 (1.5%) PPP and 50 (1.1%) Moltest patients ($p=0.0755$). Amount of resected benign lesions was similar – 44 (35%) PPP and 21 (42%) Moltest patients ($p=0.2511$). Lobectomies and segmentectomies were performed in 84% PPP and 81% Moltest LC patients ($p=0.6547$). Distinctly, Moltest patients more often underwent video-assisted thoracoscopic surgeries – 34 (68%) vs 30 (26%) of PPP ($p<0.0001$; OR:0.15 95%CI:0.07-0.31). Number of stage I non-small cell lung cancer (NSCLC) surgical patients is also higher in Moltest – 25 (86%) vs 64 (79%) of PPP ($p<0.0001$, OR:3.04 95%CI:1.64-3.62).

Conclusion:

Narrower inclusion criteria (upper age limit of 79, >30 pack-years) in the screening programme led to higher number of resected NSCLC early stages. High-volume medical centers with broad expertise in LC screening management increase indications for minimally invasive surgical approach.

Disclosure: No significant relationships.

Keywords: lung cancer, lung cancer screening, low-dose computed tomography, implementation, video-assisted thoracoscopic surgery, CT screening.



B-005

UNIORTAL VERSUS THREEPORTAL VIDEO ASSISTED THORACIC SURGERY LOBECTOMY: ANALYSIS OF THE ITALIAN VATS GROUP DATABASE

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Objectives:

The possible advantages of the uniportal on the threeportal videoassisted thoracic surgery (VATS) lobectomy are still to be determined. This study investigated this item within the Italian VATS Group Database. The primary endpoint was the early postoperative pain; secondary endpoints were intra and postoperative complications, conversion rate, surgical time, number of dissected lymphnodes, and length of stay.

Methods:

The study was a retrospective, cohort multicentre trial on data prospectively collected by 49 Italian thoracic units. Inclusion criteria were: clinical stage I-II NSCLC, uniportal or threeportal VATS lobectomy, R0 resection. Exclusion criteria were: cT3 disease, previous thoracic malignancy, induction therapy, connective tissue disease, peripheral vascular disease, dementia and diabetes mellitus with organ damage. Pain parameter was dichotomized: numeric rating scale (NRS) ≤ 3 described mild pain, whereas NRS score > 3 described moderate/severe pain; the generalized estimating equation (GEE) was used for statistical analysis.

Results:

Among 4338 patients enrolled in the Italian VATS Group Database from January 2014 to July 2017, 1980 entered the inclusion criteria; 1808 patients received threeportal lobectomy and 172 uniportal surgery. The two groups were homogeneous except age, Charlson index, PET SUV, and peridural catheter. On the 2nd and 3rd postoperative day the uniportal group odds ratios for moderate/severe pain were 2,54 (95% C.I. 1,81-3,56, $p < 0,001$) and 2,98 (95% C.I. 1,94-4,28, $p < 0,001$), respectively. Uniportal group had higher operative time ($p < 0,001$) and conversion rate ($p = 0,004$) but shorter length of stay ($p < 0,001$). This trial has limitations typically related to retrospective multicenter studies; moreover, the two cohorts were highly unbalanced.

Conclusion:

The analysis of the Italian VATS Group Database revealed that uniportal lobectomy had higher risk of moderate/severe pain on second and third postoperative day, higher conversion rate, longer surgical time but shorter length of stay. These results support the need for a randomized controlled trial.

Disclosure: No significant relationships.

Keywords: Italian VATS Group, VATS, uniportal, threeportal, lobectomy

B-006**TUMOR SIZE OF THYMOMA DETERMINES RECURRENCE-FREE AS WELL AS DISEASE-SPECIFIC SURVIVAL AFTER SURGICAL TREATMENT**

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Objectives:

TNM staging system for thymic epithelial tumors was adopted by UICC in 2016. Although T factor is defined by the invasive nature of thymoma, the size of tumor is not considered. The aim of this study is to examine the significance of tumor size using the nation-wide retrospective database in Japan.

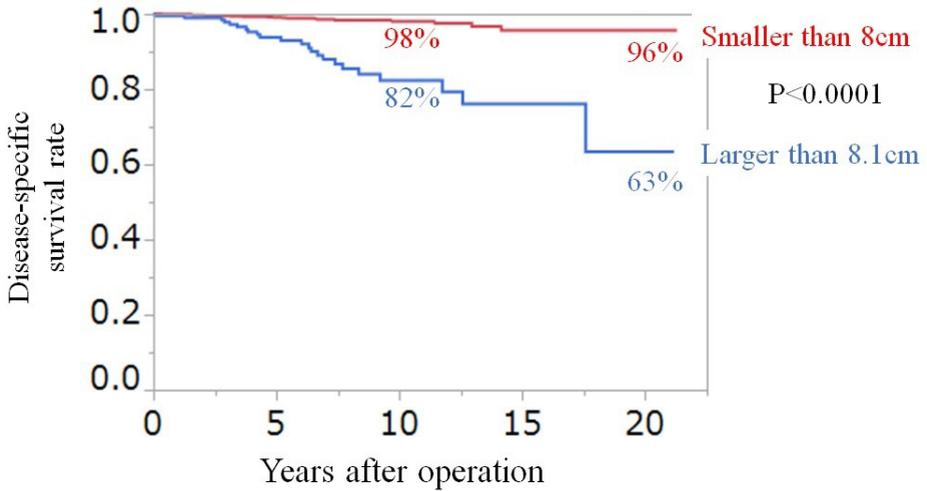
Methods:

Because preoperative chemotherapy or steroid can reduce thymoma, tumor size was evaluated by the maximum diameter of CT image prior to any kinds of treatment. The tumor size before treatment was available in 2267 patients and ranged from 0.6 to 19.4cm (average 5.2cm). Myasthenia gravis (MG) was associated in 557 patients. Harrell's C-index was adopted to determine the cut-off value of tumor size in every 0.5 cm.

Results:

WHO pathological type and stage defined by TNM				
	Group A	Group B	Group C	Total
WHO Type A	119	60	7	186
WHO Type AB	342	274	26	642
WHO Type B1	321	210	13	544
WHO Type B2	336	241	22	599
WHO Type B3	156	119	21	296
Total	1274	904	89	2267
Stage I	1113	638	37	1788
Stage II	20	16	0	36
Stage IIIA	92	133	24	249
Stage IIIB	3	9	0	12
Stage IVA	38	84	20	142
Stage IVB	7	12	4	23
Total	1273	892	85	2250

The highest value of C-index (0.7997) was obtained in terms of recurrence free survival after complete resection when the cut-off value was set at 5.0cm. The patients were classified into 3 groups, A: smaller than 5cm, B: 5.1 to 10cm, and C: larger than 10cm. The number of patients according to WHO histological type and the TNM stage are summarized in relation to the tumor size in Table. Tumor recurrence rate was 5%, 16%, and 36% in Group A, B, and C, respectively ($P < 0.0001$). Recurrence-free survival rate at 10 years after complete resection was 93%, 83%, and 78% in Group A, B, and C, respectively ($P < 0.0001$). The highest value of C-index (0.8654) was obtained in terms of disease-specific survival when the cut-off value was set at 8.0cm. Disease-specific survival according to size is shown in Figure. Tumor size, T definition, M definition, and WHO pathological type were independent factors for disease-specific survival while N definition, association with MG, and completeness of resection were not.

**Conclusion:**

Tumor size was suggested to be an important factor of T definition in TNM staging of thymoma.

Disclosure: No significant relationships.

Keywords: TNM stage, recurrence-free survival, disease-specific survival, WHO pathological type, myasthenia gravis, thymic epithelial tumor

**MONDAY, 28 MAY 2018****12:30 - 13:30****VIDEO I****V-007****SUTURE IT DOWN, MESH IT UP: THE WAY I DO IT**M.V. Pulle, Belal Bin Asaf, A. Kumar*Department of Thoracic Surgery, Sir Ganga Ram Hospital, New Delhi, India***Objectives:**

Diaphragmatic eventration is an uncommon clinical condition characterized by significant elevation of a hemi-diaphragm which can cause dyspnea. Minimally invasive methods such as laparoscopy, thoracoscopy and robotic methods carries the advantages of less postoperative pain and shorter hospitalization. However, laparoscopic and Thoracoscopic methods had technical difficulty particularly in suturing due to limited working space posed by rib cage. Surgical Robot overcomes these difficulties with advantages of better 3D vision and improved dexterity. Here in, we describe our experience with robotic plication through abdominal approach for the treatment of diaphragmatic eventration.

Video Description:

Our patient is an elderly lady with history of progressive dyspnea for eight months. The patients were positioned supine, with a single-lumen endotracheal tube. Patients are positioned in reverse Trendelenburg position with split legs. Abdominal ports are placed as depicted in the video. A 5-mm defect was created in the diaphragm so that the lung partially collapsed and the diaphragm relaxed into the operative field. The robot was docked. First, plication of central tendon was done using 2-0 prolene suture followed by imbricating sutures between tendinous and muscular diaphragm. Then the placating sutures are placed laterally with 2-0 prolene suture in horizontal mattress fashion. Plication continued laterally till the insertions of diaphragm. The same procedure was continued medially from central tendon. We incidentally found a Morgagni defect which was closed with V lock sutures. Morgagni defect and left diaphragm were reinforced with mesh. Hemostasis ensured.

Conclusions:

The robotic system offers improved operative ergonomics with better instrument dexterity, which is particularly helpful during suturing. An abdominal approach obviates the need for single-lung ventilation, facilitate exposure, and allow more precise placement of plication sutures to achieve an even tension and maximum plication. In our experience, Robotic assisted diaphragmatic plication is safe, feasible and effective method.

Disclosure: No significant relationships.**Keywords:** diaphragm, eventration, robotic plication.

V-008

ROBOT ASSISTED COMPLEX SEGMENTECTOMY FOR LUNG CANCER LOCATED IN THE SEGMENT 3: SIMPLE WAY TO IDENTIFY INTERSEGMENTAL PLANE WITH INTRAOPERATIVE AIR INJECTION THROUGH BRONCHUS

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Objectives:

Robot-assisted thoracic surgery (RATS) is a new modality for minimally invasive lung resection and have some advantages in terms of better maneuverability of instruments and three-dimensional high-definition view. However, the experience of robotic lung segmentectomy is limited. We experienced a case of right S3 segmentectomy with RATS. A 56 year old man was referred to our department because pulmonary nodule was pointed out in medical checkup. Chest computed tomography showed the abnormal shadow which was 7 x 6 mm in size, located in segment three of the right upper lobe. The lymph nodes were not swelling. clinical diagnosis was suspicious of lung cancer and clinical stage was TisN0M0 stage0. We performed right S3 segmentectomy with RATS. Operative time was 220 minutes and blood loss were 8cc. The postoperative complication was not obtained. He was discharged at three postoperative day.

Video Description:

Robotic surgery could provide capabilities of dissection for smaller vessels around the lymph nodes and segmentary bronchus, vein and artery. On the other hand, the major difficulty in RATS segmentectomy is the resection without palpation. Particularly in small nodule, the position of the nodule is unknown during surgery. We overcame by performing accurate segmentectomy for air injection to the segmental bronchus.

Conclusions:

Robotic anatomic segmentectomy surgery has not only an advantage of minimally invasive surgery but also an additional advantage of three-dimensional vision and facilitates precise anatomic dissection.

Disclosure: No significant relationships.

Keywords: segmentectomy, surgery, lung cancer, RATS



V-009

FLUORESCENT GUIDED THORACOSCOPIC LUNG SEGMENTECTOMY FOR GROUND GLASS LESION WITH INTRAOPERATIVE ELECTROMAGNETIC NAVIGATIONAL BRONCHOSCOPY AND INDOCYANINE GREENK.N. Han, Hyun Koo Kim, K. Lee, Y.H. Choi*Thoracic and Cardiovascular Surgery, Korea University Guro Hospital, Seoul, Republic of Korea***Objectives:**

VATS resection of small pulmonary nodule or nonpalpable ground glass lesion is challenging. In this video, we performed image-guided single port VATS wedge resection following segmentectomy for indeterminate ground glass lesion with intraoperative dye localization by electromagnetic navigational bronchoscopy (ENB).

Video Description:

We planned a VATS wedge resection for 1-cm sized ground glass lesion in 73-year old male under ENB-guided localization with ICG dye and lipiodol. Potential diagnosis was non-small cell lung cancer. Under general anesthesia with single lumen intubation, we performed ENB guided localization with fluorescent dye to identify the pleural location and deep resection margin. After position change to right lateral decubitus, image-guided VATS wedge resection was performed under NIR surgical system and C-arm. The frozen pathology was adenocarcinoma, so we converted to segmentectomy. We performed intravenous injection of ICG to identify the intersegmental plane.

Conclusions:

Our ENB technique for localization using ICG and radiocontrast might be beneficial for dual check both of pleural location and deep resection margin.

Disclosure: No significant relationships.

Keywords: segmentectomy, electromagnetic navigational bronchoscopy, ground glass lesion

V-010

SUCCESSFUL ENDOSCOPIC MANAGEMENT OF LEFT SUBCLAVIAN ARTERIAL INJURY AT THE THORACIC OUTLETLin Ma*Department of Thoracic Surgery, West China Hospital, Sichuan University, Chengdu, China***Objectives:**

Uncontrollable hemorrhage caused by vascular injury is an important reason for conversion to thoracotomy during thoracoscopic lung surgery. The management of intro-operative subclavian arterial injury at thoracic outlet has been rarely reported.

Video Description:

Severe adhesions were found between the left upper lobe and thoracic outlet. An accidental injury happened when dissecting the adhesions. We tried to repair the injury using a three-portal approach after clamping the proximal of the subclavian artery with a releasable endoscopic bulldog clamp, and the “suction-compressing angiorrhaphy technique” was applied to control the bleeding. However, we loss the point and the direction of suturing neither from the utility port in the 3rd ICS nor the assistant port in the 9th ICS due to the limited space at thoracic outlet. The bleeding volume was unacceptable because we failed to control the distal portion of the artery. We used an endoscopic atraumatic vascular clamp from assistant port in the 9th ICS to clamping the rupture directly, but it was still a tough suture and we failed to repair the rupture completely. So another assistant port was made at the posterior axillary line in the 7th ICS to perform the suture, the laceration was sutured by pledgetted 4-0 Prolene successfully. Released the bulldog clamp, and there was no active bleeding. The last picture showed the x-ray film in the postoperation day 1 and day 6, and the ports design.

Conclusions:

Our video proofed that appropriate strategy could be applied to deal with the high pressure arterial injury at the thoracic outlet during the thoracoscopic surgery. Control the proximal artery could decrease the bleeding but it is not enough to stop it. If failed to control the distal part, clamping the rupture directly is a safe alternative, and add another appropriate port to complete suture is the key point.

Disclosure: No significant relationships.

Keywords: subclavian artery, hemorrhage, vats, thoracic outlet



V-011

INDOCYANINE GREEN (ICG) FLUORESCENCE-NAVIGATED THORACOSCOPIC RIGHT S9+10 SEGMENTECTOMY FOR INTRALOBAR SEQUESTRATION WITH CONGENITAL DIAPHRAGMATIC HERNIA

Mingyon Mun, M. Nakao, Y. Matsuura, J. Ichinose, K. Nakagawa, S. Okumura
Thoracic Surgical Oncology, Cancer Institute Hospital of JFCR, Tokyo, Japan

Objectives:

Intralobar sequestration in the right side is rare. I experienced a case of right side intralobar sequestration with diaphragmatic hernia. An abnormal artery in the sequestration was coming from celiac artery, and it was very closed to diaphragmatic hernia. I would like to show you our technique of ICG fluorescence navigated thoracoscopic right S9+10 segmentectomy for intralobar sequestration with diaphragmatic hernia.

Video Description:

VATS right S9+10 segmentectomy was conducted by four port VATS. There were severe adhesion between lower lobe and hernia sac. So, hernia sac was opened to avoid liver injury. Abnormal artery was ligated at the proximal side to decrease the pressure of the cutting edge and divided using a vascular stapler at the peripheral side. Regarding intralobar sequestration, segmental bronchus sometimes does not continue to the peripheral lung, so it is difficult to make inflation-deflation line when we confirm the intersegmental plane. Nowadays, we use the indocyanine green (ICG) fluorescence-navigated method to confirm the intersegmental plane based on segmental artery. In this particular patient, it was very useful. After dividing A9+10, ICG 0.25 mg/kg was injected intravenously, soon after injection, we could see the intersegmental border (S9+10 were dark, other segment were lighting) and put some markings. At first, I divided the lung parenchyma between S6 and basal segment. So, the B10 and B9 could be exposed easily. And then the second ICG was injected, and I put some markings between S9+10 and S7+8. After dividing V9+10 branches, finally, lung parenchyma was divided along these markings. S6 and S8 were fixed by a suture to prevent the distortion. Defect area of the diaphragm was repaired using a patch.

Conclusions:

Indocyanine green fluorescence-navigated thoracoscopic right S9+10 segmentectomy for intralobar sequestration with diaphragmatic hernia was safely performed.

Disclosure: No significant relationships.

Keywords: diaphragmatic hernia, ICG fluorescence, vats, segmentectomy, sequestration

V-012

ROBOTIC SEGMENTECTOMY AIDED BY LOCAL AND INTRAVENOUS INDOCYANINE GREEN

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²*Thoracic Surgery Department, Hôpital Nord APHM, Marseille, France*

³*Cardiothoracic Surgery, New York University (NYU) Langone Medical Center, New York, United States of America*

Objectives:

The diagnosis of subcentimetre pulmonary nodules increased and, subsequently, the number of sub-lobar resections. We aim to demonstrate the efficacy of indocyanine green (ICG) at nodule location, at identifying regional lymph nodes and, administered intravenously after devascularization, at defining the pulmonary segmental anatomy in order to perform a sub-lobar resection.

Video Description:

A 79-years-old lady was diagnosed with a left upper lobe posterior segment T1a (9mm) N0M0. She was offered surgery but nothing more than a segmentectomy was affordable. In the operating room, the patient underwent navigational bronchoscopy through single lumen intubation. The ICG was injected near the lesion. Subsequently, the patient was selectively intubated and laterally positioned. The robotic four arms techniques and the ports placement are showed: over the ninth rib, the 4th arm hosted a curved up grasper, bipolar dissector was used in arm 3, arm 2 was the camera and arm 1 was used for Cadere forceps and staplers. The lesion was confirmed by the ICG fluorescence in the left upper lobe posterior segment. After 15 minutes, the fluorescence moved from the lung parenchyma to the hilum and identified the regional lymph nodes. Eleven lymph nodes were fluorescent, and the arterial branches for the posterior segment were now easily identified. After resection of the two segmental arteries, the anesthesiologist injected ICG intravenously and we observed the fluorescence progressing into the pulmonary parenchyma. Thereby, a net delimitation appeared between the posterior segment and the rest of the left upper lobe, which was fluorescent. A clear parenchymal division line was identified. The procedure is completed with stapler slightly proximal to this line to ensure clearance of the resection margin.

Conclusions:

The robotic camera provides near-infrared imaging which displays ICG fluorescence. This can facilitate the lesion's location, identify regional lymph nodes and offers real time segmental anatomy demarkation, as demonstrated in the video.

Disclosure: R.J. Cerfolio: Commercial ties with Intuitive, Neomend, Precision, Bovie, CSATS, CHS, Ethicon, and Covidien. No research grant for this work.

Keywords: sub-lobar resection, segmentectomy, robotic thoracic surgery, MITS, navigational bronchoscopy, indocyanine green

MONDAY, 28 MAY 2018**13:30 - 14:30****PULMONARY NON-NEOPLASTIC****O-013****PULMONARY ACTINOMYCOSIS IN THE 21ST CENTURY – A MULTINATIONAL STUDY FOCUSING ON CURRENT DIAGNOSIS AND TREATMENT OF PULMONARY ACTINOMYCOSIS.**

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¹*General, Thoracic and Vascular Surgery, University Hospital Dresden, Dresden, Germany*

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Objectives:

Pulmonary actinomycosis is an uncommon chronic bacterial infection caused by anaerobic bacteria. It is often confused with other suppurative conditions and particularly with lung cancer. As most studies are at least some decades old, we aimed to analyse the current pattern of disease in the 21st century.

Methods:

In a retrospective study we identified all patients with pulmonary actinomycosis at 5 tertiary referral hospitals in Canada, Bulgaria and Germany between 2000 and 2017. Demography, presence of risk factors, comorbidity, clinical presentation, diagnostic measures, treatment and outcome were analysed.

Results:

There were 30 patients (25 men; mean age 54 years). Clinical symptoms were cough (17), haemoptysis (6), weight loss (12), chest wall infiltration (6), fistulisation through the chest wall (6) and septic disease (3). Radiographic findings were tumour-like mass-lesion (13), cavity (4), lung abscess (6) and pleural empyema (4). FDG-PET was positive in 4 cases with tumour-like mass-lesion. Common risk factors were alcoholism (11), smoker (15), COPD (11) and dental disease (8). Extrapulmonary manifestations were rare (2/30). The mean Charlson-index-of-comorbidity-score was 2,13. Diagnosis was obtained via bronchoscopy (12), CT-guided biopsy (3) and surgery (15). Patients with tumour-like lesion needed significantly more frequently surgery to obtain diagnosis (OR: 7.38; 95% CI: 1.22-60.99; p=0.02), were more often smokers (OR: 15.73; 95% CI: 2.18-205.60; p=0.02) and had a higher rate of lobectomy (OR: 22.91; 95% CI: 1.92-1348.01; p=0.01). There were no significant differences in mortality (p=1) and disease free at last consultation (p=0.71) between operative and non-operative patients.

Conclusion:

As clinical appearance, risk factors and typical comorbidity of pulmonary actinomycosis and lung cancer are very similar, distinction between tumour-like lesion of the lung caused by actinomycosis and lung cancer is extremely challenging. FDG-PET is not helpful. In cases of tumour-like lesion surgery is the mainstay to rule out lung cancer.

Disclosure: No significant relationships.

Keywords: tumour-like lesion, chest Infection, infectiology, actinomycosis.

O-014

NINETY DAYS HOSPITAL COSTS FOLLOWING ANATOMIC LUNG RESECTIONS

Alessandro Brunelli¹, A. Crockatt², N. Chaudhuri¹, E. Kefaloyannis¹, R. Milton¹, K. Papagiannopoulos¹, P. Tcherveniakov¹, V. Bassi²

¹*Thoracic Surgery, St. James's University Hospital, Leeds, United Kingdom*

²*Finance and Costing, St James's University Hospital, Leeds, United Kingdom*

Objectives:

To assess the total (TC) and relative (RC) 90-day postoperative hospital costs after anatomic lung resection and to identify factors associated with them.

Methods:

Six hundred and forty lung resections (April 2014-September 2016) performed in a single centre (547 lobectomies, 55 pneumonectomies, 38 segmentectomies). **TC** was calculated up to 90 days from the date of surgery and included the postoperative cost of the index hospitalization and the costs of hospital or emergency department re-admissions, clinic appointments, medications, radiology post-discharge up to 90 days from the operation. **RC** was calculated as the difference between TC and the postoperative cost of the index hospitalization. TC and RC of different operations were compared using ANOVA test. Bivariate comparisons were performed by using Mann-Whitney test. Multivariable regression analysis was used to identify factors associated with TC.

Results:

Median TC was €9,032.2 (IQR 6777-16974) after open lobectomy, €7,794.5 (IQR 5705-12476) after VATS lobectomy, €12,174.1 (IQR 8308-22642) after pneumonectomy and €6,494.0 (IQR 5124-13665) after VATS segmentectomy (ANOVA, $p < 0.0001$). Median RC was €3,269.0 (IQR 1598-8127) after open lobectomy, €2,681.8 (IQR 1324-6203) after VATS lobectomy, €4,383.8 (IQR 1219-11622) after pneumonectomy and €2,723.3 (IQR 1207-9536) after VATS segmentectomy (ANOVA test, $p = 0.008$). 50 VATS patients (11%) were converted to open lobectomy. Their TC was €4,000 higher than non-converted VATS ones (€11,432.2 vs. €7,505.9, $p = 0.001$). Their RC was also higher than non-converted patients (€3,725.9 vs. €2,591.1, $p = 0.054$). RC accounted for 36% of TC cost after pneumonectomy, 36% after open lobectomy, 34% after VATS lobectomy, and 42% after segmentectomy. Multivariable regression analysis showed that age ($p = 0.001$), DLCO ($p = 0.012$) and BMI ($p = 0.027$) were inversely associated with TC, whereas male sex ($p = 0.005$) was associated with increased cost.

Conclusion:

RC accounts for one third of the TC. Cost-saving measures should be implemented to target not just the in-hospital but also the post-discharge period particularly in patients with risk factors associated with increased cost.

Disclosure: No significant relationships.

Keywords: risk modelling, hospital cost, lung resection.

O-015

DYNAMIC MAGNETIC RESONANCE IMAGING (MRI) AS OUTCOME PREDICTOR FOR LUNG VOLUME REDUCTION SURGERY

K. Martini¹, Claudio Caviezel², D. Schneiter², G. Milanese¹, I. Opitz², W. Weder², T. Frauenfelder¹
¹*Diagnostic and Interventional Radiology, University Hospital Zürich, Zurich, Switzerland*
²*Thoracic Surgery, University Hospital Zurich, Zurich, Switzerland*

Objectives:

Lung volume reduction surgery (LVRS) improves lung function, dyspnea and even survival in carefully selected emphysema patients. Despite rigorous and well-accepted inclusion criteria, the pre-operative prediction of responders is still an issue. We hypothesize a significant correlation between parameters of pre-operative dynamic MRI (dMRI) and postoperative outcome, measured by pulmonary function tests (PFT).

Methods:

In this prospective clinical trial, dMRI was performed on a 3T-MRI-scanner obtaining dynamic sequences of the lung during two breath-cycles the day before and three months after surgery, herein termed as pre- and post-LVRS-MRI. Quantitative measurements were performed on sagittal planes in pre- and post-LVRS-MRI at fully expiration: lung anteroposterior (AP) diameter, lung area and lung perimeter. Measured parameters were normalized by division through patient-height. Additionally, all patients underwent PFT pre- and post-LVRS. The cut-off value for an excellent treatment-benefit after LVRS was defined as a 30% increase of forced expiratory volume in one second (FEV1%).

Results:

Thirty-nine consecutive patients (15 females, median age 61 years) with all types of emphysema morphology underwent LVRS and were included in the study. On expiration, mean lung area on both sides ($p_{\text{right}}=0.001$ and $p_{\text{left}}=0.016$) as well as AP-diameter ($p=0.003$) and lung perimeter ($p<0.001$) for the right lung together with evaluated PFT parameters ($p<0.001$) improved significantly in patients undergoing LVRS. Considering the 30% cut-off for treatment-benefit, LVRS benefit and non-benefit groups showed significant differences in normalized total lung area ($p=0.016$). Receiver operating curves (ROC) analysis indicated normalized total lung area as the most sensitive pre-operative outcome predictor for a 30% increase in FEV1% with a sensitivity of 86% and a specificity of 61% when height-normalized expiratory lung area is $>35793\text{mm}^2$.

Conclusion:

Pre-operative dMRI parameters can be used as additional outcome predictor for patient selection in LVRS. A height-normalized total lung area in expiration $>35793\text{mm}^2$ correlates with a 30% increase in FEV1%.

Disclosure: No significant relationships.

Keywords: outcome prediction, LVRS, lung volume reduction surgery, dynamic MRI.



O-016

DIFFERENT DOSES OF RECOMBINANT TISSUE PLASMINOGEN ACTIVATOR FOR ACUTE PULMONARY EMBOLISM IN PATIENTS UNDERWENT LUNG CANCER SURGERY: A SINGLE-CENTER EXPERIENCE.Yuping Li*Department of General Thoracic Surgery and Thoracic ICU, Shanghai Pulmonary Hospital, Shanghai, China***Objectives:**

Recombinant tissue plasminogen activator (rt-PA) is currently the most commonly used thrombolytic therapy for pulmonary embolism (PE). However, there are very few data on treatment of acute PE after thoracic surgery. This report is the results of our thrombolytic therapy, as well as our attempts to identify optimal dosing of a favorable outcome.

Methods:

Retrospective analysis of intravenous thrombolysis for acute PE after thoracic surgery using different dosage of rt-PA (December 2013-August 2017) was performed. The efficacy was determined by observing pulmonary artery obstructions on CT angiograms and improvement of hemodynamic parameters. The adverse events, including death and bleeding were also evaluated. The patients included 11 men and 9 women with a mean age of 64 years.

Results:

Twenty patients receiving rt-PA thrombolytic therapy were stratified to high-dose group (≥ 50 mg, n=9), and low-dose group (0.6mg/kg, n=11). Seven patients (7/9, 77.8%) in high-dose group suffered from major bleeding after thrombolysis. One of them suffered from fatal bleeding despite blood transfusions. A total of three major bleeding complications still occurred in low-dose group, none of which were classified as fatal bleeding. Although there were no significant differences in mortality rate between the two groups during hospitalization ($P > 0.05$), the patients in high-dose group had an extremely high mortality rate (6/9, 66.7%) which is unacceptable for surgeons.

Conclusion:

After four years of practice, our institution has produced results that low dose rt-PA (0.6 mg/kg body weight) was superior to high-dose rt-PA (≥ 50 mg) in preventing major bleeding events and remained similar efficacy. Low-dose prolonged infusion did not always dissolve the embolism completely, but it indeed stabilized the hemodynamic parameters and attenuated the myocardium injury by partly successful reperfusion. Low-dose prolonged infusion of rt-PA may be an effective optional choice for the critical PE patients with thrombolytic contraindications.

Disclosure: No significant relationships.

Keywords: recombinant tissue plasminogen activator, pulmonary embolism, thrombolysis.

O-017

EARLY EXERCISE PULMONARY DIFFUSION CAPACITY OF CO AFTER ANATOMICAL LUNG RESECTION. A WORD OF CAUTION FOR FAST-TRACK PROGRAMS

Nuria Novoa, M.T. Gomez, M. Fuentes, J.L. Aranda, I. Rodriguez, M. Jimenez
General Thoracic Surgery, University Hospital of Salamanca, Salamanca, Spain

Objectives:

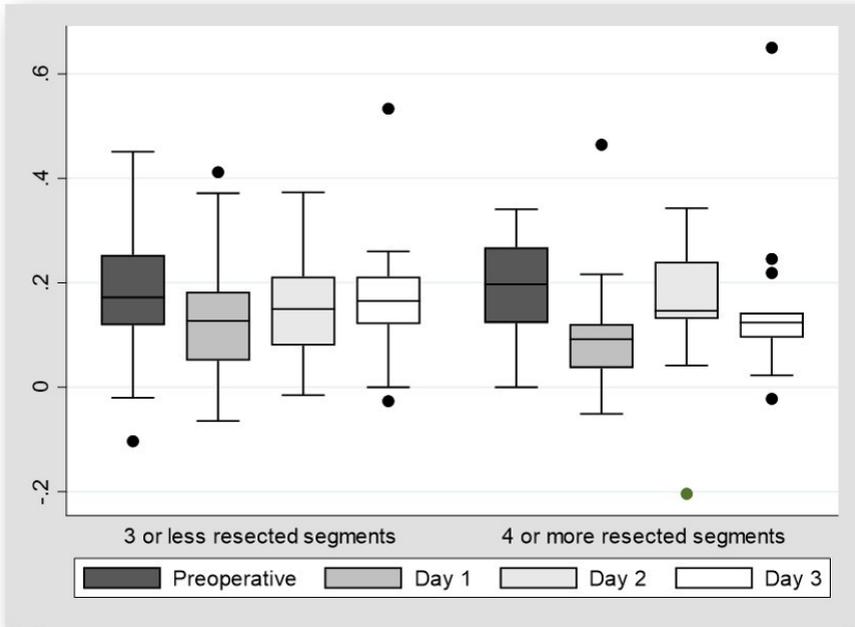
In healthy individuals, increasing pulmonary blood flow during exercise increases also DLCO. Fast-track programs in lung resection are promoted facilitating patients' early discharge and decreasing costs. We hypothesise that the increase of DLCO in exercise is impaired in the early postoperative period. This could represent an unexpected risk of pulmonary complications if the patient is discharged too early. We aimed to measure changes in exercise DLCO along the three first days after lung resection.

Methods:

Prospective observational study. Consecutive lung cancer patients scheduled for VATS anatomical resection (excluding pneumonectomy) in a six month period underwent DLCO measure-by single breath technique adjusted by Hb concentration- before and after standardised exercise the day before and three consecutive postoperative days. Delta (Δ) variation (basal vs exercise) was calculated. Postoperative pain and pleural air leak were measured by analogical visual scale (AVS) and conventional pleural drainage systems, respectively, and its influence on Δ DLCO each postoperative day evaluated by linear regression analysis. Local ethics committee accepted the study (PI 10310/2017)

Results:

Fifty patients (43 lobectomy) were included. Six cases were unable to complete the test the first day, two the second and three the last day. Causes: pain, atrial fibrillation and orthostatic hypotension. AVS and pleural air leak were not correlated to Δ values (model R^2 : 0.0048). Figure 1: evolution of Δ values along 3 postoperative days, according to the number of resected segments (up to 3 or more than 3). Although there is a progressive recovery of values, DLCO capacity in exercise is impaired, more importantly, in patients who underwent a resection of more than 3 functioning segments.



Conclusion:

Physiologic increase in DLCO during exercise is still impaired on the 3d postoperative day in patients undergoing resection of more than 3 functioning pulmonary segments. This fact should be considered before discharging those patients.

Disclosure: No significant relationships.

Keywords: DLCO postexercise measurement, postoperative cardio-pulmonary complications, anatomical lung resection, fast-track program.

O-018

LUNG VOLUME REDUCTION BY STEREOTACTIC RADIOTHERAPY: EARLY RESULTS OF AN INVESTIGATOR-INITIATED PHASE I/II CLINICAL TRIALJoseph Shrager¹, M. Diehn², M. Binkley², B. Loo²¹*Cardiothoracic Surgery, Division Thoracic Surgery, Stanford University School of Medicine, Stanford, CA, United States of America*²*Radiation Oncology, Stanford University School of Medicine, Stanford, CA, United States of America***Objectives:**

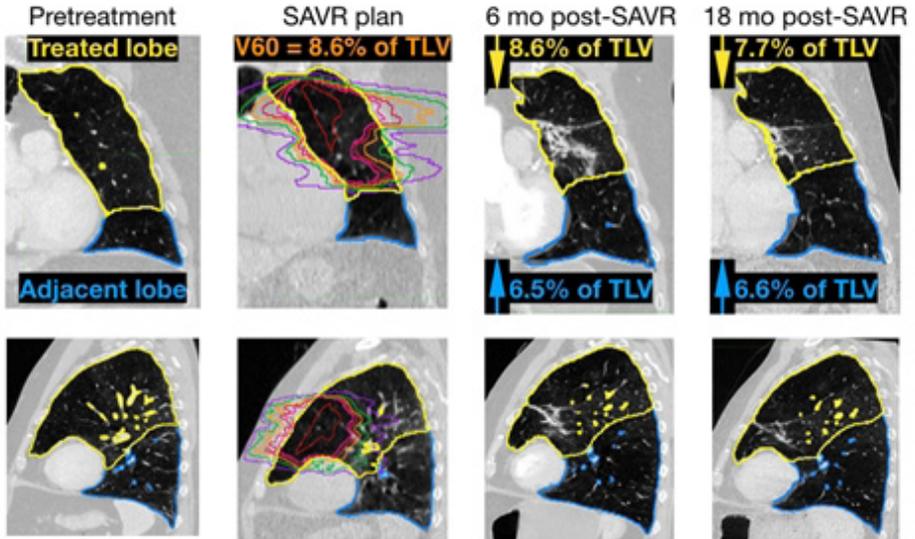
Although LVRS is supported by randomized data, many patients do not meet strict, NETT criteria for the operation. Bronchoscopic approaches have been disappointing. Stereotactic radiotherapy has been expanding its areas of application into benign diseases. We hypothesized that stereotactic radiotherapy might provide a novel means to create targeted volume reduction (Stereotactic Ablative Volume Reduction - "SAVR") and improve dyspnea in hyperexpanded emphysema patients who cannot undergo LVRS.

Methods:

IRB-approved, prospective clinical trial attempting unilateral volume reduction in 10 patients. Inclusion criteria were broader than those required for LVRS in USA (allowing DLCO>18%, lower lobe disease, prior surgery). Radiation targets included 45 Gy in 3 fractions to the center of the most emphysematous region, with the remainder (under 10% of total bilateral lung volume [TLV]) receiving 20Gy. Outcomes included PFTs, 6MWT, dyspnea questionnaire, and CT-measured lung volume changes.

Results:

Seven subjects have been treated. Post-treatment CTs (n=7) showed mean volume reduction in the treated lobe 4.4% of TLV (SD 3.3%, p = 0.01). PFT and subjective improvement occurred in 4 (67%) and 3 (50%) of subjects, respectively. Mean clinical outcomes across all subjects (n=6) showed only a trend toward statistically significant improvements (p=0.16). However, among the 4 improved subjects, there was a strong trend towards increased maximal post-treatment FEV1 (0.88 ± 0.28 baseline vs. 1.12 ± 0.44 post-treatment, p=0.07), representing a mean increase in FEV1 of 27%. Among the 4 subjects with improved FEV1, mean volume reduction in the treated lobe was 6.6% of TLV (SD = 1.9%, p = 0.03) (IMAGE: treatment plan/ results in one subject). One subject died of respiratory decompensation deemed possibly related to the treatment.



Monday P.M.
Abstracts 007 - 042

Conclusion:

We report encouraging preliminary results with SAVR in non-candidates for LVRS. Results from the entire 10-patient cohort will be required to confirm. If confirmed, then randomized study with bilateral treatment, perhaps in homogeneous emphysema, will be appropriate.

Disclosure: J. Shrager: Funding for this clinical trial received from Varian, Inc.

J. Shrager: Use of stereotactic radiotherapy for treatment of emphysema.

M. Diehn: I received research funding for this clinical trial from Varian, Inc.

All other authors have declared no conflicts of interest.

Keywords: emphysema, lung volume reduction surgery, stereotactic radiotherapy, chronic obstructive pulmonary disease

MONDAY, 28 MAY 2018**14:30 - 15:40****MTIG VATS RESECTION****O-019****ENERGY IN VIDEO-ASSISTED THORACOSCOPIC SURGERY (VATS) LOBECTOMY: MULTICENTRIC RANDOMIZED STUDY COMPARING ADVANCED BIPOLAR, ULTRASONIC AND COMBINED ENERGY DEVICES**Patrick Bagan¹, P. Berna², A. Fourdrain², R. Zaimi¹, B. Dakhil¹¹*Thoracic and Vascular Surgery, Victor Dupouy Hospital, Argenteuil, France*²*Department of Thoracic Surgery, Amiens University Hospital, Amiens, France***Objectives:**

An essential part of VATS lobectomy is dissection, hemostasis and lymphostasis. Nowadays, various different electro-surgical devices are available. This prospective study was designed to highlight differences between energy sources in performing in vivo comparison of three modern energy systems with respect to safety and efficacy.

Methods:

Patients admitted for VATS Right Upper Lobectomy (RUL) for cancer in two surgical centers were prospectively randomized into three groups according to the energy used. RUL were performed with scissors, delivering ultrasonically frictional heat energy and bipolar heat energy (Thunderbeat®, group TB), with ultrasonic scissors (Harmonic ACE 7®, group HA) and with advanced bipolar device (LigaSure Maryland®, group LSM). Study endpoints were sealing capability in comparing postoperative drainage duration with digital monitoring drainage system and the cutting speed in comparing time for radical lymph node dissection following lobectomy. Post-operative complications and devices cost were also investigated.

Results:

Fifty-nine participants (61 % male) with a mean age of 65.9 +/- 18 years were assigned to TB (n = 19), HA (n = 20) and LSM (n= 20) groups. All the study groups were similar in terms of age, pulmonary function. There was no mortality in either group. TB showed a significant reduction in duration for lymph node dissection versus the HA and LSM devices (25.9 mn vs 33.8 and 34.1; p=0.002 and p=0.0019 respectively). HA showed a significant reduction in drainage duration versus TB and a similar duration to LSM (3.6 days vs 5.2 and 4.3; p=0.049 and p=0.09 respectively). The pulmonary complication rates were similar in the 3 groups (ranging from 12.5 % to 15%). Device costs were 425, 479 and 510 euros for TB, HA and LSM, respectively.

Conclusion:

In summary, we observed that Thunderbeat® is the fastest system for dissection with the lowest cost. Harmonic® is the more efficient in term of sealing capability.

Disclosure: No significant relationships.**Keywords:** VATS lobectomy, energy source, prospective study.



O-020

THE VERY EXPERIENCED TIME – HONOURED SURGEONS (VETUS) METHOD: A SELF-ASSESSMENT EVALUATION FOR SENIOR SURGEONS APPROACHING VATS LOBECTOMIES

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²*Department of Thoracic Surgery, University College London Hospital, London, United Kingdom*

³*Division of Thoracic Surgery, University of L'Aquila, Mazzini Hospital, Teramo, Italy*

⁴*Division of Thoracic Surgery, Istituto Nazionale Tumori, IRCCS-Fondazione G. Pascale, Napoli, Italy*

Objectives:

VATS lobectomies(VL)are performed in relatively lower numbers due to variability in clinical practice and presence of subjective bias. In VL learning-curve,self-assessment is contemplated to favour exposure of surgeons to technique. In Europe, educational attention to senior-thoracic-surgeons (i.e., independently in practice >10-years) is lacking due to absence of defined pathways. VETUS is a self-assessment method applied by Italian-VATS-group to facilitate approach of senior-surgeons to VL. This pilot-study is meant to understand:feasibility,reproducibility and reliability of VETUS.

Methods:

VETUS is 6-targets global-self-assessment-rating-scale (Table-1a) for independent-and-anonymous performance and progress evaluation of senior-surgeons following a VL one-year approach. Targets are scored using Likert scale with anchors at -1,3 (-1,0,1 not compliant, 2,3 compliant). Total is sum of each of 6-targets-scores. In 1-year, up-to-now 100-participants, at predefined time-intervals, evaluated their performances regarding targets. Internal-Consistency of VETUS-targets was estimated using Cronbach's-alpha, calculated for datasets corresponding to each participating surgeon (rater). Interclass-Correlation-Coefficients(ICC) were used to assess VETUS Interrater-Reliability of target checklist on each of 6-targets through variance components from 1-way random-effect-model (assumption: raters randomly selected from larger population). Construct validity of VETUS was assessed by comparing groups-performances. For each variable, group-means were compared using Student's-t-tests when normal distribution was anticipated. Because null-hypothesis of normality was rejected for some variables, Mann-Whitney-U-test and Pareto-Anaysis were also performed.

Results:

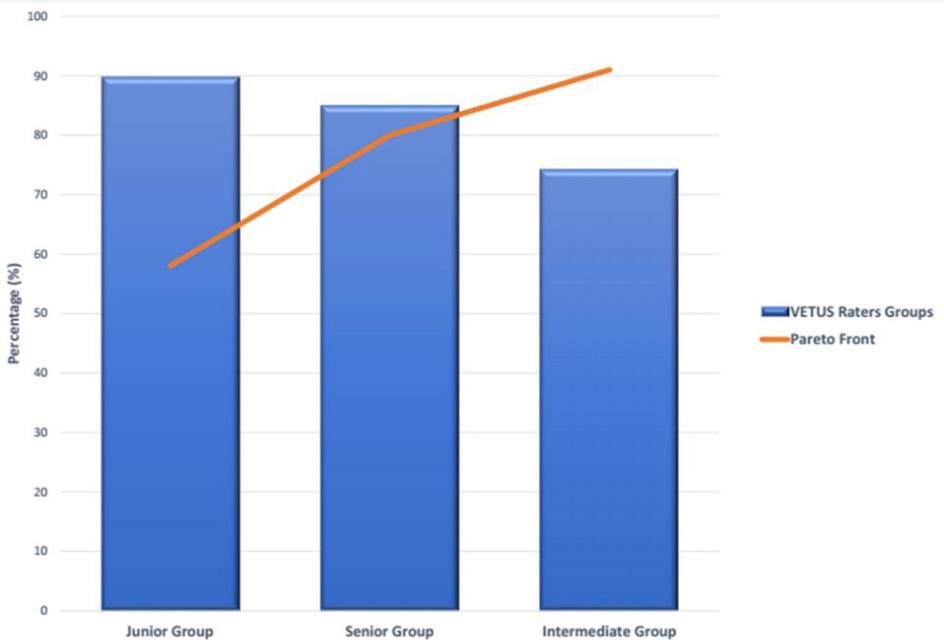
Are showed in Table-1b. VETUS-mean total scores do not significantly differ between groups. VETUS Internal-Consistency was excellent (Cronbach's-alpha range:0.85–0.97). Each target highly correlated with total-score. Internal-Consistency was not improved by deletion of any single-target. ICC was highest for junior-surgeons (0.731) whereas was lowest for senior-surgeon. In the latter, domain with lowest ICC was “chest-CT-features” (0.144). Groups-comparisons showed comparable results except for “direct-view-during-surgery”, “percentage-of-total-lobectomies/year” domains with statistically significant differences between groups.

Table 1a VETUS self-assessment schedule for performance targets and timing of progress in the VATS lobectomy learning curve

Performance targets	1 month	2 months	3 months	6 months	1 year
Chest CT features	Lower lobes	Lower lobes + right middle lobe	Lower lobes + right middle lobe	Upper lobes	All lobes
Number of ports	3 or 4	3 or 4	3	3	3
Utility thoracotomy incision lengths	6 cm	6 cm	4 cm	3 cm	3 cm
Direct view during surgery (monitored by Anaesthesiologist)	Allowed five times	Allowed three times	Not allowed	Not allowed	Not allowed
Timing of dissection/division of major hilar structures (monitored by Anaesthesiologist)	Max 1 h each	Max 45 min each	Max 45 min each	Max 30 min each	Max 30 min each
Percentage of VATS lobectomies	6%	12%	15%	20%	30 - 40%

Table 1b Rating characteristics, Internal Consistency, and Interclass Correlation Coefficient (ICC) for different sets of VETUS raters

Scale	Rating characteristics						p-value
	Junior Group (10 years in practice) No = 38		Intermediate Group (11 – 20 years in practice) No = 35		Senior Group (>20 years in practice) No = 27		
	Compliant No. (%)	Not compliant No. (%)	Compliant No. (%)	Not compliant No. (%)	Compliant No. (%)	Not compliant No. (%)	
Chest CT features	27 (71.05)	11 (28.95)	20 (57.14)	15 (42.86)	18 (66.67)	9 (33.33)	0.45
Number of ports	26 (68.42)	12 (31.58)	16 (45.71)	19 (54.29)	18 (66.67)	9 (33.33)	0.13
Utility thoracotomy incision lengths	14 (38.64)	24 (63.16)	19 (54.29)	16 (45.71)	11 (40.74)	16 (59.26)	0.29
Direct view during surgery (monitored by Anaesthesiologist)	37 (97.37)	1 (2.63)	27 (77.14)	8 (22.86)	21 (77.78)	6 (22.22)	0.025
Timing of dissection/division of major hilar structures (monitored by Anaesthesiologist)	37 (97.37)	1 (2.63)	29 (82.86)	6 (17.14)	23 (85.19)	4 (14.81)	0.11
Percentage of VATS lobectomies	37 (97.37)	1 (2.63)	20 (57.14)	15 (42.86)	26 (96.30)	1 (3.70)	0.00029
Total VETUS, mean ± standard deviation (median)	9.10 ± 0.95 (9)		7.94 ± 1.39 (8)		8.59 ± 0.97 (9)		0.92
Cronbach's alpha	0.85		0.89		0.97		
Interclass correlation coefficient (ICC)	0.73		0.64		0.49		

**Conclusion:**

VETUS is feasible, reliable and valid self-assessment-approach to evaluate performance and learning-curve of senior-surgeons approaching-VL. VETUS may provide focused-feedback and define pathways of systematic training approach outside traditional educational-channels. VETUS could also serve as international, standardised VL quality-evaluation-process.

Disclosure: No significant relationships.

Keywords: VATS skills, VATS lobectomy, training, thoracoscopy, global assessment, intraoperative performance.



O-021

COMPARING THE LEARNING CURVE OF ROBOTIC -ASSISTED AND VIDEO-ASSISTED THORACOSCOPIC RECURRENT LARYNGEAL LYMPH NODE DISSECTION IN ESOPHAGEAL CANCER PATIENTSYin-Kai Chao*Department of Thoracic Surgery, Chang Gung Memorial Hospital, Taoyuan, Taiwan***Objectives:**

Owing to the limited exposure of the left paratracheal space, the dissection of nodes along the left recurrent laryngeal nerve (RLN) represents the most challenging part of mediastinal lymph node dissection (LND), especially in those who undergone chemoradiotherapy (CRT). As robotic surgery is developed with ergonomic designs, there are expectations that the technical advantages of robotic surgery can shorten the learning curve. However, there is no study to evaluate the learning curve between robot-assisted thoracoscopic esophagectomy (RATE) *versus* video-assisted thoracoscopic esophagectomy (VATE) in performing RLN LND.

Methods:

Patients who underwent minimal invasive esophagectomy after CRT by a single surgeon were grouped according to the use of robot or not. Intergroup comparisons were made in terms of 1) number of dissected nodes, 2) rates of RLN palsy, and 3) rates of perioperative complications. The learning curve for the RLN LND procedure was investigated with the cumulative sum (CUSUM) method.

Results:

A total of 103 patients were included (RATE group: n = 39; VATE group: n = 67). The technical challenges of left RLN LND were more evident when performed by VATE. Complete skeletonization of the left RLN was achieved only for 65.6% of patients in the VATE group, a percentage significantly lower than that obtained in the RATE group (92.3%; $p < 0.001$). The rate of postoperative left RLN palsy was significantly higher in the VATE group than in the RATE group (26.8% vs. 7.7%, respectively, $p = 0.015$), albeit not resulting in higher pneumonia rates nor longer hospitalization. CUSUM analysis revealed a longer and steeper learning curve when performed by VATE, as palsy rate improve slowly and has not yet reached acceptable proficiency after 67 cases. While in RATE group, palsy rate diminished after 7 cases and reaches an acceptable rate after 10 cases.

Conclusion:

Compared with VATE, the learning curve of robotic RLN LND is shorter.

Disclosure: No significant relationships.

Keywords: esophageal cancer, minimally invasive esophagectomy, recurrent laryngeal nerve, robotic surgery.

O-022

MINIMALLY INVASIVE THYMECTOMY FOR EARLY-STAGE THYMOMAS WITHOUT MYASTHENIA GRAVIS-MODIFIED SUBXIPHOID THORACOSCOPIC APPROACH VERSUS UNILATERAL THORACOSCOPIC APPROACHH. Wang, Jian-Yong Ding, C. Jin, L. Tan, Q. Wang*Department of Thoracic Surgery, Zhongshan Hospital, Fudan University, Shanghai, China***Objectives:**

Conventionally, minimally invasive thymectomy for early-stage thymoma is performed via unilateral thoracoscopic approach. However, it is sometimes criticized for bad exposure of anterior mediastinum and contralateral area which may be disadvantageous for the surgery. Recently, we attempted a modified subxiphoid thoracoscopic approach with innovative sternal-elevating technique to reach better surgical exposure and less trauma.

Methods:

From January 2015 to December 2017, a total of 241 patients with clinically early-stage thymoma without myasthenia gravis were enrolled. Between them, 125 patients were performed thoracoscopic thymectomy via subxiphoid approach (Group S). Three subxiphoid incisions (12mm*1, 5mm*2) with the aid of artificial CO₂ pneumothorax were used. Additionally, we used the sternum-elevating device (Rul-tractor, USA) through the 3rd intercostal incision (5mm*1) beside the sternum. And the other 116 cases underwent conventional thymectomy via unilateral 3-port thoracoscopic approach (Group UL). The outcome was compared.

Results:

The two groups were comparable on patients demographics, such as age, gender, tumor size, WHO type and Masaoka staging. Two cases were converted to open surgery in Group S (1 case due to bleeding and 1 due to technical difficulty, while 2 cases were converted to open surgery in Group UL)1 case due to bleeding and 1 due to tumor). No significant difference was found on blood loss [(52±36) ml vs (54±48) ml, p=0.732]. Compared with Group UL, patients in Group S had much less surgical duration [(56±16)min vs (64±13)min, p=0.028], less pain scores (2.5±1.2 vs 3.2±1.1, p=0.007), earlier drainage removal [(1.4±0.7)d vs (2.5±0.9)d, p=0.000] and less postoperative hospital stay [2(1~6)d vs 3(2~9)d, p=0.000]. The complications were similar (5.6% vs 6.9%, p=0.677). And no perioperative death occurred.

Conclusion:

This study suggests that the modified subxiphoid thoracoscopic approach seems to be more effective for thymectomy for early-stage thymoma. This novel approach could improve surgical exposure, accelerate the operative progress and result in less trauma and faster recovery.

Disclosure: No significant relationships.

Keywords: modified subxiphoid thoracoscopic approach, thymomas, minimally invasive thymectomy.



O-023

AN ENHANCED RECOVERY AFTER SURGERY (ERAS) PROGRAM FOR VIDEO-ASSISTED THORACOSCOPIC ANATOMICAL LUNG RESECTIONS IS COST-EFFECTIVE

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Objectives:

Enhanced recovery after surgery (ERAS) programs have been reported to decrease complications and hospital stay after lung resection, but implementation requires time and financial investment with a dedicated clinical nurse. The aim of this study was to evaluate the clinical and economic outcomes for video-assisted thoracoscopic surgery (VATS) anatomical pulmonary resection before and after ERAS implementation.

Methods:

The first 50 consecutive patients undergoing VATS lobectomy or segmentectomy for malignancy after implementation of ERAS program were compared with 50 consecutive patients treated before its introduction. The ERAS protocol consisted on preoperative counseling, reduced preoperative fasting with preoperative carbohydrate loading, avoidance of premedication, standardized surgery and postoperative analgesia, early removal of chest tube, nutrition and mobilization. Length of stay, readmissions and cardio-pulmonary complications within 30 days were compared. Total costs were collected for each patient and a cost-minimization analysis was calculated while integrating ERAS-specific costs.

Results:

The two groups were similar in terms of demographics and surgical characteristics (table 1). The ERAS group had significantly shorter postoperative length of stay (median: 4 days; vs 7 days, $p < 0.0001$), decreased pulmonary complications (16% vs 38%; $p = 0.012$) and decreased overall post-operative complications (24% vs 48%, $p = 0.031$). One patient was readmitted for each group and there was no 30-day mortality. ERAS-specific costs were calculated as 664€ per patient including the costs related to dedicated nurse, database and carbohydrate drinks. Mean total hospitalization costs were significantly lower in ERAS group (15945€ vs 20360€, $p < 0.0001$), mainly related to lower costs for the post-operative period (7449€ vs 11454€, $p < 0.0001$) in comparison with intra-operative period (8496€ vs 8906€, $p = 0.303$). Cost-minimization analysis showed a mean saving in the ERAS group of 3751€ per patient.

Conclusion:

ERAS program for VATS anatomical resection is associated with lower complication rates, shorter postoperative length of stay and is cost-effective even during implementation.

Variables	Pre-ERAS	ERAS	p-value
Number of patients Age (years, median/range) Sex Female Male ASA score I II III	50 (64%) 68 (18%) 18 (36%) 0 (52%)	32 (48%) 24 (48%) 26 (52%) 0 (33%)	0.066 0.228 0.07
Anatomical resection Segmentectomy Lobectomy Operative time (minutes, mean/range)	20 (40%) 30 (60%) 150 (55-303)	18 (36%) 32 (64%) 134 (75-285)	0.684 0.045
Overall morbidity Overall pulmonary complications Pneumonia Air leak > 7 days Atelectasis Recurrent nerve lesion Chylothorax FA Myocardial infarction Urinary retention Re-operation at 1 month Drainage (days, median/range)	24 (48%) 19 (38%) 9 (18%) 6 (12%) 4 (8%) 1 (2%) 1 (2%) 3 (6%) 1 (2%) 1 (2%) 3 (1-15)	12 (24%) 8 (16%) 5 (10%) 4 (8%) 0 (0%) 0 (0%) 1 (2%) 0 (0%) 2 (4%) 1 (2%) 2 (2-15)	0.031 0.012 0.253 0.51 0.042 0.32 0.32 0.312 0.32 0.562 1 0.062
Postoperative stay (days, median/range)	7 (3-22)	4 (2-17)	<0.0001
Intraoperative costs (€) Postoperative costs (€) Total hospitalization costs (€) Cost related to ERAS (€) Overall costs (€) Difference (€)	8906 11454 20360 0 20360	8496 7449 15945 664 16609 - 3751	0.303 <0.0001 <0.0001

Disclosure: No significant relationships.

Keywords: thoracoscopy, cost-effectiveness, recovery.



O-024

BRAZILIAN RANDOMIZED CONTROLLED STUDY COMPARING ROBOTIC ASSISTED AND VIDEO ASSISTED SURGERY OUTCOMES IN PATIENTS UNDERGOING PULMONARY LOBECTOMY (BRAVO TRIAL)

Ricardo Terra, P. Araujo, L. Lauricella, J. Campos, M. Almeida, P. Pego-Fernandes
Thoracic Surgery, University of Sao Paulo Medical School, Sao Paulo, Brazil

Objectives:

To compare 90-day outcomes of lung lobectomy performed by the means of robotic surgery or video assisted surgery.

Methods:

Two-arm randomized clinical trial including patients with lung lesions (primary lung cancer or metastasis) with 5 centimeters or less candidates for lung lobectomy. Comorbidities that precluded surgical treatment or lesions that could require sleeve resections were exclusion criteria. After inclusion, patients were randomly (block randomization) allocated in one of two groups RATS (3-arms completely portal robotic lobectomy) or VATS (3-port video-assisted lobectomy). All patients followed the same postoperative protocol. The main outcome was morbi-mortality in 90 days. Secondary outcomes were intraoperative complications, drainage/in-hospital time, postoperative pain/quality of life, and readmissions. Fisher test was used to analyze categorical variables and Student t-test or Wilcoxon test for continuous variables. P values <0.05 were considered significant.

Results:

Eighty two patients were randomized but 5 of them were excluded (3 in the RATS group and 2 in the VATS group) due to central tumor (inclusion error) in 2, clinical deterioration in 2 and one patient removed the consent. Therefore, 77 patients comprised the study group (40 VATS and 37 RATS). The two groups were well balanced with regard to gender (57.5% female in VATS vs. 54% in RATS), age (mean of 64.9 vs. 67.1), BMI (mean of 26.4 vs. 27.5), FEV1% (mean of 82.6% vs. 85.9%), and comorbidities. Table 1 summarizes the outcomes of the procedures. Despite the tendency to a higher complication rate in the VATS group, this difference was not significant. The only significant difference was the readmission rate that was higher in the VATS group.

Conclusion:

RATS and VATS had similar 90-day outcomes. Nevertheless, we observed a tendency of lower complications with RATS as suggested by a lower readmission rate in this group. Larger studies are necessary to confirm such a finding.

Disclosure: R. Terra: Advisory Board: Johnson&Johnson Preceptorships and Speaker: H. Strattnner/Intuitive, Medtronic

P. Araujo: Educational Activities: Johnson&Johnson

P. Pego-Fernandes: Advisory Board: Johnson&Johnson Preceptorships and Speaker: H. Strattnner/Intuitive, Medtronic

Keywords: robotic surgery, video-assisted surgery, outcomes.



LBA1

RANDOMIZED PLACEBO-CONTROLLED TRIAL OF DEXAMETHASONE DURING INDUCTION OF ANESTHESIA IN LUNG CANCER THORACOSCOPIC RESECTION

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Context:

Systemic corticosteroids administered during induction of anesthesia are an effective adjunct to control postoperative pain and opioid consumption after several types of surgery. The role of corticosteroids in pain control after thoracic surgery was unknown, however.

Objective:

To determine whether administering dexamethasone prior to video-assisted thoracoscopic surgery (VATS) improves postoperative recovery.

Design: Randomized placebo-controlled trial according to CONSORT guideline (Figure 1a).

Setting: Single-institution trial.

Methods:

Participants and interventions: Sample size was calculated to obtain 100 patients with pulmonary lesions, suspected or diagnosed as lung cancer, from 301 patients assessed for eligibility. The pharmacy computer randomly assigned patients (1:1) to receive either 0.1 mg/kg dexamethasone in a single intravenous dose or placebo during induction of anesthesia. The treatment assigned was masked from the patients and physicians. Resection was primarily performed by uniportal VATS (95%). Postoperative analgesia consisted of acetaminophen, nonsteroidal anti-inflammatory drugs, and patient-controlled analgesia (PCA) with hydromorphone.

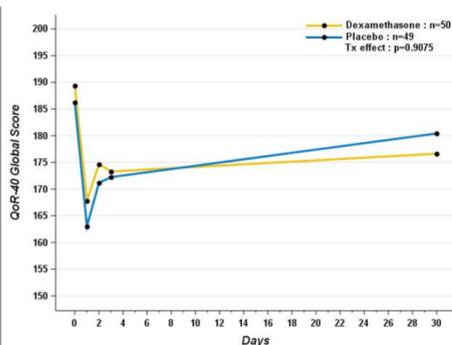
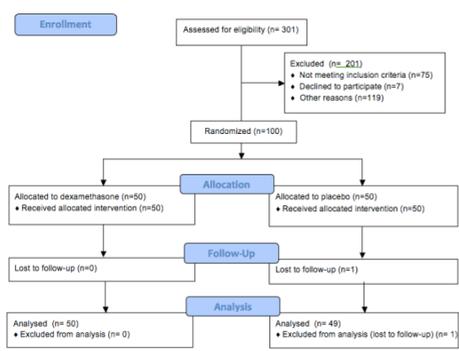
Main outcome measure: The primary outcome was postoperative quality of recovery, as assessed by the QoR-40 questionnaire administered daily during hospitalization and 30 days postoperatively. Secondary outcomes included time to first analgesic administration and postoperative opioid consumption.

Results:

Most patients—39 of 50 (78%) treated with dexamethasone and 35 of 50 (71%) with placebo underwent VATS lobectomy. All patients (57% female, mean age 64 years) received the allocated intervention; 99 completed follow-up. Median length of stay was 3 days (interquartile range 3, 4) in both groups. There were no significant between-group differences in QoR-40 scores during hospitalization or after 30 days (Figure 1b). Time to first PCA dose was 4.41 ± 1.21 hours in the dexamethasone group and 3.81 ± 1.20 hours in the placebo group ($p=0.07$). Total dose of opioids was similar in both groups ($p=0.04$).

Conclusion:

Administering dexamethasone during induction anesthesia prior to uniportal VATS for lung cancer does not improve the quality of postoperative recovery.



Trial Registration: *clinicaltrials.gov* Identifier: NCT02275702

Funding: Respiratory Health Research Group of the Laval University (Foundation Research Fellowship in partnership with the Pulmonology Chair of the JB Bégin Foundation of the Laval University)

Disclosure: No significant relationships.

**MONDAY, 28 MAY 2018****16:00 - 17:00****MIXED THORACIC I****O-025****COMPLETION PNEUMONECTOMY: A MULTICENTRE INTERNATIONAL STUDY BASED ON 119 PATIENTS**

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Objectives:

Completion pneumonectomy for NSCLC is a major thoracic surgical procedure affected by high rates of morbidity and mortality. The aim of our study was to define early and long-term outcome of this procedure, through an international multicentre study.

Methods:

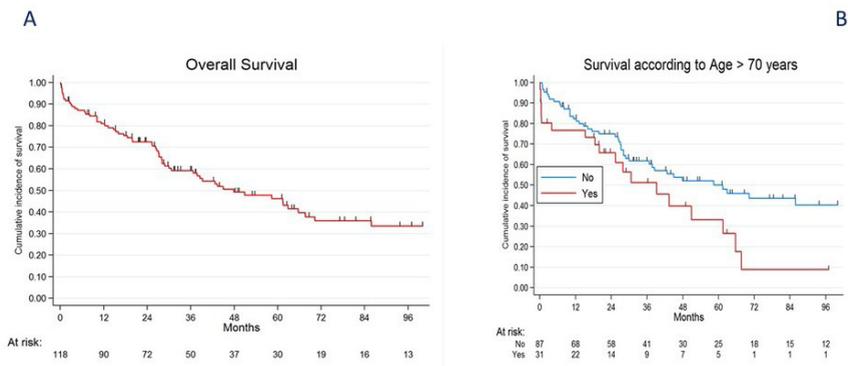
An analysis of 119 consecutive patients submitted to completion pneumonectomy (CP) for NSCLC in 6 European Thoracic Surgery Institutions between 2000 and 2016, was conducted. Explored predictors were: age, gender, cardiac comorbidity presence, side, preoperative regimens and pTNM stage. Univariable and Multivariable-adjusted comparisons for survival were performed using the Cox method. Associations between morbidity, 30-days mortality and clinical-pathological characteristics were investigated using the Fisher exact test and χ^2 test

Results:

The median age at the time of surgery was 66 years (interquartile range –IQR- 58-71); the median follow-up was 29 months. Forty patients (34%) were submitted to a pre-operative treatment (31 chemotherapy, 5 radiotherapy, 4 both); 34 (28%) had an extended resection. Median hospital length of stay was 9 days (IQR 7-11). Complications occurred in 42 patients (35%); amongst them, 4 (3%) developed bronchopleural fistulas. Preoperative treatment administration ($P= 0.03$) and an age >70 years ($P= 0.07$) were associate with a higher morbidity. 30-days mortality was 9%. An age >70 years ($P= 0.003$) and preoperative treatment ($P= 0.07$) were associate with a higher early mortality. Two-5 and 10-year overall survival were 72% (95%CI 0.62-0.79), 45% (95%CI 0.35-0.55) and 33% (0.22-0.43), respectively (Figure 1A). At multi-variate analysis for survival, only age was observed to be associate with a worst prognosis ($P= 0.04$) (Figure 1B).

Conclusion:

In our series, CP for NSCLC had an acceptable late mortality however with a high morbidity, due to the complexity of the intervention and the possible influence of preoperative chemo-radiotherapies. An accurate patient selection remains fundamental in order to achieve the best early and late onset outcomes.



Disclosure: No significant relationships.

Keywords: complications, lung cancer, completion pneumonectomy, survival



O-026

UNDERSTANDING THE TRADE-OFFS BETWEEN LENGTH OF STAY, READMISSIONS AND EMERGENCY VISITS IN REGIONALIZED ESOPHAGECTOMY CARE USING AN ANALYSIS OF HEALTHCARE COSTS

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Objectives:

To identify predictors of higher healthcare costs in the year following esophagectomy. We examined the competing risks of length of stay (LOS), readmissions and emergency department (ED) visits and their relationship to distance between the patient's residence and esophagectomy center.

Methods:

Using linked health data, we conducted a retrospective cohort study of esophagectomies (N=1,666) in Ontario, Canada (2006-2012) during the time that esophagectomy care became regionalized into high-volume centers. Ontario has a single-payer health system. Total costs in Canadian dollars within 1 year of esophagectomy (including inpatient care, ED visits, physician billings, drugs, homecare) were calculated for each individual using validated person-centered costing methodology. Generalized linear modelling was used.

Results:

Readmissions and ED visits resulted in average increased costs (AIC) of \$42,655 and \$17,158 per patient, respectively ($p < 0.0001$). In the base model (not controlling for index LOS), factors that were significantly associated with higher cost were: radiation therapy (AIC=\$20,774/patient, $p < 0.001$), any readmission (AIC=\$27,332/patient, $p < 0.001$), and having esophagectomy in 2 of 14 health regions (reference=highest-volume region). Care in these 2 health regions had AICs of \$19,487 and \$23,346/patient ($p < 0.04$). **Total costs were lower in patients who lived further away** from the index hospital ($p = 0.004$). When index LOS was controlled for, factors independently associated with higher costs were: increased LOS (AIC=\$2,140/patient/day, $p < 0.001$), radiation therapy (AIC= \$20,997/patient, $p < 0.001$) and any readmission (AIC= \$24,509/patient, $p < 0.001$). The same 2 regions had higher costs. Home-to-esophagectomy center distance was no longer associated with cost.

Conclusion:

It does not appear that keeping patients in hospital longer after esophagectomy protects health systems from higher costs, even in patients that live far away from esophagectomy centers. This suggests that this common argument against regionalization may not be justified, when accounting for competing risks using system-level costing methodology. Further study is required to determine why care is more expensive in some health regions.

Disclosure: No significant relationships.

Keywords: esophageal cancer, esophagectomy, healthcare costs, resource utilization



O-027

IMAGING PHENOTYPE USING RADIOMICS TO PREDICT INDOLENT LUNG ADENOCARCINOMA IN PATIENTS WITH PERSISTENT PURE GROUND-GLASS NODULES

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Objectives:

Recent data revealed radiomic analysis had great potentials in differentiating invasive adenocarcinomas(IAs) from their preinvasive lesions or minimally invasive adenocarcinomas(MIAs) with manifestation of persistent pure ground-glass nodules(PGGNs), which are assumed to be indolent lung carcinoma with favorable prognosis. This study aimed to identify lesions from IAs by establishing a radiomics signature and to evaluate its discrimination and calibration.

Methods:

This study included 898 PGGNs from January 2009 to September 2015, which were randomized into a primary cohort (n=449) and a validation cohort (n=449). In order to develop the radiomics signature, we utilized an in-house software program to quantitatively extract radiomics features from the retrieved CT images, and the least absolute shrinkage and selection operator(LASSO) binary logistic regression model were performed to select the most predictive features. Discrimination and calibration of the signature were validated with the area under the curve (AUC) and a visual calibration curve with 1000 bootstrap resamples, respectively.

Results:

Out of 898 nodules, 501 (55.8%) were preinvasive lesions, 245 (27.3%) were MIAs and 152 (16.9%) were IAs. Ten potential predictors were screened out exclusively in 1080 radiomics features extracted from nodules, by the LASSO model. Among the 10 features, the radiomics signature developed shown good discrimination between preinvasive lesions/MIAs and IAs with an AUC of 0.95 (95% CI, 0.91-0.98) and 0.89 (95% CI, 0.84-0.93) separately in both primary and validation cohort. Calibration curve of the signature indicated predicted outcomes consistent with pathological status. However, clinical characters including gender, age, smoking status were not significant for prediction of indolent adenocarcinoma.

Conclusion:

The signature based on radiomics features can be used to decode lung nodule in a noninvasive manner, thus enabling the identification of imaging phenotypes to characterize lung nodule. It provides an added predictive value to identify indolent lung adenocarcinoma from IAs presenting as PGGNs.

Disclosure: No significant relationships.

Keywords: imaging phenotype, radiomics, pure ground-glass nodules.

O-028

PROSPECTIVE RANDOMIZED COMPARISON OF DIAGNOSTIC EFFICIENCY OF TRANSCERVICAL EXTENDED MEDIASTINAL LYMPHADENECTOMY (TEMLA) AND ENDOSCOPIC ULTRASOUND (EBUS, EUS) IN THE MEDIASTINAL STAGING OF NON-SMALL CELL LUNG CANCER (NSCLC) PATIENTS

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²*Endoscopy Unit, Pulmonary Hospital, Zakopane, Poland*

³*Department of Histopathology, Pulmonary Hospital, Zakopane, Poland*

⁴*Department of Thoracic Surgery, Pulmonary Hospital, Zakopane, Poland*

Objectives:

The aim of this prospective randomized study was to compare diagnostic efficiency of Transcervical Extended Mediastinal Lymphadenectomy (TEMLA) and Endobronchial Ultrasound (EBUS) and/or Endoesophageal Ultrasound (EUS) in the primary staging of the mediastinal lymph nodes (LN) for Non-Small Cell Lung Cancer (NSCLC) patients.

Methods:

There were 200 patients with pathologically confirmed cIA-IIIa NSCLC who underwent Positron Emission Tomography (PET) combined with Computer Tomography (CT). Patients without distant metastasis on PET/CT were randomized to mediastinal staging by means of either TEMLA (97 patients) or EBUS/EUS (103 patients). After mediastinal staging, patients without N2/N3 metastases underwent anatomical lung resection with mediastinal lymphadenectomy. Those with N2/N3 disease were referred to neoadjuvant or definitive oncological treatment.

Results:

There were no significant differences between both groups for sex, subtype of NSCLC, localization of the tumor and T1a-T4 distribution ($p < 0.05$). N2 metastases were detected in 14/97 TEMLA patients (14,4%) and in 9/103 EBUS/EUS patients (8,7%). Pulmonary resection was performed in all 83 patients with negative results of TEMLA and in all 94 patients with negative EBUS. During lung resection, previously undetected N2 metastases were found in 1 TEMLA patient (1,2%) and in 6 EBUS/EUS patients (6,4%). In comparison to EBUS/EUS, TEMLA had significantly higher sensitivity for detection of N2 metastases (93.3% vs 60%, $p = 0.034$) and higher Negative Predictive Value (NPV) and accuracy with differences on the border of significance (98.8% vs 93.6%, $p = 0.078$ and 99.0% vs 94.2%, $p = 0.066$).

Conclusion:

Diagnostic yield of TEMLA for the detection of mediastinal LN metastases was superior to EBUS/EUS.

Disclosure: No significant relationships.

Keywords: mediastinal staging, NSCLC, EBUS, EUS, TEMLA



O-029

MULTICENTER REVIEW OF THYMECTOMY INDICATED FOR MYASTHENIA GRAVIS FAVORS A LEFT-SIDED APPROACH AND LOWER SEVERITY CLASS

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Objectives:

Complete thymectomy is a key component of the optimal treatment for myasthenia gravis (MG). Unilateral, minimally invasive approaches are increasingly utilized with debate about the optimal approach. A right-sided approach has a wider field of view and easier access to the left inferior horn; a left-sided approach accesses potentially more thymic tissue and easier contralateral phrenic visualization. We aimed to assess the impact of laterality on perioperative and medium-term outcomes.

Methods:

We performed a multicenter review of 90 patients that underwent a minimally invasive thymectomy for MG from 01/2000-09/2015, with at least one-year follow-up. The Myasthenia Gravis Foundation of America (MGFA) clinical research standards classification and definitions were followed. A 'good outcome' was defined by complete stable remission/pharmacologic remission/minimal manifestations 0, and a 'poor outcome' by minimal manifestations 1-3. Values are reported as median (interquartile range [IQR]) unless otherwise stated. Univariable and multivariable regression analyses were used to assess factors associated with a good outcome.

Results:

There were 53 (59%) right-sided thymectomies and 37 (41%) left-sided. Overall, at 39 months (27-60) follow-up, an improved status was reported in 81% (73), equally between approaches; $p=0.56$. However, the left-sided approach achieved a 'good outcome' (49%, 18) more frequently than the right-sided (28%, 15); $p=0.05$. MGFA class I and II were more likely to achieve a 'good outcome' ($p<0.01$). Operating time was shorter with a left-sided versus right-sided approach [120 (100-160) versus 184 (139-228) minutes; $p<0.01$]. A multivariate logistic regression model showed that after adjusting for left-sided approach, lower MGFA class remained associated with a good outcome (Table).

Univariate Logistic Regression Results				
	Poor Outcome (n=57)	Good Outcome (n=33)	Odds Ratio (95%CI)	p-value
Laterality				
Right-sided	38 (67%)	15 (45%)	Reference	
Left-sided	19 (33%)	18 (55%)	2.4 (1.0-5.8)	0.05
Age	38 (27-54)	32 (26-56)	1.0 (0.8-1.1)*	0.47
Gender				
Male	19 (33%)	13 (40%)	Reference	
Female	38 (67%)	20 (61%)	0.8 (0.3-1.9)	0.56
MGFA class				
I	15 (26%)	10 (30%)	4.2 (1.1-15.6)	0.03
IIa, IIb	17 (30%)	19 (58%)	7.0 (2.0-24.2)	<0.01
IIIa, IIIb, IVa, IVb, V	25 (44%)	4 (12%)	Reference	
Acetylcholine receptor positive	43/54 (80%)	22/29 (76%)	0.8 (0.3-2.4)	0.69
Muscle-specific kinase protein positive	5/20 (25%)	2/6 (33%)	1.5 (0.2-10.8)	0.69
Thymectomy classification (n)				
Video-assisted thoracoscopic only	6 (11%)	3 (9%)	Reference	
Robotic-assisted	51 (89%)	30 (91%)	1.2 (0.3-5.1)	0.83
Histological diagnosis				
Normal thymus	21 (37%)	11 (33%)	Reference	
Hyperplastic/follicular lymphoid hyperplasia thymus	18 (32%)	11 (33%)	1.2 (0.4-3.3)	0.77
Thymoma	7 (12%)	4 (12%)	1.2 (0.4-4.0)	0.75
Involved thymus	11 (19%)	7 (21%)	1.1 (0.3-4.6)	0.90
Multivariable Logistic Regression Model				
Left-sided approach			2.6 (1.0-6.6)	0.05
MGFA class				
I			4.2 (1.1-16.1)	<0.01
IIa, IIb			7.4 (2.1-26.2)	<0.01
IIIa, IIIb, IVa, IVb, V			Reference	
*OR calculated per 5 year increase in age				



Conclusion:

Thymectomy for MG results in clinical improvement in the majority of patients, particularly those with preoperative MGFA class I and II. A left-sided thymectomy may be preferred over a right-sided approach given the lower operating times and potential for superior medium-term symptomatic outcomes.

Disclosure: R.J. Cerfolio: Proctor and lecturer for Intuitive Surgical.

M. Onaitis: Speaker and consultant for Intuitive Surgical.

B.E. Louie: Research grant from Intuitive Surgical

Keywords: thymectomy, myasthenia gravis, unilateral, MGFA

O-030

CISPLATIN PLUS DOCETAXEL VERSUS LOBAPLATIN PLUS DOCETAXEL AS AJUVANT CHEMOTHERAPY FOR ESOPHAGEAL CARCINOMA: A PROPENSITY SCORE MATCHING STUDY OF MULTICENTER DATABASE.

Yan Zheng, X. Liu, R. Zhang, Z. Wang, H. Sun, S. Liu, Y. Li

Thoracic Surgery Department, The Affiliated Cancer Hospital of ZhengZhou University/Henan Cancer Hospital, Zhengzhou, China

Objectives:

The Lobaplatin, a third-generation of cisplatin derivative, showed promising activity and low side effects for esophageal squamous cell carcinoma (ESCC). We compared nedaplatin plus docetaxel with cisplatin plus docetaxel in patients with ESCC as adjuvant chemotherapy to determine effects on overall survival and toxicity.

Methods:

A multicenter retrospective study was performed using a propensity score. ESCC and adjuvant chemotherapy (Cisplatin plus Docetaxel or Lobaplatin plus Docetaxel) within the period between January 2013 and December 2016 were selected from 6 centers in China. The criteria were as follows: i) stage II to III; ii) without preoperation treatment; iii) R0 resection; iv) adjuvant chemotherapy; v) without adjuvant radiotherapy/chemoradiotherapy; vi) without history of other type of cancer. Completed clinical and pathological data were collected from Large-scale Data Analysis Center of Cancer Precision Medicine-LinkDoc database and analyzed by using data technology support from LinkDoc by using R-language. The WHO Toxicity Grading Scale was used. The side effects of adjuvant chemotherapy and overall survival rate were compared.

Results:

Between 01.2013 and 12, 2016, there were 733 eligible ESCC. 458 patients were reserved after propensity score matching with 1:1 ratio. A point estimate of the 3-year overall survival rate of the cisplatin group was 47.5%, the lobaplatin group was 46.7%(P=0.146). Leukopenia (grade III-IV 2.62%, grade I-II 34.5%, grade 0 59.39% versus 5.24%, 43.23%, 45.85%; P=0.0176), neutropenia (grade III-IV 6.55%, grade I-II 37.56%, grade 0 51.09% versus 4.37%, 53.28%, 36.34%; P=0.0015), nephrotoxicity (grade I-II 13.97%, grade 0 76.86% versus 26.64%, 65.94%; P<0.001) and gastrointestinal symptoms (grade III-IV 2.18%, grade I-II 54.59%, grade 0 32.31% versus 6.55%, 65.07%, 20.88%; P=0.0011), were more likely in cisplatin group. There were no significant difference of side effects in hemoglobin, platelet and hepatotoxicity.

Conclusion:

Compared with cisplatin, the lobaplatin provided the same survival benefits but lower side effects of myelosuppression, gastrointestinal symptoms and different safety profiles. It might be a choice for adjuvant chemotherapy of ESCC.

Disclosure: No significant relationships.

Keywords: esophageal cancer, adjuvant chemotherapy, side effect

**MONDAY, 28 MAY 2018****16:00 - 17:00****VIDEO II****V-031****COMPLEX STERNAL RECONSTRUCTION FOLLOWING CARDIAC SURGERY USING STRATOS SYSTEM, BONE GRAFT AND OMENTOPLASTY**Nizar Asadi, P. Perikleous, F. De Robertis, V. Anikin*Thoracic Surgery, Royal Brompton & Harefield Foundation Trust, London, United Kingdom***Objectives:**

Sternal wound dehiscence following sternotomy for cardiac surgery is a rare but serious complication with high morbidity and mortality. Patients with high risks and multiple comorbidities are unlikely to be successfully treated by a simple rewiring of the sternum; therefore, the reconstruction of the anterior chest wall defect becomes challenging for the surgeon. We present our technique using the Stratos System, autograft bone and omentoplasty in the management of complex sternal dehiscence.

Video Description:

We present 71-year-old gentleman presented to our department with severe sternal dehiscence following four months of his cardiac surgery. CT scan showed wide gap between the two halves of the manubrium as well as the body of the sternum; therefore, surgical reconstruction was performed with Startos system, bone graft and omentoplasty. Operative technique: Following the dissection and mobilising of the bilateral pectoral muscle the sternal defect is identified and the fibrotic tissue is removed, and the sternum curetted to identify the viability of the bony tissue. The outer tables of both sternal halves are divided in oblique fashion towards the central defect. This is then supplemented with bone graft harvested from a rib. Following this the STRATOS bars are inserted after preparing the ribs bilaterally. In addition to the sternal reconstruction an omentoplasty is performed by mobilisation of the omentum via upper laparotomy and then, trans-diaphragmatic, positioned of the omentum flap over the entire sternal defect.

Conclusions:

Rigid sternal fixation with or without omentoplasty can be performed successfully in the management of sternal wound dehiscence with acceptable outcomes. Although the optimum method of chest wall stabilisation is still a matter of debate our technique did show excellent results with complete stabilization of the anterior chest wall with no complications.

Disclosure: No significant relationships.**Keywords:** chest wall reconstruction, titanium prosthesis, chest wall, sternal dehiscence

V-032

COMPLETE PORTAL ROBOTIC SLEEVE RESECTION OF THE BRONCHUS INTERMEDIUSRaul Caso, T. Watson, M.B. Marshall*Department of Surgery, MedStar Georgetown University Hospital, Washington, DC, United States of America***Objectives:**

Sleeve lobectomy avoids the morbidity associated with resection of another lobe of the lung. Importantly, it avoids the morbidity of a pneumonectomy. This video demonstrates a minimally invasive complete portal robotic sleeve resection of the bronchus intermedius in a patient with an endobronchial lesion.

Video Description:

A 69-year-old woman found to have an endobronchial lesion that underwent unsuccessful endoscopic resection. Cautery artifact obscured the diagnosis. The decision was made to perform a robotic sleeve resection of the bronchus intermedius. After exposure of the bronchus intermedius, it was resected by cutting below the upper lobe takeoff and proximal to the superior segmental bronchus takeoff. Once margins returned negative the anastomosis was created. A running anastomosis was performed with a 3-0 PDS in an end-to-end fashion. Final pathology revealed benign adenoma with negative margins.

Conclusions:

We demonstrate the technical aspects of a robotic sleeve resection of the bronchus intermedius. We have previously reported this technique with an open approach for benign strictures of the bronchus intermedius. A minimally invasive approach may be useful in the management of benign pathology of the bronchus intermedius.

Disclosure: No significant relationships.

Keywords: sleeve resection, robotic surgery, minimally invasive surgery



V-033

REPEATED LUNG VOLUME REDUCTION SURGERY IN MASSIVELY DESTROYED LUNGS WITH SEVERE HYPERINFLATION

Claudio Caviezel, D. Schneider, I. Schmitt-Opitz, W. Weder
Thoracic Surgery, Hospital University of Zurich, Zurich, Switzerland

Objectives:

Feasibility of repeated lung volume reduction surgery (re-LVRS) has previously been described. In well selected patients lung function and quality of life improve with acceptable morbidity. The prevalent postoperative complication is prolonged air leak leading to re-operation for fistula closure. Indication for re-LVRS requires distinct emphysema target zones, a clear profit from first procedure and severe hyperinflation. Herein, we present a video of a case with re-LVRS. Indication, operative steps, revision and functional outcome are shown and discussed.

Video Description:

A 72 years old male patient underwent primary bilateral thoracoscopic LVRS three and a half years ago. FEV1 improved from 31% to 66% predicted three months postoperatively. The patient had a remarkable benefit, which declined over the last year. Preoperative lung function values were FEV1 24%, TLC 165%, RV 334% and RV/TLC 74%. The diffusion capacity was 30%. CT scans showed functionless lung areas predominantly on the right side. Regarding the lower lobe and some central parts of the right lung there was still some parenchyma with better quality on CT. These findings were confirmed by perfusion scans and densitometry. Because of the severe hyperinflation and the relatively preserved diffusion capacity, re-LVRS was indicated. Because of severe postoperative air leak revision surgery had to be performed on day three. The further course was uneventful and the patient dismissed at the 15th postoperative day after the primary intervention. Postoperative lung function after three months showed a FEV1 of 40% and a diffusion capacity of 40%.

Conclusions:

Although accompanied by a significant higher rate of prolonged postoperative air leak, repeated LVRS improves lung function and quality of life in highly selected patients. This video shows a successful case of re-LVRS including revision surgery and outcome. Step-by-step presentation highlights performance for this kind of specialized thoracic surgery.

Disclosure: No significant relationships.

Keywords: lung volume reduction surgery, emphysema, re-LVRS, repeated lung volume reduction surgery

V-034

PHRENIC NERVE PRESERVING SUBXIPHOID ROBOT-ASSISTED THYMECTOMY IN A CHILD WITH MEDIASTINAL LYMPHANGIOMAChang Hyun Kang, K. Hyun, S. Park, H.J. Lee, I.K. Park, Y.T. Kim*Thoracic and Cardiovascular Surgery, Seoul National University Hospital, Seoul, Republic of Korea***Objectives:**

Minimally invasive thymectomy in children is technically challenging because of the small sizes of the thoracic cavity. We report a case of successful resection of a large mediastinal tumor encasing phrenic nerve by subxiphoid robot-assisted thymectomy in a child.

Video Description:

A 13-years old boy with large bulging mass in the anterior mediastinum was referred to our hospital for surgical resection. Chest CT scan revealed a 6.7 cm sized multiloculated cystic mass and chest MRI demonstrated a dense solid lesion with peripheral septations suggesting benign cystic tumor. Subxiphoid robot assisted thymectomy was planned instead of left transpleural approach because of too small available space in left thoracic cavity. The patient was placed in supine position and the chest cavity was entered through a 4 cm-sized longitudinal subxiphoid incision. Three more ports for robotic arms were placed on the bilateral thoracic cavities. A huge mass was identified encasing left mammary vein, innominate vein, and left phrenic nerve. Dissection was started from the retrosternal area and all the mediastinal contents were swept up from the pericardium. Innominate vein was easily separated from the tumor, but the left phrenic nerve was encased by the tumor. Considering the benign nature of the tumor and long-term functional hazard of sacrificing phrenic nerve in the child, we decided to preserve the nerve. Tumor was opened over the phrenic nerve and phrenic nerve was preserved with minimal tumor breakdown. En-bloc removal of the tumor, thymus, perithymic fat was possible and the tumor was retrieved through subxiphoid working window. The patient was recovered well postoperatively without any signs of diaphragmatic palsy and was discharged home at the 3rd postoperative day. Final pathological findings were consistent with lymphangioma.

Conclusions:

Subxiphoid robot-assisted thymectomy is a novel and effective approach in the pediatric patients with large anterior mediastinal tumor.

Disclosure: No significant relationships.

Keywords: mediastinal tumor, pediatric thoracic surgery, minimally invasive surgery



V-035

AORTO-PULMONARY NON-FUNCTIONING PARAGANGLIOMA ROBOTIC RESECTIONMarco Nardini¹, M. Migliore¹, R.J. Cerfolio²¹*Thoracic Surgery, University Hospital Policlinico of Catania, Catania, Italy*²*Cardiothoracic Surgery, New York University (NYU) Langone Medical Center, New York, NY, United States of America***Objectives:**

The aim of this video-case is to suggest that complex procedures, in which a thoracoscopy would be prohibitive, can be accomplished with robotic platforms.

Video Description:

We describe the case of a 35-years-old man incidentally diagnosed with a 4.5cm rounded mass in the visceral mediastinum, deeply encased in the aorto-pulmonary window: sitting over the pulmonary trunk, anterior to the carina, posterior to the ascending aorta and surrounded by the arch, as showed by the CT-scan. Plasmatic level of metanephrines was normal. The patient was proposed removal by mean of median sternotomy, but he was committed to have a minimally invasive procedure and so chased a third opinion. The ports placement and instrumentation are described. The dissection started from the posterior mediastinal pleura, over the left vagus nerve. Lymph node region 5 was dissected. After further dissection medially, the smooth surface of the lateral aspect of the mass was identified. The technical key now, in order to create a plane for dissection, it has been to pass a suture through the neoplasm. This allowed retraction in all the directions and to dissect the mass from the surrounding tissues. The procedure was 120 minutes. The chest drain was ablated on the following day and the patient was discharged home. He complained of some degree of hoarseness which is gradually resolving. This was likely due to trauma to the left recurrent laryngeal nerve, which was not actually compromised. The histology described a primary mediastinal paraganglioma. The patient is well 2 months after surgery.

Conclusions:

Aorto-pulmonary paragangliomas are rare. Their diagnosis and management are often challenging for the thoracic surgeon. The robotic platform, in a dedicated centre, with articulated instruments and enhanced view allowed to safely perform this resection while maintaining a minimally invasive approach. To our knowledge, this is the first case of its kind accomplished through port access approach.

Disclosure: R.J. Cerfolio: Dr. Cerfolio lectures for Intuitive Surgical.

Keywords: aorto-pulmonary paraganglioma, neuroendocrine tumors, MITS, robotic thoracic surgery, mediastinal mass

V-036

A GIANT ESOPHAGEAL LEIOMYOMA EXCISION WITH ROBOTIC ASSISTANCE

Mohan Venkatesh Pulle, V. C. L., H. Puri, S. Bishnoi, B.B. Asaf, A. Kumar
Department of Thoracic Surgery, Sir Ganga Ram Hospital, New Delhi, India

Objectives:

The spectrum of thoracic procedures performed using the Da Vinci Robotic System (Intuitive Surgical Inc., Sunnydale, CA) assistance is growing day-by-day. Improved dexterity and 3D vision in Robot provided the ability to perform complex procedures with excellent procedural outcomes. Here, we aim to demonstrate excision of Giant esophageal leiomyoma with Robotic assistance in a 32-year cheerful lady, who presented with progressive dysphagia for 4 months. Upper GI endoscopy revealed a bulge with no mucosal abnormality suggestive of a sub mucosal lesion. Contrast enhanced computed tomography of chest revealed a 5 cm esophageal lesion, possibly Leiomyoma. She underwent surgery successfully and had uneventful post-operative recovery.

Video Description:

Diagnostic Thoracoscopy revealed a bulge just cranial to the azygous vein. Posterior mediastinal pleura over bulge was divided using cautery spatula. Azygous vein was looped and divided using Endoscopic linear stapler. Mediastinal pleura and sub pleural fat over the esophageal bulge was further dissected to expose the esophageal wall. Longitudinal myotomy was performed and the dissection continued till a white glistening esophageal leiomyoma was visualized. This mass was retracted towards the left and right using robotic grasper and simultaneous blunt dissection was performed to separate adhesions of muscle fibers with leiomyoma. Utmost care was taken during dissection of mass from underlying mucosa. At the end, we could achieve complete enucleation of esophageal leiomyoma along with intact capsule. Esophageal myotomy was closed using 3-0 interrupted PDS sutures. Air leak test done and none found. Hemostasis ensured and specimen was delivered out in an endobag. Wound closed in layers.

Conclusions:

Our video demonstrates successful removal of giant esophageal leiomyoma through minimally invasive robotic assisted approach. Robot provides the advantages of improved dexterity and advanced 3D vision which facilitates easy endosuturing. Our case supports the application of robotic assisted minimal invasive surgery as mainstay mode for resecting oesophageal leiomyoma.

Disclosure: No significant relationships.

Keywords: esophageal leiomyoma, giant, robotic excision



MONDAY, 28 MAY 2018
17:00 - 18:30
YOUNG INVESTIGATOR AWARD

O-037

RANDOMISED CLINICAL TRIAL OF TRANSDERMAL FENTANYL PATCH AS PART OF FAST-TRACK THORACIC SURGERY POSTOPERATIVE PAIN MANAGEMENT PROTOCOL

Anastasija Bistrova, K. Grigorovica, D. Breiva, I. Tracums, A. Spaks

Centre of Lung Diseases and Thoracic Surgery, Pauls Stradins Clinical University Hospital, Riga, Latvia

Objectives:

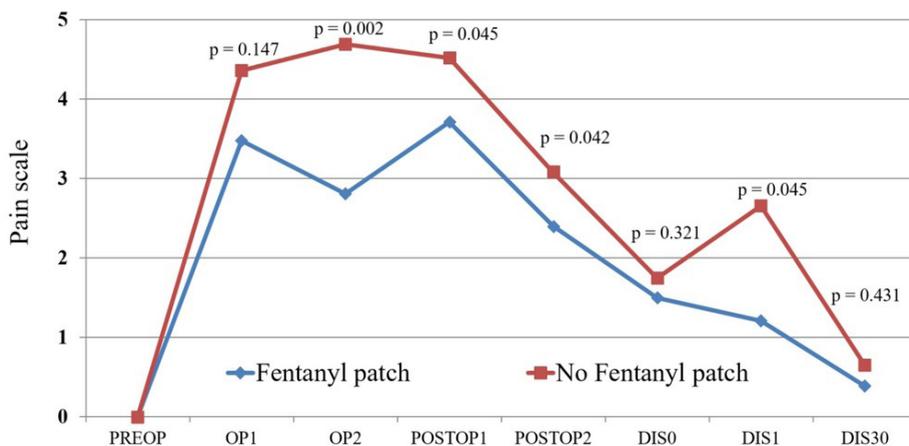
Aggregation of marginal gains is necessary to improve outcomes in the era of VATS. Successful pain management is one of the cornerstones of fast-track surgery. We hypothesize that use of long-acting transdermal fentanyl patches can facilitate recovery after thoracic surgery enabling more stable and efficient pain control during hospital stay and after discharge.

Methods:

Patients were enrolled based on the following criteria: two-port VATS for lung resection; postoperative hospital stay less or equal to eight days. After randomization patients received 25 mcg/hr fentanyl patch or placebo. Postoperatively both groups received analgesia with paracetamol 1 g TDS and lornoxicam 8 mg BD for baseline pain control, and trimeperidine 20 mg PRN for breakthrough pain. On discharge trimeperidine was replaced by oral codeine 30 mg PRN. Primary outcome was intensity of postoperative pain measured by numeric pain scale. Secondary outcomes were respiratory depression, confusion, nausea/vomiting, postoperative hospital stay and duration of chest drainage. Pain intensity was assessed before surgery (PREOP), directly after surgery (OP1) and 3-5 hours later (OP2), on postoperative day 1 (POSTOP1) and 2 (POSTOP2), day of discharge (DIS0), next day after discharge (DIS1) and 30 days after discharge (DIS30).

Results:

Sixty three patients were randomized with 1:1 allocation ratio. Seven patients were excluded from the study. Pain control was significantly better in fentanyl group during hospital stay and after discharge (Table 1).



Pain intensity influenced surgeon's decision about drain removal thus patients with better pain control tended to have chest drain removed later (3.35 vs. 2.72 days, $p=0.063$) and to be discharged later (4.41 vs. 3.96, $p=0.14$). There was no difference in other secondary outcomes.

Conclusion:

Use of fentanyl patches is safe and efficient for postoperative pain management in thoracic surgery. It complements concept of fast-track surgery and we will continue patient enrolment in order to receive more robust data supporting our conclusions.

Disclosure: A. Bistrova: Fentanyl transdermal system (patch) 25 mcg/h

K. Grigorovica: Fentanyl transdermal system (patch) 25 mcg/h

D. Breiva: Fentanyl transdermal system (patch) 25 mcg/h

I. Tracums: Fentanyl transdermal system (patch) 25 mcg/h

A. Spaks: Fentanyl transdermal system (patch) 25 mcg/h

Keywords: postoperative analgesia, fast-track surgery, fentanyl patch



O-038

IS THE NEW ‘KUNTZ NERVE’ SAVIOR FOR COMPENSATORY HYPERHIDROSIS?

Gamze Çetinkaya, H. Melek, T. Sevinç, E. Özer, E. Yenturk, A.S. Bayram, C. Gebitekin
Thoracic Surgery, Uludag University, Bursa, Turkey

Objectives:

The Kuntz nerve is one of the most important factor for failure of hyperhidrosis surgery. Compensatory hyperhidrosis (CH) is the most common complication after endoscopic thoracic sympathectomy (ETS) and may lead to an impairment in quality of life (QoL). We hypothesized that we could construct a parallel pathway to the damaged part of the sympathetic nerve, similar to the Kuntz nerve, with reconstruction of two intercostal nerves, thus treating CH. The aim of this survey is to assess the QoL before and after the reconstruction surgery, level of satisfaction, and to evaluate long term results.



Figure 1 a,b,c : Parietal pleura covering the related intercostal nerve is opened using the hook without cauterization in order to prevent damage to the nerve



Figure 2. a,b,c: If clips were used during the initial surgery, these clips are removed without dissection



Figure 3. a,b,c: The anastomosis of T2-T4 intercostal nerve ends was performed using 5/0 polyglactin suture



Figure 4 a, b, c: Fibrin glue is used to cover and support the anastomosis

Methods:

Between January 2014 and November 2016, 36 patients with CH underwent intercostal nerve reconstruction surgery. Thirty two patients undergoing Gebitekin Technique(GT) were prospectively reviewed. GT was performed videothoracoscopically by creating an end-to-end anastomosis of the two intercostal nerves under and above the ETS level (figure)The patients completed the self assessment form for QoL designed by the World Health Organization (WHOQOL-BREF) and a questionnaire designed by our by clinic in order to measure patient satisfaction and demographic parameters. These forms were filled out during the preoperative period and six months after surgery.

Results:

In total, 64 surgeries were performed in 32 patients with a mean age of 32.5 (22-48) years. Severe CH along with dryness, depression, loss of libido, suicide attempt and fatigue were observed in 23 (%71,88) patients. All patients answered the WHOQOL-BREF questions. An improvement of CH symptoms was seen in 24 cases (75%) along with improvement of dryness which was observed in 60% of the patients. Recurrence of primary hyperhidrosis was not seen in any of the patients. Improvement was observed in all survey sub-areas after GT ($p < 0.05$) (Table 1).

Domain Score	Preoperative value (min/ max)	Postoperative value (min/ max)	p value
Physical health	12,29 (6,86/17,14)	16,57 (6,29/20,00)	<0,001
Psychological	10,34 (4,00/17,33)	15,33 (4,67/18,67)	<0,001
Social relationships	12,00 (4,00/20,00)	14,67 (4,00/20,00)	<0,001
Environment	14,50 (9,50/18,00)	16,00 (7,00/19,50)	0,01

Conclusion:

The study revealed that QoL was greatly influenced by CH. However, GT showed promising results in the management of CH and accompanying problems.

Disclosure: No significant relationships.

Keywords: compensatory hyperhidrosis, kuntz nerve, new technique

O-039

VIDEO-ASSISTED THORACOSCOPIC SURGERY WITH INTRAOPERATIVE CONVERSION DOES NOT CONSTITUTE A TREATMENT FAILURE WHEN COMPARED WITH UPFRONT THORACOTOMY IN LUNG CANCER SURGERY

Alex Fourdrain, F. De Dominicis, S. Roisin, S. Lafitte, J. Iquille, P. Bagan, P. Berna
Department of Thoracic Surgery, Amiens University Hospital, Amiens, France

Objectives:

Intraoperative conversion may be required during video-assisted thoracoscopic surgery (VATS) for lung cancer, especially when the indication has been broadened. We evaluated the morbidity and mortality rates associated with VATS for anatomic pulmonary resection with conversion to thoracotomy and compared this technique with fully VATS approach and classical open thoracotomy approach to resection.

Methods:

We performed a retrospective, single-center study between January 2011 and January 2017, and included 610 consecutive patients having undergone either VATS, eventually with intraoperative conversion to thoracotomy or open thoracotomy for anatomic pulmonary resection, excluding pneumonectomies and angioplastic/bronchoplastic/chest wall resections. After propensity score adjustment, we assessed the 90-day mortality, and determined if surgical conversion was a risk factor for mortality when compared to open thoracotomy.

Postoperative morbidity and mortality	p-value Full VATS VS VATSconv	Full VATS n=253	VATS with conversion n=56	Open Thoracotomy n=301	p-value VATSconv VS Open Thoracotomy
30-day mortality	p=0.552	1.2% (n=3)	1.8% (n=1)	2.3% (n=7)	p=1
90-day mortality	p=0.396	2.8% (n=7)	5.4% (n=3)	3.7% (n=11)	p=0.468
Pneumonia	p=0.020	15.4% (n=39)	28.6% (n=16)	26.9% (n=81)	p=0.797
Bronchoscopy	p=0.389	16.6% (n=42)	21.4% (n=12)	27.9% (n=84)	p=0.315
Reintubation	p=0.503	4.7% (n=12)	7.1% (n=4)	5.7% (n=17)	p=0.755
Bronchial fistula	p=1	0.8% (n=2)	0% (n=0)	2% (n=6)	p=0.595
Vocal cord paralysis	p=0.696	3.6% (n=9)	1.8% (n=1)	2.3% (n=7)	p=1
Arrhythmia	p=0.008	9.1% (n=23)	21.4% (n=12)	15.6% (n=47)	p=0.282
Chest tube placement	p=0.0001	4 ± 5.1 days	6.8 ± 3.8 days	6.4 ± 4.6 days	p=0.611
Length of stay	p=0.011	7.2 ± 8.6 days	12.6 ± 15 days	11.4 ± 10 days	p=0.560

**Results:**

Of the 610 patients, 253 underwent fully VATS, 56 underwent VATS with conversion (4 extended procedures, 9 single-lung ventilation issues, 13 difficult dissections, 14 vascular injuries, 16 pleural adhesions; conversion rate: 18.1%) and 301 underwent open upfront thoracotomy. When comparing the VATS+conversion and open thoracotomy groups, the VATS+conversion group was older and more likely to have early-stage tumors (T1a). The 90-day postoperative mortality rate was 5.4% (n=3/56) in the VATS+conversion group, and 3.7% (n=11/301) in the open thoracotomy group; this difference was not statistically significant (p=0.468). Likewise, the morbidity rate was similar in these two groups. After propensity score adjustment, there was no difference in 90-day mortality between the VATS+conversion and open thoracotomy groups.

Conclusion:

The immediate postoperative morbidity and mortality rates following anatomical pulmonary resection for lung cancer were similar for VATS with conversion and open thoracotomy. When in doubt, VATS for anatomical resection of lung tumors should be preferred to an open approach, as the former technique provides the patient with the potential benefits of fully VATS-based resection but is not disadvantageous when intraoperative conversion to open thoracotomy is required.

Disclosure: No significant relationships.

Keywords: conversion, video-assisted thoracoscopic surgery, lung cancer, lobectomy

O-040

IMPLEMENTATION AND INITIAL EVALUATION OF A SMARTPHONE APPLICATION TO IMPROVE PERIOPERATIVE PULMONARY REHABILITATION IN ELECTIVE THORACIC SURGICAL PATIENTS

Carlos Alfredo Fraile Olivero, J.R. Jarabo Sarceda, E. Fernández Martín, X.W. Trelles, A.M. Gómez Martínez, J. Calatayud Gastardi, P. Santos Capa, P.D. Arribas Manzanal, M. Martínez Tardido, M. Bernabéu Lledó, F. Hernando Trancho
Department of Thoracic Surgery, Hospital Clinico San Carlos, Madrid, Spain

Objectives:

Optimal perioperative chest physical therapy joint with medical advices has been related to a decrease in postoperative morbidity and mortality in patients undergoing thoracic surgical procedures. Access to rehabilitation programs may be difficult in certain circumstances. We decided to design a free application with standardized protocols so that patients could perform respiratory rehabilitation themselves. We analyze here first results of implementation and evaluation of this software in clinical practice.

Methods:

The application was designed as a multidisciplinary tool including perioperative medical advices (smoking cessation, mouth health, early mobilization, pain control), 10 chest physical exercises (with animated images) and programmable Smartphone daily notifications in order to favor adherence to the tool. Patients scheduled for electives thoracic surgical procedures were given complete information to download, set up and interact with the software. A Multiple-Choice-Question test was developed and applied to the patients at the moment of hospital discharge in order to evaluate their experience.

Results:

A total of 52 patients interacted with the application and answered the test after the surgery. Median age was 59.7 and 55.8% were males. From them, 44 patients (84.6%) considered the application "Very compressible". 51 patients (98%) considered "positive" the contribution of the application to face the postoperative period. Additionally, 25 patients (48.1%) deemed appropriate the quantity of time and physical effort needed to complete the interaction with the application and reach the goals.

Conclusion:

The use of new technologies is possible to improve preoperative training among patients undergoing thoracic surgical procedures. Our software was successfully integrated in clinical practice and patients faced it positively. Our preliminary results must be validated and potential clinical benefit should be prospectively evaluated.

Disclosure: No significant relationships.

Keywords: postoperative pulmonary complications, smartphone application, medical advices, chest physical exercises, chest physical therapy, multiple choice question (MCQ) test.



O-041

THE EFFECTS OF LOW SUCTION ON DIGITAL DRAINAGE DEVICES AFTER VIDEO-ASSISTED THORACOSCOPIC SURGERY LOBECTOMY – A RANDOMIZED CONTROLLED TRIALBo Laksáfoss Holbek¹, M. Christensen¹, H.J. Hansen¹, H. Kehlet³, R.H. Petersen¹¹*Department of Cardiothoracic Surgery and Section for Surgical Pathophysiology, Rigshospitalet, Copenhagen, Denmark*²*Section for Surgical Pathophysiology, Rigshospitalet, Copenhagen, Denmark***Objectives:**

The optimal level of suction on digital chest drainage devices after VATS lobectomy is not known, and therefore varies between thoracic surgical units. In a randomised controlled trial, we sought to determine the potential benefit of the lowest possible suction, -2 cmH₂O, compared to our institutional standard, -10 cmH₂O, using the newly developed Thopaz+.

Methods:

Two hundred and twenty eight patients were randomised to a suction level of -2 cmH₂O (low suction) or -10 cmH₂O (control) after VATS lobectomy for suspected or confirmed lung cancer. Primary outcome was time to chest drain removal. Drain data were obtained from the digital drainage devices, and patient data were obtained from medical records during admission and post-operative follow-up until 30 days after surgery.

Results:

For the low-suction (-2 cmH₂O) and control (-10 cmH₂O) groups respectively, median [IQR] drainage duration was 41.9 [23.4, 71.8] and 46.6 [24.1, 106.6] hours ($p=0.15$), median length of stay was 2.5 [2.0, 6.2] and 3.0 [2.0, 8.0] days ($p=0.38$), prolonged air leak >5 days was reported in 15% and 24% of patients ($p=0.15$). The median total fluid production was 661.0 [341.5, 1217.0] and 795.0 [439.2, 1588.0] mL ($p=0.08$). The median time to consistent air leak cessation (<20 mL/min) was 5.8 [0.3, 44.3] and 23.7 [1.1, 90.8] hours ($p=0.003$) and the median time to fulfilment of drain removal criteria was 17.8 [12.3, 56.3] and 35.7 [13.1, 102.8] hours ($p=0.004$). There were no differences in proportion or size of pneumothorax or subcutaneous emphysema after drain removal, and no differences in post-operative morbidity in the two groups.

Conclusion:

We demonstrated that low suction significantly shortened time to air leak cessation and fulfilment of drain removal criteria, but without influencing drainage duration, length of stay, or morbidity.

Disclosure: B.L. Holbek: Received a 3 months research grant from Medela during the study period.

H.J. Hansen: Personal fees from Medtronic outside the submitted work.

R.H. Petersen: Personal fee from Medtronic outside the submitted work.

Keywords: length of stay, video-assisted thoracoscopic surgery, enhanced recovery after surgery, prolonged air leak, lung cancer, chest drain

O-042

IS PLEURECTOMY/DECORTICATION FOR BIPHASIC MALIGNANT PLEURAL MESOTHELIOMA REALLY WORTHWHILE? PROPENSITY SCORE-MATCHED ANALYSIS ON A LARGE MULTICENTRIC EXPERIENCE

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Objectives:

Even in a multimodal setting, the role of surgery in biphasic malignant pleural mesothelioma (Biph-MPM) is extremely controversial. In this study, we performed a focused analysis on a large dataset of Biph-MPM cases evaluating the prognostic impact of a multimodal approach including pleurectomy/decortication (P/D).

Methods:

From 01/09 to 12/16, 213 Biph-MPM patients treated in 4 tertiary centers experienced in MPM, were selected and clinical, pathological and surgical information retrieved. A Cox regression model was used to identify predictors of survival and Kaplan-Meier method to summarize overall survivals. Variables unbalanced between surgical and not-surgical groups were included in a 1:1 propensity score matching.

Results:

Mean age and male/female ratio were 68.4±9.5 and 5:1, respectively. A multimodal treatment including P/D was performed in 58 pts (27%), chemotherapy alone in 99 pts (47%) and best supportive care (BSC) in 56 (26%). Final pathological staging and percentage of epithelioid histology is reported in Fig.1. Median overall survival was 11 months. At univariate analysis (Fig.1), the survival was significantly influenced by FEV1% (p=0.011), performance status (p<0.001), surgical approach (p<0.001) and (slightly) by pTNM (p=0.051). Multivariate analysis confirmed performance status and surgical approach as independent variables affecting long-term survival (see Fig.1). Even excluding BSC-patients, univariate analysis (H.R.:0.44, C.I.:0.30-0.65, p<0.001) and multivariate analysis (H.R.:0.30, C.I.:0.16-0.61, p<0.001) showed the prognostic impact of surgery. A propensity score matching (balanced for age, gender, and pTNM) extracted 116 patients with well-balanced baseline characteristics. Median overall survival (Fig.1) was still longer in patients underwent a multimodal treatment including P/D when compared with others (17 months vs 10 months, H.R.:0.42, C.I.:0.28-0.64, p<0.001).

Univariate Cox Analysis Total Population

	# patients	% death	median	Hazard Ratio	P value	(C.I. 95%)
Symptoms*						
No	3	66.7	13.3			
Yes	89	87.6	11	1.23	0.769	0.30-5.05
FEV1 %**						
<40	23	87.0	13.3			
>=40	16	75.0	18.5	0.36	0.014	0.16-0.81
Performance Status*						
0-1	75	89.2	11			
>=2	8	100.0	4	3.71	0.0008	1.73-7.96
Surgery						
No	153	91.6	9			
Yes	50	79.3	17	0.35	<0.0001	0.24-0.51
Radical resection**						
No	33	84.8	11			
Yes	22	81.8	16.5	0.77	0.399	0.42-1.41
Epithelioid differentiation*						
<50%	88	89.8	12			
>=50%	86	89.3	10	1.08	0.625	0.79-1.48
TNM						
I	35	77.1	13			
II	31	96.8	12	1.27	0.376	0.75-2.14
III	137	89.1	11	1.28	0.244	0.84-1.95
IV	10	90.0	8.5	2.94	0.006	1.37-6.33
N						
I	21	71.4	13			
2	43	93.0	12	1.33	0.352	0.73-2.40
3	41	82.9	14	0.82	0.531	0.44-1.52
4	108	91.7	9	1.73	0.05	1.00-2.97
N+						
0	84	84.5	13			
I	6	83.3	10.3	2.17	0.101	0.86-5.48
2	19	84.2	13	1.07	0.813	0.61-1.87
M						
0	205	88.3	12			
I	8	87.5	8.5	2.08	0.059	0.97-4.48
Neoadjuvant therapy*						
No	39	74.4	17			
Yes	19	89.3	19	0.88	0.676	0.48-1.61
Treatment						
<i>Best supportive care</i>						
CHI only	99	86.9	13	0.38	<0.0001	0.11-0.27
Surgery +/- (neo)Adjuvant CHI	58	79.3	17	0.17	<0.0001	0.27-0.33
<i>Adjuvant CHI**</i>						
No	30	83.3	18			
Yes	25	72.0	17	0.93	0.814	0.50-1.73

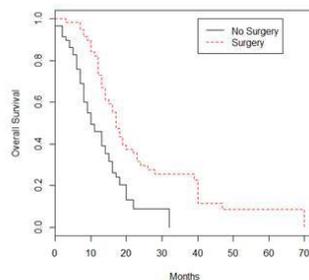
* data missing; ** only surgical patients

Multivariate Cox Analysis Total Population

	Hazard Ratio	P value	(C.I. 95%)
Age	1.1	0.483	0.98-1.04
Gender	1.3	0.37	0.74-2.6
Performance Status	1.7	0.023	1.07-2.57
Surgery	0.3	0.0002	0.16-0.57
TNM	1.2	0.135	0.94-1.55

PROPENSITY SCORE MATCHING POPULATION (n=116)

	# patients	% death	median	Hazard Ratio	p-value	(C.I. 95%)
No						
Surgery	58	89.6	10			
Surgery	58	79.3	17	0.42	<0.001	0.28-0.64



Conclusion:

Despite the poor prognosis of biphasic malignant pleural mesothelioma, in selected cases the surgical approach (Pleurectomy/Decortication) seems to be reasonable and associated with better long-term outcomes. Patients with Biph-MPM should therefore be included in trials evaluating radical procedures and adjuvant treatment.

Disclosure: No significant relationships.

Keywords: propensity score matching, pleurectomy/decortication, malignant pleural mesothelioma, biphasic mesothelioma



TUESDAY, 29 MAY 2018
08:00 - 09:00
INNOVATIVE/EXPERIMENTAL

O-043

THE VALUE OF ENDOSCOPIC LUNG VOLUME REDUCTION FOR SEVERE COPD WITH EMPHYSEMA USING ENDOBRONCHIAL VALVES: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMIZED CONTROLLED TRIALS

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Objectives:

Endoscopic Lung Volume Reduction (LVR) was developed as a lesser invasive alternative to surgical LVR, whilst maintaining the positive outcomes associated with surgery in patients with Severe COPD and Emphysema. Our study aimed to develop a systematic review and meta-analysis of Randomized Controlled Trials (RCT) to evaluate the effectiveness of endoscopic LVR in Severe COPD and Emphysema in comparison to untreated control group.

Methods:

A systematic search of electronic databases, including MEDLINE, EMBASE, and the Cochrane Library up to December 2017, was performed. The Cochrane criterion was used to assess the quality of literature. Continuous variables were converted according to the formula of Cochrane Handbook for Systematic Reviews of Interventions. Data from RCT were combined, and meta-analysis was performed. Statistical analysis was performed using Cochrane RevMan (version 5.3).

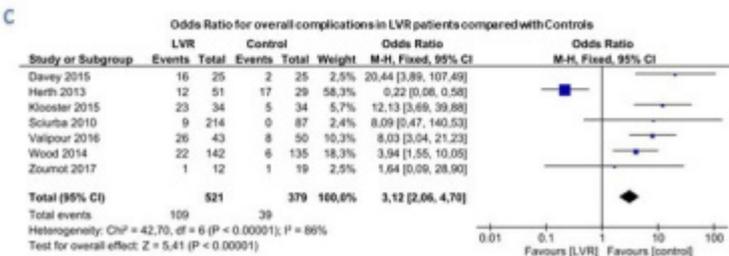
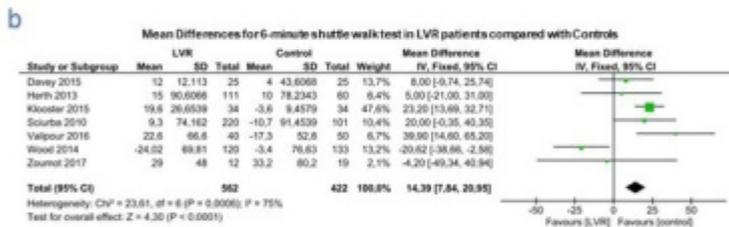
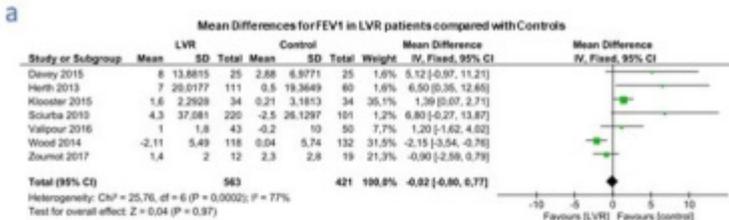
Results:

Seven of eight RCT were included in the meta-analysis; study #2 was not added because the comparator and follow-up period were different (Table).

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Table. Characteristics of selected studies. Risk of bias was assessed according to Cochrane Handbook for Systematic Reviews of Interventions.			
No.	Study type	Reference	Risk of Bias
#1	Randomised Controlled Trial	Sciurba FC, Ernst A, Herth FJ, Strange C, Criner GJ, Marquette CH, et al. A randomized study of endobronchial valves for advanced emphysema. <i>N Engl J Med</i> 2010; 363: 1233-44.	Low
#2	Randomised Controlled Trial	Ninane V, Geltner C, Bezzi M, Foccoli P, Gottlieb J, Welte T, et al. Multicentre European study for the treatment of advanced emphysema with bronchial valves. <i>Eur Respir J</i> 2012;39:1319-25.	Attrition bias Reporting bias
#3	Randomised Controlled Trial	Herth FJ, Eberhardt R, Gompelmann D, Ficker JH, Wagner M, Ek L, et al. Radiological and clinical outcomes of using Chartis to plan endobronchial valve treatment. <i>Eur Respir J</i> 2013; 41:302-8.	Low
#4	Randomised Controlled Trial	Wood DE, Nader DA, Springmeyer SC, Elstad M R, Coxson HO, Chan A, et al. The IBV Valve trial: a multicenter, randomized, double-blind trial of endobronchial therapy for severe emphysema. <i>J Bronchology Interv Pulmonol</i> 2014; 21:288-97.	Low
#5	Randomised Controlled Trial	Davey C, Zoumot Z, Jordan S, McNulty WH, Carr DH, Hind MD, et al. Bronchoscopic lung volume reduction with endobronchial valves for patients with heterogeneous emphysema and intact interlobar fissures (the BeLieVeR-HiFi study): a randomised controlled trial. <i>Lancet</i> 2015;386:1066-73.	Low
#6	Randomised Controlled Trial	Klooster K, ten Hacken NH, Hartman JE, Kerstjens HA, van Rikxoort EM, Slebos DJ. Endobronchial Valves for Emphysema without Interlobar Collateral Ventilation. <i>N Engl J Med</i> 2015; 373:2325-35.	Low
#7	Randomised Controlled Trial	Valipour A, Slebos DJ, Herth F, Darwiche K, Wagner M, Ficker JH, et al. Endobronchial Valve Therapy in Patients with Homogeneous Emphysema. Results from the IMPACT Study. <i>Am J Respir Crit Care Med</i> 2016; 194:1073-82.	Low
#8	Randomised Controlled Trial	Valipour A, Slebos DJ, Herth F, Darwiche K, Wagner M, Ficker JH, et al. Endobronchial Valve Therapy in Patients with Homogeneous Emphysema. Results from the IMPACT Study. <i>Am J Respir Crit Care Med</i> 2016; 194:1073-82.	Low

There was a large amount of outcome heterogeneity ($I^2 = 75 - 86\%$) as a direct expression of the degree of inconsistency. From our meta-analysis, no statistically significant improvement of FEV1 in LVR compared with control patients (mean difference [MD] = -0.02, 95% confidence interval [CI]: -0.80 – 0.77, $p = 0.97$ – Fig. 1a) was assessed. In addition, in the control group, a better performance at 6-minute shuttle walk test (MD = 14.39, 95% CI: 7.84 – 20.95, $p < 0.0001$ – Fig. 1b) and a reduced complication rate (Odds Ratio = 3.12, 95% CI: 2.06 – 4.70, $p < 0.00001$ – Fig. 1c) were observed.



Conclusion:

In terms of FEV1 improvement, increased exercise performance and reduced complication rate, our meta-analysis shows the absence of a clear clinical impact of LVR. A more extended follow-up to assess the durability of clinical benefits and effects on survival of LVR is needed.

Disclosure: No significant relationships.

Keywords: randomized controlled trials, severe COPD with emphysema, endoscopic lung volume reduction, lung volume reduction surgery, systematic review, meta-analysis.

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O-044

COMPARISON OF POST-OPERATIVE PAIN AND QUALITY OF LIFE BETWEEN SUBXIPHOID AND INTERCOSTAL VATS FOR THORACIC SURGERYJian Chen¹, C. Yang², L. Jiang²¹*Thoracic Surgery, Shanghai Pulmonary Hospital, Shanghai, China*²*Department of Thoracic Surgery, Shanghai Pulmonary Hospital, Medical School of Tongji University, Shanghai, China***Objectives:**

Uniportal video-assisted thorascopic surgery (VATS) emerged as a promising and exciting approach for minimally invasive thoracic surgery. However, nearly all reported uniportal VATS have been performed via the intercostal route, and chest wall trauma still exist. One-thirds of patients underwent uniportal VATS have severe pain. Here, the investigators undertook a novel uniportal VATS technique involving a subxiphoid route for thoracic surgery. We evaluated the post-operative pain and quality of life between subxiphoid and intercostal VATS for thoracic surgery.

Methods:

Since August 2014, 850 cases of subxiphoid and 1200 cases of intercostal VATS were successfully performed in our surgery group. The clinical information, length of hospitalization, post-operative surgical complications, postoperative pain and life quality were investigated. Postoperative pain was measured with a numeric rating scale (NRS) and quality of life was assessed with the EuroQol 5 dimensions (EQ5D) 1,3,6 month after discharge. The primary outcomes were the proportion of patients with clinically relevant moderate-to-severe pain (NRS ≥ 3) and mean quality of life scores.

Results:

Five hundred patients in the subxiphoid group and 700 in the intercostal group were included in the final analysis. The proportion of patients with clinically relevant pain (NRS ≥ 3) was significantly lower during the 1,3,6 month after Subxiphoid VATS than intercostal VATS (P<0.001). Quality of life according to EQ5D was significantly better after Subxiphoid VATS (P<0.001). The length of hospitalization had no difference. Postoperative surgical complications were similar between the two groups, consisting of reoperation for bleeding, pulmonary torsion, arrhythmia, or neurological events.

Conclusion:

Subxiphoid VATS is associated with less postoperative pain and better quality of life than is intercostal VATS for the six months after surgery, suggesting that subxiphoid VATS should be the preferred surgical approach for thoracic surgery. We have launched the first randomized controlled trial on (NCT 03331588) to further prove our results.

Disclosure: No significant relationships.**Keywords:** quality of life, vats, subxiphoid, uniportal, pain



O-045

EVALUATION OF A NEW TOOL FOR SELECTING RESPONDERS PATIENTS TO ENDO-BRONCHIAL VALVE (EBV) BRONCHOSCOPIC LUNG VOLUME REDUCTION (BLVR) TREATMENT: STRATX QUANTITATIVE ANALYSIS

Alfonso Fiorelli¹, M. Anile², L. Occhiati³, R. Cascone³, A. Carlucci³, F. Cassiano⁴, C. Andreotti⁴, D. Diso², N. Serra⁵, F. Venuta², E.A. Rendina⁴, M. Santini³, A. D'Andrilli⁴

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⁵Statistic, University Federico II, Naples, Italy

Objectives:

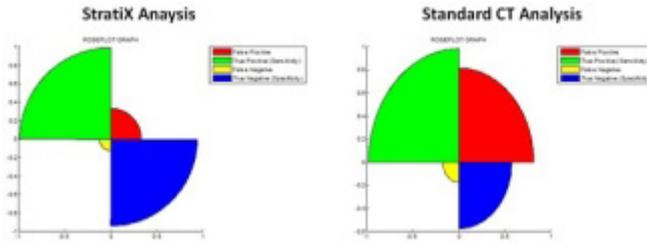
BLVR with EBV is a palliative treatment for heterogeneous emphysema. The lack of interlobar Collateral Ventilation (CV) is the main predictive factor for clinical improvement. Chartist and Computed Tomography (CT)-fissure analysis are the current methods for evaluating CV. The first is an invasive method not applicable in all patients while the second is a subjective method with significant inter-reader variability. StratX is a new cloud-based quantitative CT analysis that provides clinically-validated information on fissure completeness and emphysema density for EBV patient selection. We compared StratX versus standard CT-fissure analysis in selecting patients with high probability of EBV success.

Methods:

It was a retrospective multi-center study including all consecutive patients with heterogeneous emphysema undergoing EBV treatment. In addition to standard functional tests, patients underwent standard CT scan for evaluating fissure completeness (before treatment) and lobar collapse (after treatment). The HRCT exams were then retrospectively reviewed by StratX software. A lobar volume reduction of treated lobe (TLVR) ≥ 350 mL was considered as clinically significant. Sensitivity, specificity, PPV, NPV and accuracy of StratX and standard CT-fissure analysis for predicting TVLR ≥ 350 mL was statistically compared.

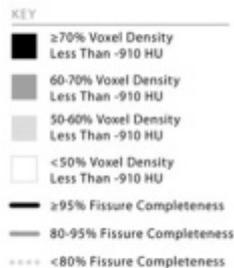
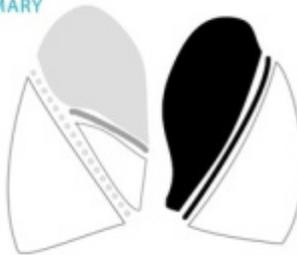
Results:

Eighty three patients assessed by standard CT and StratX were included in the analysis. Sixty-five/83 (78%) presented TVLR ≥ 350 mL. The sensitivity, specificity, PPV, NPV and accuracy of StratX versus standard CT were, respectively: 98% vs. 96% (p=1.0); 88% vs. 33% (p=0.002); 96% vs. 84% (p=0.022); 94% vs. 75% (p=0.231); and 96% vs. 83% (p=0.0105). Only patients with TVLR ≥ 350 mL had significant improvement in FEV1% (p=0.001); FVC% (p=0.003); DLCO% (p=0.01); 6MWT (p=0.006); and SGRQ (p=0.007).



StratX report of a patient undergoing EBV treatment (target lobe: LUL)

SUMMARY



RESULTS

	RIGHT LUNG				LEFT LUNG	
	RUL	RUL+RML	RML	RLL	LUL	LLL
% Fissure Completeness	72.0	51.3	66.4	51.3	100.0	100.0
% Voxel Density Less Than -910 HU	59	57	28	12	80	19
% Voxel Density Less Than -950 HU	47	45	18	7	68	12
Inspiratory Volume (ml)	2492	2705	213	773	2814	799

Conclusion:

StratX is more accurate than standard CT to evaluate CV; its use in clinical practice could improve the selection of patient to treat with EBV.

Disclosure: No significant relationships.

Keywords: endo-bronchial valve, bronchoscopic lung volume reduction, StratX Quantitative Analysis.



O-046

NEAR-INFRARED FLUORESCENCE IMAGING OF THORACIC DUCT IN MINIMALLY INVASIVE ESOPHAGECTOMY

Hao Li¹, F. Yang¹, J. Zhou¹, F. Yang², J. Li¹, J. Wang²

¹Department of Thoracic Surgery, Peking University People's Hospital, Beijing, China

²Thoracic Surgery, Peking University People's Hospital, Beijing, China

Objectives:

Chylothorax is a major serious complication after esophagectomy, which remains an important cause of reoperation and prolonged hospital stay. A promising alternative is to identify chyle leaks at the time of esophagectomy and perform the ligation selectively. However, intraoperative identification of the leakage site or the thoracic duct is still a difficult problem. In our study, we demonstrated that near-infrared (NIR) fluorescence imaging with indocyanine green (ICG) could identify the thoracic duct real-time and precisely during video-assisted thoracoscopic esophagectomy.

Methods:

We enrolled 19 patients who underwent thoraco-laparoscopic MIE (minimally Ivor-Lewis or McKeown surgery) for esophageal cancer between April 2016 and August 2017. We injected 4ml ICG subcutaneously and intradermally in the right inguinal region approximately 30 minutes before the chest operation. The D-light P® NIR thoracoscope was used for intraoperative fluorescence imaging.

Results:

The TDs were well visualized in high contrast among 16 of 19 patients (84.2%) with NIR fluorescence. The mean SBR of all the TDs was 3.93 ± 2.14 . The fluorescence imaging of TDs could be detected from 0.5h after ICG injection, and last as long as 3h with acceptable high SBR. The best time-window of TD NIR imaging seemed to be around 1h after injection. With the guidance of real-time fluorescence lymphography, 3 patients received selectively prophylactic ligation of the TD. All patients were histologically confirmed as squamous cell carcinoma, and no patient experienced postoperative chylothorax.

Conclusion:

NIR fluorescence imaging with ICG provided highly sensitive and real-time assessment of the TD injury and the source of chyle leakage, which enabled selectively prophylactic ligation of the TD during minimally invasive esophagectomy.

Disclosure: No significant relationships.

Keywords: thoracic duct, minimally invasive esophagectomy, near-infrared.

O-047

NONINTUBATED SURGICAL BIOPSY OF UNDETERMINED INTERSTITIAL LUNG DISEASE. A MULTICENTER OUTCOME ANALYSIS

Eugenio Pompeo¹, C. Atincaya Ozturk², F. Guerrero³, E. Ruffini³, M.A. Iniguez-Garcia⁴, M. Peer⁵, L. Voltolini⁶, C. Caviezel⁷, W. Weder⁷, I. Opitz⁷

¹*Thoracic Surgery, Tor Vergata University, Rome, Italy*

²*Hospital, Thoracic Surgery Clinics, Sureyyapasa Chest Disease and Thoracic Surgery Education and Research, Istanbul, Turkey*

³*Thoracic Surgery, University of Torino, Torino, Italy*

⁴*Thoracic Surgery, Head of the bronchoscopy and endoscopy service (INER), Mexico City, Mexico,*

⁵*Thoracic Surgery, Assaf Harofeh Medical Center, Zerifin, Israel*

⁶*Thoracic, Cardiac and Vascular Department, Thoracic Surgery Unit - Careggi University Hospital, Florence, Italy*

⁷*Thoracic Surgery, University Hospital Zürich, Zurich, Switzerland*

Objectives:

Nonintubated surgical biopsy of interstitial lung disease (NISBILD) has shown promise in unicenter reports as a reliable method to achieve pathological diagnosis with low morbidity. Aim of this study was to investigate for the first time early outcomes of NISBILD by a multicenter retrospective analysis.

Methods:

Seven European and extra-European Institutions participated to the study. Overall, 112 procedures were included. Mean age was 60±12 years (65 males and 47 females). Preoperative total lung capacity and diffusion capacity of carbon monoxide were 74±16% predicted and 57±18% predicted, respectively. Forty-five patients had one or more associated co-morbidity. The procedures were performed under spontaneous ventilation by intercostal block (N=94) or epidural anesthesia (N=18) with (N=58) or without (N=54) sedation and by thoracoscopic surgery (N=88), or minithoracotomy (N=24).

Results:

Mean anesthesia time, operative time and global time spent into the operating room were 31±31 min, 29±15 min and 89±156 min, respectively. Feasibility was scored as excellent, good, satisfactory or unsatisfactory requiring conversion to general anesthesia with intubation in 92, 12, 2 and 6 instances respectively. There was no mortality whereas morbidity was 7.1% and included prolonged air leaks in 4 patients and pneumonia, atelectasis, anemia and gastric bleeding in one patient each. Precise pathological diagnosis was achieved in 110 patients (98%). Mean hospital stay was 2±3 days. Intergroup comparisons of results between Institutions' series >30 patients (group A, N=60) versus cumulative results of those <30 patients (group B, N=52) showed no difference in feasibility (P=0.1), and morbidity (P=0.1) whereas hospital stay was shorter in group A (1.2±0.5 days versus 4±3 days, P<0.0001).



Conclusion:

Results of this multicenter study confirm excellent feasibility of NISBILD in 82% of patients with no mortality and satisfactory morbidity. At intergroup comparisons, there was no intergroup difference in feasibility and morbidity rate whereas hospital stay was shorter in group A.

Disclosure: No significant relationships.

Keywords: nonintubated thoracic surgery, lung biopsy of interstitial lung disease, multicenter study, spontaneous ventilation

O-048

A NONINVASIVE VISUALIZING TECHNIQUE OF THE LUNG INTERSEGMENTAL PLANE USING INFRARED THERMOGRAPHY

Kei Sakamoto, S. Mitsuboshi, S. Katagiri, H. Maeda, T. Matsumoto, T. Isaka, K. Oyama, M. Murasugi, M. Kanzaki

Department of Surgery I, Tokyo Women's Medical University, Tokyo, Japan

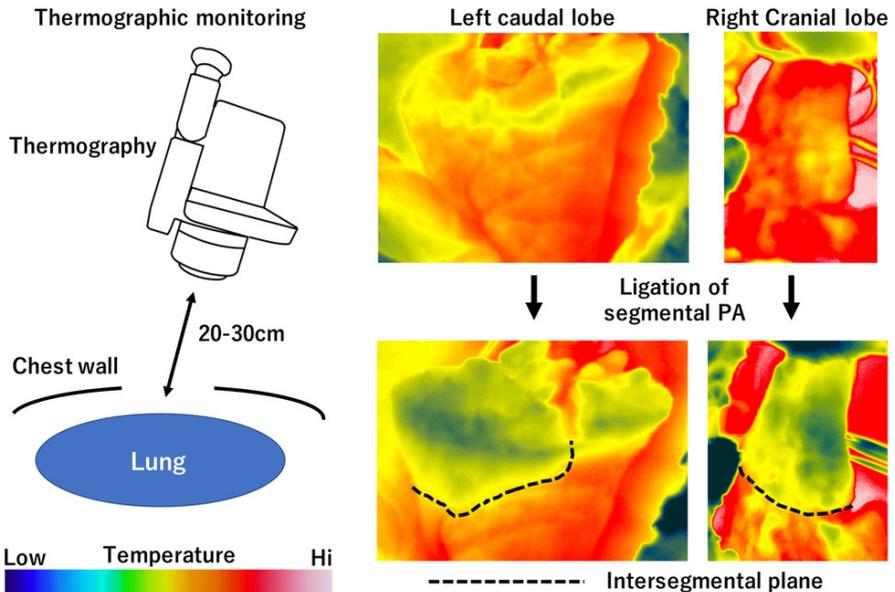
Objectives:

Visualization of the lung intersegmental plane is an important technique during lung segmentectomy. Although several techniques have been used for visualizing intersegmental planes, existing techniques require some kind of interventions, and have some limitations. In such a situation, we tried to visualize intersegmental planes with an infrared thermography and reported as a preliminary research finding (*Interact CardioVasc Thorac Surg* (2016) 23 (1): 171-173). Thereafter, we did a series of experiments and confirmed the reproducibility of the thermographic technique and obtained new findings and problems for clinical applications.

Methods:

Thirteen lung segmentectomies were performed on experimental pigs. During segmentectomies, lung surface temperatures were monitored with a thermography (InfRec Thermo GEAR R300SR-S[®]) before and after ligations of segmental arteries (PA) and veins (PV). In 3 cases, we temporary ligated segmental PAs antecedent to segmental PVs, and examined whether it's possible to identify intersegmental planes only after ligation of segmental PAs. In addition, we evaluated minimal required size of skin incision to monitor intersegmental planes.

Results:



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In all 13 experiments, intersegmental planes were visualized as sharp lines which were formed by differences of temperatures between resecting and preserving segments ($32.1 \pm 2.4^\circ\text{C}$ vs $34.4 \pm 2.2^\circ\text{C}$), and these lines were perfectly matched with inflation-deflation lines. In addition, we could identify intersegmental planes only after ligation of segmental PAs (resecting segments: $31.8 \pm 1.6^\circ\text{C}$ vs preserving segments: $34.5 \pm 0.5^\circ\text{C}$). And the minimal requirement size of skin incision was 12cm diameter.

Conclusion:

Our successful outcome confirmed the reproducibility of our thermographic technique and demonstrated the same result after ligation of PAs alone. Thus, we consider that the thermographic technique is applicable to not only simple segmentectomies such as left upper division or S6, but also complex segmentectomies such as laterobasal or dorsobasal segments in which it's difficult to identify and ligate segmental veins.

Disclosure: K. Sakamoto: This work was supported by MEXT Grants-in-Aid for Scientific Research (KAKENHI) Number JP16K19987.

Keywords: segmentectomy, thermography, intersegmental plane

TUESDAY, 29 MAY 2018**09:00 - 10:00****ESOPHAGUS/MEDIASTINUM****O-049****USING PLAN-DO-STUDY-ACT CYCLE TO IMPROVE OUTCOMES IN ESOPHA-
GECTOMY PATIENTS**

Raul Caso¹, C. Hynes¹, D. Jackson¹, M. Pichert¹, N. Haddad², M. Margolis¹, T. Watson¹, M.B. Marshall¹

¹*Department of Surgery, MedStar Georgetown University Hospital, Washington, DC, United States of America*

²*Department of Gastroenterology, MedStar Georgetown University Hospital, Washington, DC, United States of America*

Objectives:

Esophagectomy carries a significant morbidity with esophagogastrostomy leak remaining among the most challenging and severe complications. Plan-do-study-act (PDSA) cycle is a quality improvement tool that allows for process enhancement via incremental change. Through continuous rapid PDSA cycle we eliminated esophageal leaks and introduced further quality improvements in esophagectomy patients.

Methods:

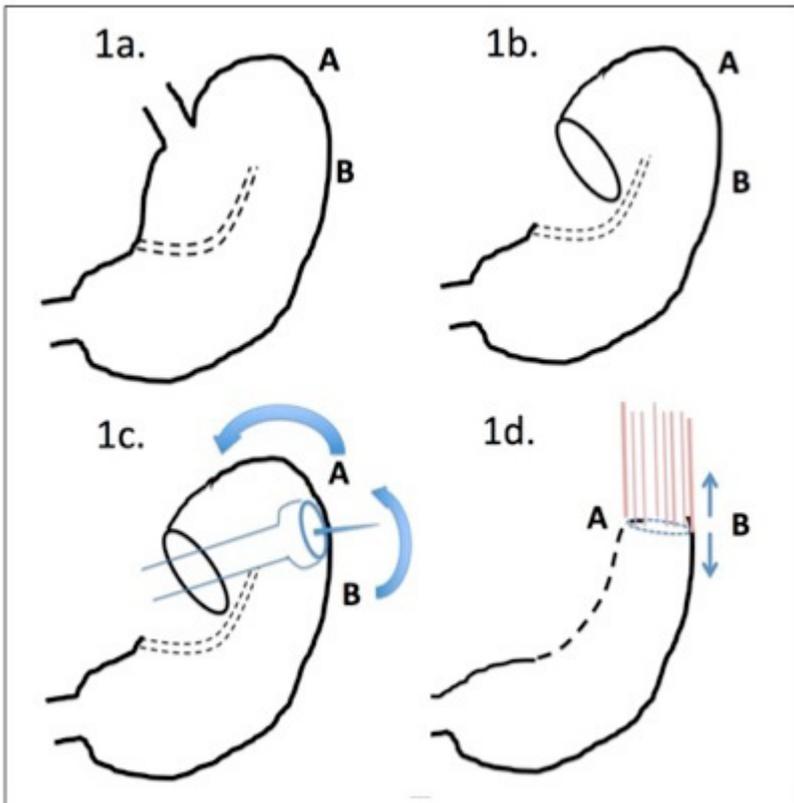
Esophageal anastomoses were performed with an end-to-end anastomotic (EEA) technique. PDSA cycle was used to identify strategies to prevent esophageal leaks. Patient outcomes were tracked. When a leak occurred the strategy was abandoned and a new cycle began. Interventions included empiric stenting, omental buttress, gastric tube preconditioning, optimizing conduit perfusion, and oversewing the anastomosis. Once leaks were eliminated, the cycle was aimed at additional morbidity, length of stay and quality of life.

Results:

Esophageal leaks occurred during the first four cycles leading to identification of the underlying etiology of anastomotic leak: tension. Leaks only occurred on the left side of the stapled anastomosis (Figure 1, labeled B). Oversewing the staple line, as the final intervention, eliminated leaks in the next 61 minimally invasive patients (Table 1). An open esophagectomy surgeon reproduced our results through elimination of leaks in his 6 subsequent patients. Without leaks, all minimally invasive esophagectomy patients are discharged on an oral diet, thus our subsequent cycle eliminated feeding tubes in the last 30 patients. Our current cycle directed at length of stay reduced the average from 5 days to 4 days. Overall complication rates have been reduced to below 5%.

Table 1. Anastomotic leak rates following minimally invasive esophagectomy. (EEA, end-to-end stapler anastomosis; N/A, not applicable.)	
Strategy	Leak rates by modification of EEA technique (N=102)
No modification	29% (4/14)
Soft tissue buttress	24% (4/17)
Prophylactic stenting	33% (3/9)
Fluorescent perfusion imaging	33% (3/9)
Oversewing	0% (0/61)

Figure 1. Creation of esophagogastronomy anastomosis following esophagectomy.



Conclusion:

PDSA cycle led to identification of the underlying etiology of and solution for esophageal leaks occurring with the EEA stapler. Results are reproducible, and this methodology continues to improve quality resulting in a dramatic reduction in morbidity, length of stay and improved quality of life for patients undergoing esophagectomy.

Disclosure: No significant relationships.

Tuesday A.M.
Abstracts 043- 066

Keywords: quality improvement, leak, minimally invasive, esophagectomy, PDSA cycle



O-050

LYMPH NODE RESPONSE AFTER NEOADJUVANT CHEMORADIATION THERAPY FOR ESOPHAGEAL ADENOCARCINOMA: TIME FOR AN APPROPRIATE YPN CLASSIFICATION

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Objectives:

Response of the primary tumor and lymph node involvement are the most important prognosticators in resected patients with esophageal adenocarcinoma after neoadjuvant chemoradiation. Response on the primary tumor is well established using T(umor) R(egression) G(rading). However, little is known about the prognostic value of lymph node response in these patients.

Methods:

Hematoxylin-eosin slides of 193 adenocarcinoma patients with clinical suspicion of lymph node involvement (cN+) and treated with neoadjuvant chemoradiation therapy between 2008 and 2015 were all reassessed by a senior pathologist. Lymph node response (LNR) was defined as a combination of central fibrosis and at least one other characteristic such as hemosiderin pigment- or cholesterol-laden histiocytes, acellular mucin pools and granulomatous inflammatory reaction. Lymph nodes were categorized in four categories: 1° as positive (ypN+) when viable tumor was found according to TNM 8th edition. 2° as negative (ypN0) in absence of viable tumor. 3° as lymph nodes with signs of LNR (LNR+). 4° as lymph nodes without signs of LNR (LNR-). All patients were grouped according to lymph node positivity and lymph node regression. Multivariate and survival analysis were performed by Cox proportional hazard regression analysis.

Results:

Thirty-four patients were ypN+/LNR+, 60 were ypN+/LNR-, 42 were ypN0/LNR+ and 57 were ypN0/LNR-. Median overall survival was respectively 41.0 months, 18.5 months, 31.2 months and 62.9 months. Survival was significantly different between ypN0 groups ($p=0.022$) but not between ypN+ groups ($p=0.299$). Multivariate analysis showed that LNR was an independent prognosticator ($p=0.005$).

Conclusion:

In cN+ esophageal adenocarcinoma patients treated with neoadjuvant chemoradiation with final pathology being ypN0 after esophagectomy, median overall survival is doubled when no signs of LNR were found suggesting these patients were in fact true N0 and that ypN0/LNR+ have a similar prognosis as ypN+/LNR+. Using these four categories of ypN allows for more precise evaluation of the impact of induction therapy.

Disclosure: L. Depypere: Clinical Research Fund University Hospitals Leuven

Keywords: esophageal carcinoma, neoadjuvant treatment, lymph node response, survival



O-051

T4+T5 SYMPATHECTOMY IN THE TREATMENT OF PALMAR-PLANTAR HYPERHIDROSIS-A RANDOMIZED CONTROL TRIALYang Hu*Thoracic Surgery, West China Hospital, Sichuan University, Chengdu, China***Objectives:**

More than 25% palmar hyperhidrosis patients suffer plantar hyperhidrosis. Traditional T4 sympathectomy seemed not good enough for relieving plantar symptoms. Our research tries to achieve this aim by applying T4+T5 sympathectomy.

Methods:

Seventy two (28 male and 44 females included, age 25.35 ± 9.27) patients diagnosed as palmar-plantar hyperhidrosis were enrolled. They were randomly divided into two groups, 36 patients underwent T4 sympathectomy and the other half had the T4+T5 sympathectomy. the palmar and plantar temperature change in operation and the revelation of hyperhidrosis were evaluated. Follow-up focusing on the recurrence and compensatory sweating were carried out too.

Results:

The T4+T5 group showed more plantar temperature elevation (1.36 ± 0.38) than the T4 group (0.46 ± 0.53), $P=0.00295$, as more percentage of foot hyperhidrosis relief (97% vs 55%). There was no recurrence in 3-month follow-up in both groups. And the compensatory sweating was comparable (48% vs 45%).

Conclusion:

T4+T5 sympathectomy is a feasible and reliable method in the treatment of palmar-plantar hyperhidrosis with good control rate of plantar symptoms and no increase in compensatory sweating.

Disclosure: No significant relationships.

Keywords: T4 sympathectomy, plantar hyperhidrosis, T4+T5 sympathectomy

O-052

NATIONAL TRENDS AND PERIOPERATIVE OUTCOMES OF ROBOTIC THYMECTOMY. A PROPENSITY-MATCHED COMPARISON WITH OPEN AND VIDEO ASSISTED THORACOSCOPIC SURGERY (VATS) APPROACHES

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Objectives:

Despite the recent increased adoption of robotic-approach for resection of thymic tumors, current reports are drawn from large-volume academic-centers. To date, little data exists assessing national trends and outcomes of robotic thymectomies compared to open and VATS approaches.

Methods:

The National Cancer Database was queried for patients who underwent resection for thymic tumors (2010-2014). Differences between the different approaches(Robotic–VATS–Open) were compared (Chi-square, Kruskal-Wallis tests). We tracked national trends for the different techniques over the study period utilizing the Mantel-Haenszel test for trends. Predictors of using the robotic-approach were estimated by Logistic-regression analysis. Propensity-matching analysis (robotic vs.VATS & robotic vs.open)was done(1:1-Caliper 0.05), controlling for age, gender, comorbidity-index, induction-treatment, tumor size, and tumor-extension.

Results:

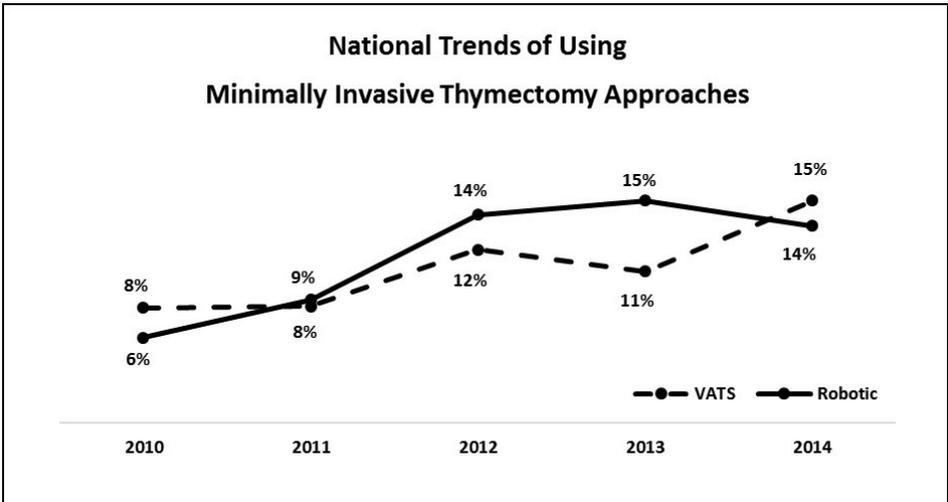
Two thousand five hundred and fifty eight thymectomies were performed (Robotic=300, VATS=280, open=1,978). The use of a robotic-approach increased from 6%(2010) to 14%(2014) (Mantel-Haenszel, $P<0.001$) (Figure). The number of hospitals performing at least 1 robotic-thymectomy increased from 22(2010) to 52(2014). Differences between the approaches are summarized (table). Independent predictors influencing the choice of a robotic approach included; Academic-Research/integrated cancer-program (HR:1.66, CI:1.22-2.27), later year of diagnosis (2014;HR:2.23,CI:1.31-3.80), and Asian race(HR:1.68,CI:1.05-2.69). Robotic approach was less likely used in mid-west hospitals (HR:0.65,CI:0.42-0.99), for larger tumors (cm;HR:0.85,CI:0.80-0.90), adjacent organs-invasion (HR:0.55,CI:0.37-0.82), thymic carcinoma (HR:0.62,CI:0.40-0.97), and following induction-chemotherapy(HR:0.22,CI:0.08-0.61). In propensity-matched groups, there were no differences in the rate of positive margin, nodal dissection, 30-days readmission, and 30-/90-days mortality between the groups. However, a robotic approach was associated with fewer conversions compared to VATS, and a shorter length of stay compared to open. There were no differences in 5-year OS between the matched groups [(Robotic 93% vs. VATS 94%, $P=0.571$), (Robotic 91%vs. Open 80%), $P=0.094$].

Variables	Robotic (n=197)	VATS (n=197)	P value
Conversion to open approach	23 (12%)	11 (6%)	0.031
Regional LN dissection (n=391)	69 (35%)	61 (31%)	0.410
Lymph nodes resected	0 (0-1)	0 (0-1)	0.945
Positive resection margin (n=363)	50 (28%)	43 (23%)	0.319
Hospital stay	3 (2-4)	3 (1-4)	0.255
30d readmission (n=392)	4 (2%)	4 (2%)	1*
30d mort (n=295)	1 (1%)	2 (1%)	1*
90d mort (n=292)	1 (1%)	2 (1%)	1*

Variables	Robotic (n=272)	Open (n=272)	P value
Conversion to open approach	16 (6%)	N/A	N/A
Regional LN dissection (n=539)	93 (34%)	86 (32%)	0.542
Lymph nodes resected	0 (0-2)	0 (0-2)	0.972
Positive resection margin (n=505)	68 (27%)	53 (21%)	0.112
Hospital stay	2 (1-4)	4 (2-6)	<0.001
30d readmission (n=544)	9 (3%)	4 (1.5%)	0.261*
30d mort (n=429)	0	2 (1%)	0.237*
90d mort (n=421)	1 (0.5%)	2 (1%)	0.615*

* Calculated by Fischer's Exact test

Tuesday A.M.
Abstracts 043_066



Conclusion:

Over a 4-years' period, the number of robotic thymectomies and hospitals performing thymectomies have doubled. In matched analysis, robotic cases had fewer conversions and a shorter hospital-stay without compromising the adequacy of resection, readmission/mortality rates, or survival. Current trends demonstrate increased robotic utilization for small-thymomas with excellent perioperative results.

Disclosure: No significant relationships.

Keywords: national trend, robotic, thymectomy



O-053

IMPACT OF INTRODUCTION OF AN ENHANCED RECOVERY PATHWAY IN ESOPHAGEAL CANCER SURGERY: A PROSPECTIVE COHORT STUDY AND PROPENSITY SCORE MATCHING ANALYSIS

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Objectives:

To determine the impact on perioperative results of a newly implemented Enhanced Recovery Pathway (ERP) as compared to traditional care (TC) after esophagectomy in a single center study.

Methods:

A cohort study based on prospectively collected data was conducted in a tertiary center for esophageal surgery from January 2015 till September 2017, including all patients having undergone intentional curative esophagectomy for cancer. Primary endpoints were postoperative complications defined according to the Esophageal Complications Consensus Group (ECCG) criteria and the Comprehensive Complications Index (CCI%). Secondary endpoints were postoperative length-of-stay (LOS) and 30-days readmission rate. To reduce possible bias due to confounding variables, a propensity matched analysis was conducted.

Results:

There were 160 TC and 50 ERP patients. No differences were found neither in patient demographics, comorbidities, tumor characteristics nor in treatment types. A significant decrease in complications was found between the two groups, especially pneumonia and respiratory failure requiring reintubation (38% in TC and 16% in ERP; $p=0.0007$ and 16% versus 4%; $p=0.026$ respectively) and postoperative blood transfusion (26%-4%; $p=0.003$). Consequently, CCI% was statistically different between both groups: TC 38.1% vs. ERP 28.2% ($p=0.03$). Median LOS was also significantly shortened from 13 days (IQR 10-20) in TC to 9 days (IQR 8-13) in ERP patients ($p=0.009$). The 30-day readmission rate (10% in TC and 10% in ERP) was not significantly affected. Forty-seven ERP-patients could be matched to 47 TC-patients in a propensity analysis in which 11 variables were used to ensure an even distribution of confounders between groups. This analysis confirmed the significant impact on pneumonia ($p=0.032$); blood transfusion ($p=0.021$) and LOS ($p=0.022$).

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		TC		ERP	
Age	yrs (mean)	68		66	
Gender	Male	42	88%	39	81%
	Female	6	13%	9	19%
BMI	Underweight	3	6%	3	6%
	Normal range	15	31%	17	35%
	Obese	8	17%	9	19%
	Overweight	22	46%	19	40%
Alcohol	No	43	90%	43	90%
	Abuse in Hx or >5 U/d	5	10%	5	10%
Smoking	No or stopped >1 yr	35	73%	34	71%
	Active or stopped < 1yr	13	27%	14	29%
	Charlson Comorbidity Score				
	0	25	52%	26	54%
	1	16	33%	14	29%
	>1	7	15%	8	17%
Performance	ECOG 0	37	77%	35	73%
	ECOG 1	11	23%	12	25%
	ECOG 2		0%	1	2%
prev mal	No	43	90%	39	81%
	Yes	5	10%	9	19%
Treatment	Neoadjuvant + surgery	26	54%	32	67%
	Primary Surgery	22	46%	16	33%
Surg type	MIE	24	50%	26	54%
	Open	24	50%	22	46%
Anastomosis	Cercical	27	56%	28	58%
	Intrathoracic	21	44%	20	42%

	TC			ERP			p=
	95% CI		Upper	95% CI		Upper	
	Lower	Upper		Lower	Upper		
N=	47			47			
Predicted probability	0,2115	0,19	0,23	0,2114	0,19	0,23	0,994
CCI%	31,10	23,89	38,31	27,95	21,72	34,17	0,507
CCI% 30d readmittance	34,67	27,10	42,24	30,48	24,17	36,79	0,395
Pneumonia	33,3%	19,5%	47,2%	14,6%	4,2%	24,9%	0,032
Respiratory insufficiency	14,6%	4,2%	24,9%	4,2%	0%	10,0%	0,082
Anastomotical leakage	10,4%	1,5%	19,4%	4,2%	0%	10,0%	0,243
Delirium	10,4%	1,5%	19,4%	2,1%	0%	6,3%	0,094
Transfusion postOP	22,9%	10,6%	35,2%	6,3%	0%	13,4%	0,021
Readmittance ICU	14,6%	4,2%	24,9%	8,3%	0,2%	16,4%	0,342
ICU stay (days)	3,6	0,3	7,0	1,0	0	2,2	0,145
LOS (days)	18,94	13,73	24,14	12,25	9,78	14,72	0,022
Readmittance within 30 days	20,8%	8,9%	32,8%	18,8%	7,3%	30,2%	0,800

Table: Confounding variables for propensity analysis and results propensity matching

Conclusion:

ERP for esophagectomy in a tertiary referral center is associated with a significant decrease in postoperative (respiratory) complications which results in a significant decrease of LOS without affecting readmission rate.

Disclosure: No significant relationships.

Keywords: esophagectomy, cancer, peri-operative care



O-054

POSTOPERATIVE ADJUVANT RADIOTHERAPY MAY INCREASE THE RISK OF CANCER-RELATED DEATH IN ELDERLY PATIENTS WITH THYMIC CARCINOMA - A STUDY BASED ON SEER DATABASELi Zhixin¹, G. Jiang²¹*Thoracic Surgery Department, Shanghai Pulmonary Hospital, Shanghai, China*²*Department of Thoracic, Shanghai Pulmonary Hospital, Shanghai, China***Objectives:**

Due to low incidence of thymic carcinoma, its extraordinary different prognosis from thymoma, and a greater risk of non-cancer related death in elderly patients, the role of postoperative adjuvant radiotherapy (PORT) is controversial among elderly (≥ 70 years old) patients underwent surgical treatment for thymic carcinoma. The purpose of this study was to explore the role of PORT in postoperative survival in elderly patients with thymic carcinoma.

Methods:

ICDO3 was used to search treatment and follow-up data of patients with resected thymic carcinoma in SEER database. Kaplan-Meier survival analysis was conducted to compare difference between postoperative cancer-related survival (CRS) and non-cancer related survival (NCRS) in elderly patients. Competitive risk models were also used to assess the effect of PORT on the risk of cancer-related survival in different age groups (< 70 vs ≥ 70 yrs old)

Results:

A total of 611 patients with thymic carcinoma underwent resection, 138 patients in elderly group (≥ 70 yr), including 66 patients with PORT and 72 patients without PORT. The overall 5-year cancer-related survival (CRS) was 63.5%. The 5-years cancer-related survival (CRS) was 73.1% in non-radiation group and 53.1% in radiation group ($P = 0.02 < 0.05$). In terms of NCRS, there was no significant difference in 5-year survival between non-radiation and radiation group. (72.9% vs 78.3%, $p = 0.12$). Simultaneous competition risk models show a significantly increased risk of cancer-related deaths in elderly patients. ($P = 0.03$)

Conclusion:

Postoperative adjuvant radiotherapy may decrease cancer-related survival in patients in elderly patients (≥ 70 years) after thymectomy. For elderly patients with thymic carcinoma, PORT should be carefully considered.

Disclosure: No significant relationships.

Keywords: radiation, thymic carcinoma, elderly, resected

TUESDAY, 29 MAY 2018
10:30 - 11:30
PULMONARY NEOPLASTIC I

O-055

DO INDIVIDUAL SURGEON VOLUMES AFFECT OUTCOMES IN THORACIC SURGERY?

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United States of America*

Objectives:

Minimum volume standards for thoracic surgical procedures have been advocated to improve outcomes. However, such standards are controversial within the thoracic surgery literature, and the methodology to determine cut points between high and low volume surgeons/hospitals have been criticized. The aim of this study was to determine if surgeon volume is associated with differences in outcomes using a large state-wide database.

Methods:

The study utilized the New York State Department of Health Statewide Planning and Research Cooperative (SPARCS) data for analysis. Patients who underwent major lung resections including sublobar resection, lobectomy, and pneumonectomy were included (1995-2014) and were categorized based on the extent of resection. Average annual surgical volumes of sublobar resection, lobectomy, and pneumonectomy were calculated separately and grouped into three categories based on the tertiles (Table 1). Primary outcomes were in-hospital mortality and 30-day readmission. Events and percentages were presented for patients' characteristics and outcomes except for events fewer than 11 to avoid patient identification.

Results:

During the time period, 52,930 major lung resections were performed, of which 34,220 (64.7%) were performed by low- or medium-volume surgeons. In-hospital mortality was significantly greater for low-volume surgeons compared to high-volume surgeons for sublobar resection (2.1% vs 0.9%, $p < 0.01$), lobectomy (2.7% vs 1.4%, $p < 0.01$), and pneumonectomy (difference not reportable $p < 0.01$). Medium-volume surgeons also had lower in-hospital mortality rates compared to low-volume surgeons for lobectomy (1.7% vs 2.7%, $p = 0.01$). Additionally, low-volume surgeons had higher 30-day readmission rates for patients undergoing lobectomy. However, low- and medium-volume surgeons as a group were more likely to operate on non-white patients, patients with Medicaid, and patients who had congestive heart failure and chronic pulmonary disease present on admission.

<i>Surgeon Volume</i>				p-value		
				High vs Medium	High vs low	Medium vs low
Outcomes of patients undergoing sublobar resection						
	<i>Low (<16)</i>	<i>Medium (16-34)</i>	<i>High (≥34)</i>			
In-hospital mortality	306(2.1%)	304(2.1%)	140(0.9%)	<0.01	<0.01	0.83
30-day readmission	1707(11.7%)	1685(11.8%)	1779(11.2%)	0.11	0.19	0.75
Outcomes of patients undergoing lobectomy						
	<i>Low(<7)</i>	<i>Medium(7-19)</i>	<i>High(≥19)</i>			
In-hospital mortality	61(2.7%)	42(1.7%)	36(1.4%)	0.44	<0.01	0.01
30-day readmission	345(15.5%)	312(12.6%)	284(11.2%)	0.14	<0.01	<0.01
Outcomes of Patients undergoing pneumonectomy						
	<i>Low (<6)</i>	<i>Medium (6-13)</i>	<i>High(≥13)</i>			
In-hospital mortality	33(9.2%)	14(4.8%)	NR	0.12	<0.01	0.03
30-day readmission	70(19.6%)	51(17.4%)	58(17.8%)	0.89	0.57	0.48

Conclusion:

Low or medium volume thoracic surgeons performed the majority of major lung resections during the study period. Although low volume surgeons have higher in-hospital mortality and readmission rates compared to high volume surgeons, it is possible these differences were due to operating on higher risk patients.

Disclosure: No significant relationships.

Keywords: thoracic surgery, surgeon volume, pulmonary resection

O-056**IMPROVED SURVIVAL IN N2 NON-SMALL CELL LUNG CANCER: BETTER STAGING OR BETTER TREATMENT, ANALYSIS OF THE SEER DATABASE**

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Objectives:

Over the past several decades, there has been an apparent improvement in survival of patients with stage IIIA-N2 NSCLC. PET-scanning for NSCLC staging/restaging was approved by CMS in 2001. We sought to determine whether this survival improvement was due to more sensitive staging-modalities and/or an evolution in surgical practice.

Methods:

The Surveillance, Epidemiology and End Results(SEER)database was queried (1988-2013) to identify patients with NSCLC staged N2M0-1. Staging was modified to the AJCC 7th edition. Patients were categorized into treatment groups based on year of diagnosis. Comparison of survival was made between two time periods defined by the time PET approval was granted by CMS; period 1(P1) from 1988-2001 and period 2(P2)from 2002-2013. Patients treated surgically(1988-2001 vs. 2002-2013)were propensity matched by age, gender, histology, T-stage,procedure, and number of lymph nodes resected. Overall(OS)and cancer-specific survival(CSS)were compared between the matched pairs.

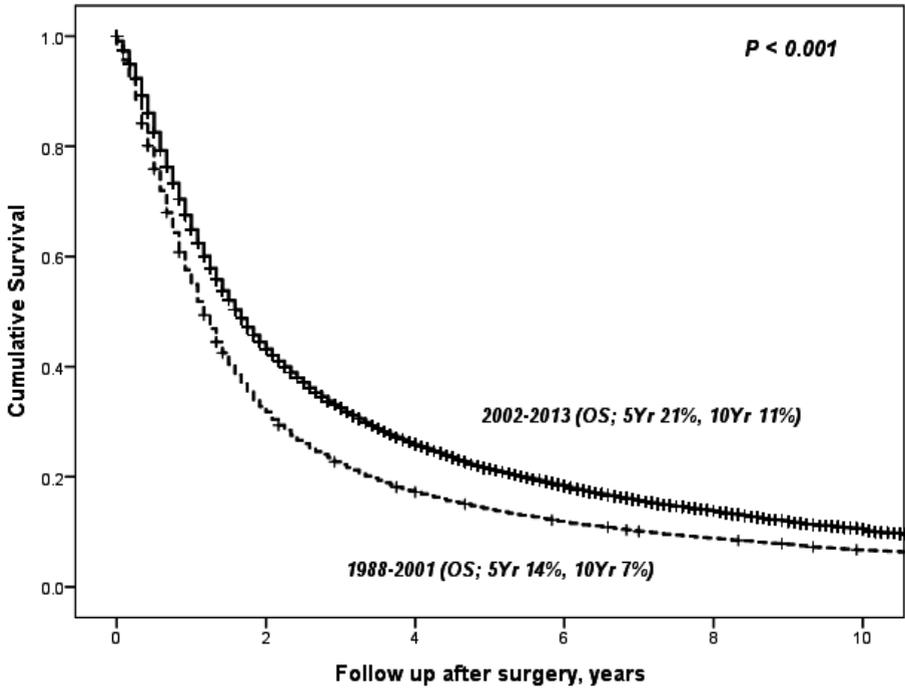
Results:

224,295 patients were identified with N2-M0/M1 NSCLC. 5-, 10-year survival was 4.8%, 2.2% in P1 and 6.7%-3.2% in P2. There was a significant increase in M1 incidence in P2 compared to P1(63% vs. 55%, $p<0.001$). A total of 54070 patients had T0-3N2M0 and their 5yr-OS was significantly better in P2 vs. P1(16.3% vs.11.8%). Complete treatment information was available on 39127/54070 patients. Survival for this cohort was significantly better in P2 regardless of treatment modality(Table,Figure). In patients undergoing surgical resection, there was a significant increased use of lobectomy(69% vs. 76.5%)and a decreased use of pneumonectomy(19% vs. 10%). Significantly more total lymph nodes were resected in P2 vs. P1(9 vs.7, $p<0.001$). In the matched cohorts, 5-year OS was significantly improved in P2 vs. P1(OS: 34% vs. 24%, $p<0.001$)as was CSS(51%vs. 38%, $p<0.001$).

Conclusion:

The main driver of the significant improvement in survival of cT0-3N2M0-NSCLC patients over the last 25-years was improved clinical-staging with increased PET utilization, implied by the significant increase in M1-disease. Survival-improvements might also be credited to surgical-practices evolution, increased use of induction-therapy, decreased use of pneumonectomy, and more thorough lymphadenectomy.

T0-3 N2 M0 NSCLC with known treatment status (n=39 127)



Tuesday A.M.
Abstracts 043-066

Clinico-pathological data			
	1988-2001	2002-2013	P value
Age	68 (60-74)	68 (60-75)	<0.001
Gender (Male)	6340 (58.4%)	15490 (54.8%)	<0.001
Race			<0.001
White	8976 (82.7%)	23291 (82.4%)	
Black	1178 (10.9%)	3369 (11.9%)	
Asian	565 (5.2%)	1292 (4.6%)	
Others	134 (1.2%)	322 (1.1%)	
Histology			<0.001
Adenocarcinoma	4419 (40.7%)	11779 (41.7%)	
Squamous CC	3450 (31.8%)	9273 (32.8%)	
Others	2984 (27.5%)	7222 (25.5%)	

T stage			
T0-1	2438 (22.5%)	6781 (24%)	<0.001
T2	5030 (46.3%)	14278 (50.5%)	
T3	3385 (31.2%)	7215 (25.5%)	
Resection	4801 (44.2%)	10616 (37.5%)	<0.001
RT Only	6052 (55.8%)	17658 (62.5%)	<0.001
Five year OS			
All patients	14%	21.4%	<0.001
RT only	7%	13.5%	<0.001
Resection	23%	34%	<0.001

Disclosure: No significant relationships.

Keywords: SEER database, staging, non-small cell lung cancer



O-057

TUMOR SIZE CONTRIBUTES TO POORER SURVIVAL MORE THAN EXTENSION IN PATIENTS WITH RESECTED T4N0-1M0 NON-SMALL CELL LUNG CANCERQiuyuan Li¹, P. Zhang¹, Y. Wang², D. Liu³, L. Luo⁴, R. Diasio⁵, P. Yang⁶, G. Jiang¹¹*Department of Thoracic Surgery, Shanghai Pulmonary Hospital Tongji University, Shanghai, China*²*School of Public Health and Management, Wenzhou Medical University, Wenzhou, China*³*Division of Pulmonary & Critical Care Medicine, West China Hospital Sichuan University, Chengdu, China*⁴*Department of Research and Education, Guizhou Province People's Hospital, Guiyang, China*⁵*Mayo Clinic Cancer Center, Mayo Clinic, Rochester, MN, United States of America*⁶*Division of Epidemiology, Department of Health Sciences Research, Mayo Clinic, Rochester, MN, United States of America***Objectives:**

With uncertainty in optimal treatment of T4N0-1 non-small cell lung cancer (NSCLC), this study set out to evaluate the efficacy of surgery as well as to identify clinicopathological factors which promote long-term survival in the redefined T4N0-1 tumors under the most recent 8th edition TNM staging.

Methods:

Patients with clinically staged N0-2M0 NSCLC with T4 extension or tumor size > 7cm diagnosed 2010-2013 in National Cancer Database were identified. Of the 1,588 N0-1 surgical cases, Cox regression analysis was applied to investigate independent survival predictors. For N0-1 NSCLC with no T4 extension and tumor size > 7cm, survival benefit of surgery and non-surgical treatment were compared after propensity score matching by age, gender, race, facility type, comorbidity, laterality, clinical N stage, histology and tumor grade.

Results:

The 5-year overall survival of the redefined T4N0-1 NSCLC patients undergoing surgery was 41.5%. Age, gender, comorbidity, nodal status, resection margin, tumor grade, chemotherapy and extension-size group were shown to be independent predictors of survival. In particular, patients with only T4 extension descriptor experienced better survival than patients with only size descriptor (hazard ratio [HR]: 0.75, 95% confidence interval [CI]: 0.62-0.92, *P* = 0.016). In the latter group, surgery led to better survival than non-surgical treatment after matching (HR: 0.45, 95% CI: 0.42-0.48, *P* < 0.001).

Conclusion:

In the newly defined T4 NSCLC, size is a descriptor that matters more than local extension for patient survival when surgery is considered. More specifically, surgery is a preferred treatment and would achieve better survival in tumors with size < 7cm for T4 extension, N0-1 NSCLC.

Disclosure: No significant relationships.

Keywords: locally advanced, survival, non-small cell lung cancer, surgery, tumor size

O-058

LIMITED RESECTION IS INFERIOR TO LOBECTOMY FOR LUNG CANCER 2-5 CENTIMETRE (CM) IN SIZEA. Sedrakyan¹, J. Mao¹, S. Harrison², B. Lee², J. Port², N. Altorki², Brendon Stiles²¹*Department of Healthcare Policy and Research, Weill Cornell Medicine, New York-Presbyterian Hospital, New York, NY, United States of America*²*Cardiothoracic Surgery, Weill Cornell Medicine, New York-Presbyterian Hospital, New York, NY, United States of America***Objectives:**

Sublobar resection (SLR), either wedge or segmentectomy, is under evaluation as an alternative to lobectomy for NSCLC. However, the upper size limit in clinical trials is ≤ 2 cm. Outcomes with SLR for larger stage I tumors are not known. In contrast, stereotactic radiation guidelines suggest treatment of tumors up to 5cm. We sought to determine whether lobectomy and SLR were equivalent for 2-5cm tumors.

Methods:

We utilized the SEER-Medicare dataset to identify stage I NSCLC patients ≥ 66 years old with tumor size 2-5cm. Patient characteristics among cohorts undergoing lobectomy versus SLR were compared (*t* tests for continuous variables, χ^2 tests for categorical variables). Survival was assessed by Kaplan-Meier method for overall and cancer specific survival. Propensity score matching was performed for further analysis.

Results:

Between 2007-2012, there were 3,890 lobectomies (58.5%) and 692 SLR (36%) for stage I tumors 2-5cm. Demographic differences existed between patients undergoing lobectomy vs. SLR. Patients undergoing SLR were older (77.5 vs. 75.4, $p < 0.001$), had smaller tumors (2.9 cm vs. 3.2 cm, $p < 0.001$), and more comorbidities ($p < 0.001$). Patients undergoing lobectomy were much more likely to have any lymph nodes removed (95.6% vs. 65.6%, $p < 0.001$) and to have > 10 lymph nodes removed (29.6% vs. 7.5%, $p < 0.001$). All-cause (HR 1.65, CI 1.48-1.85) and cancer-specific (HR 1.63, CI 1.29-2.06) mortality were higher following SLR. In propensity matched groups ($n = 666$ each), after matching for demographic, comorbidity, tumor, and surgeon/facility variables, both all-cause (HR 1.27, CI 1.10-1.47) and cancer-specific (HR 1.54, CI 1.11-2.16) mortality (Figure) were higher with SLR.

Conclusion:

In pathologically staged NSCLC patients, SLR is inferior to lobectomy for tumors 2-5cm in size. SLR is associated with inferior lymphadenectomy and with worse survival. In NSCLC patients who would tolerate resection, other localized treatment options for NSCLC such as stereotactic radiation therapy or radiofrequency ablation may also be inferior to lobectomy for large tumors.

Disclosure: B. Stiles: Pfizer - wife employed with stock and salary Merck - consultant Lung Cancer Research Foundation - Board member



Keywords: Lobectomy, limited resection, lung cancer, wedge resection, segmentectomy

O-059

PRIMARY TUMOR RESECTION OF NON-SMALL CELL LUNG CANCER PATIENTS WITH IPSILATERAL PLEURAL DISSEMINATION (M1A): A POPULATION-BASED STUDY*Zewen Sun, H. Li, T. Liu, X. Sui, F. Yang, J. Wang**Department of Thoracic Surgery, Peking University People's Hospital, Beijing, China***Objectives:**

Stage IV non-small cell lung cancer (NSCLC) patients with ipsilateral pleural dissemination (M1a) are generally contraindicated for surgery. However, several small sample reports have demonstrated that these patients may benefit from surgical intervention recently. This study aims to evaluate the clinical effects of primary tumor resection (PTR) in patients with this disease.

Methods:

In total, 652 stage IV NSCLC patients with malignant pleural effusion (55.1%), 472 with pleural nodules (39.8%), and 60 with pericardial effusion (5.1%) were identified from the Surveillance, Epidemiology, and End Results database during 2004-2014. Survival analysis was performed with Kaplan-Meier method and Cox proportional hazards regression. Overall survival of patients with or without PTR were compared in propensity-score matched group (caliper=0.02).

Results:

Overall, patients with ipsilateral pleural nodules had significantly better OS than those with malignant pleural (log-rank $p < 0.001$; median survival time (MST), 13 vs. 9 months) and pericardial effusion (log-rank $p < 0.001$; MST, 13 vs. 7 months) (Figure A). Meanwhile, patients with PTR had significantly better OS than those without PTR (log-rank $p < 0.001$; MST, 31 vs. 9) (Figure B). This trend was also observed when patients were subdivided into three above mentioned M1a subgroups. Similarly, multivariate analysis showed that PTR was still associated with improved OS (hazard ratio (HR), 0.538; 95% CI, 0.415-0.696; $p < 0.001$). In 125 propensity-score matched pairs, better OS was further validated in patients with PTR compared with those without surgical intervention to primary site (log-rank $p < 0.001$) (Figure C). Finally, in the PTR cohort, patients underwent lobectomy had significantly better OS than those underwent sublobar resection (log-rank $p < 0.001$) (Figure D).

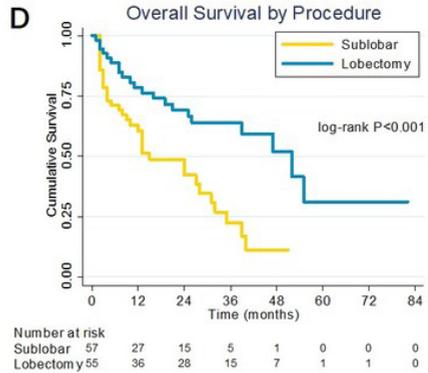
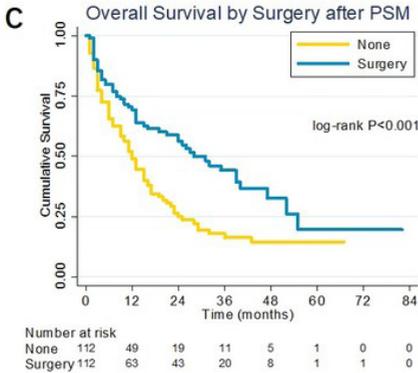
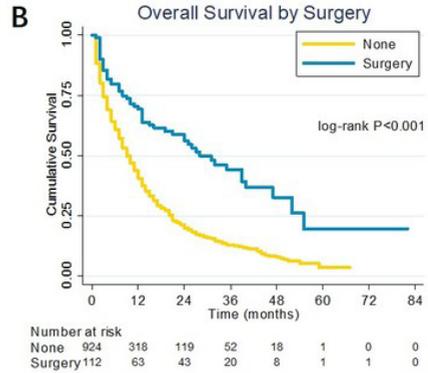
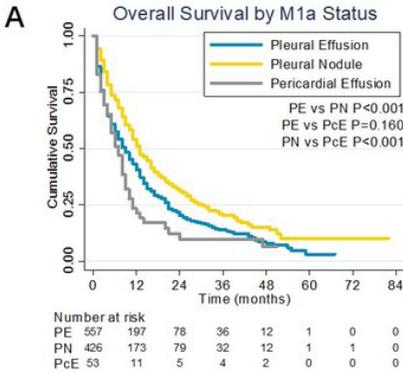


Figure: **A.** Overall survival in stage IV NSCLC patients with different M1a status; **B.** and **C.** Overall survival in patients with or without PTR before and after PSM; **D.** Overall survival in patients underwent surgery with different surgical procedure. PTR, primary tumor resection PSM, propensity-score matching

Conclusion:

This retrospective population-based study indicated that primary tumor resection could prolong overall survival in stage IV NSCLC patients with ipsilateral pleural dissemination (M1a). Besides, lobectomy might further benefit the patients with this disease.

Disclosure: No significant relationships.

Keywords: ipsilateral pleural dissemination, surgery, SEER database, non-small cell lung cancer

Tuesday A.M.
Abstracts 043-066

O-060**INCIDENCE AND DISTRIBUTION OF MEDIASTINAL LYMPH NODE METASTASIS AND IT'S IMPACT ON SURVIVAL IN PATIENTS WITH NON-SMALL CELL LUNG CANCER LESS THAN 3 CENTIMETRE (CM): DATA FROM 2292 CASES**

M. Yang¹, R. Liang¹, J. Yang¹, S. Li¹, H. Long¹, J. Fu¹, L. Zhang¹, P. Lin¹, X. Wang², T. Rong², Hao-Xian Yang¹

¹*Department of Thoracic Surgery, Sun Yat-Sen University Cancer Center, Guangzhou, China*

²*Department of Thoracic Surgery, Sun Yat-Sen University Cancer Center; Guangdong Esophageal Cancer Institute, Guangzhou, China*

Objectives:

We aim to investigate the incidence and distribution of mediastinal lymph node metastases (MLNM) in non-small cell lung cancer (NSCLC) less than 3 cm in diameter, with the purpose of guiding mediastinal lymph node dissection.

Methods:

A total of 2292 resected NSCLC cases between January 2001 and December 2014. These patients were grouped according to the primary tumor lobes. The incidence and distribution of pathologic MLNM were compared among groups. Multivariate analysis was conducted to find the independent factors impacting MLNM. The impact of MLNM on overall survival was also compared.



Fig. 1. Distribution of mediastinal lymph node metastases.

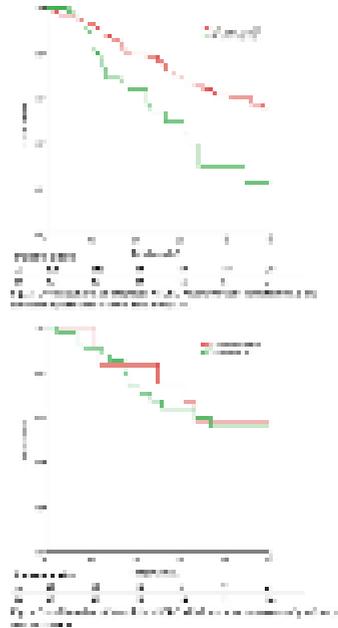


Fig. 2. Distribution of survival curves for different mediastinal lymph node metastases and primary tumor lobe locations.

Results:

The most common mediastinal metastatic sites for different primary tumor lobes were as follows: right upper lobe, 17.7% (87/492) for level 4R; right middle lobe, 14.9% (28/188) for level 7; right lower lobe, 19.8% (82/414) for level 7; left upper lobe, 18.2% (96/528) for level 5; left lower lobe, 16.6% (42/253) for level 7. As for upper lobe tumors, subcarinal (SC) zone MLNM were rare (3.9%, 44/1132) and the occurrence of lower zone MLNM was even rarer (0.7%, 5/670); the median survival time was 32 months for those with SC zone or lower zone MLNM, compared with 83 months for those with only upper zone MLNM (P = 0.002). When tumors were 1cm or less, the incidence of lower zone MLNM for both the LUL and RUL tumors were zero; the incidence of upper zone MLNM for both the RLL and LLL tumors were also zero.

Conclusion:

Different primary NSCLC lobe locations have a different propensity to be sites of MLNM in those tumors at 3cm or less. For tumors no more than 1cm, lower zone mediastinal lymph node dissection is unnecessary for upper lobe tumors and upper zone mediastinal lymph node dissection is unnecessary for lower lobe tumors.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, mediastinal lymph node, metastasis

Tuesday A.M.
Abstracts 043-066

TUESDAY, 29 MAY 2018**11:30 - 12:30****PULMONARY NEOPLASTIC II****O-061****LOBECTOMY FOR PRIMARY TUMOUR SHOWED BETTER OUTCOME THAN LIMITED RESECTION AMONG M1A STAGE NSCLC ONLY WITH PLEURAL SEEDING: AN ANALYSIS FROM THE SURVEILLANCE, EPIDEMIOLOGY AND END RESULTS (SEER) DATABASE**Wu Hao, L. Jixian, C. Baokun, M. Zhimin, W. Da*Department of Thoracic Surgery, Peking University Shenzhen Hospital, ShenZhen, China***Objectives:**

Several researches have shown that primary tumor resection result in survival benefits for M1a stage NSCLC only with pleural seeding. But no consensus concern which surgical approach for primary tumor will achieve better oncology outcome. Our research aimed to evaluate the survival difference between extensive resection (lobectomy and bilobectomy) and limited resection (wedge resection, segmentectomy and partial resection) for patients of NSCLC with pleural seeding.

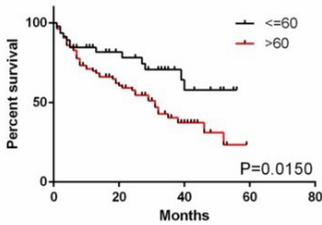
Methods:

Using the SEER database from 2010 to 2014, we identified stage M1a NSCLC cases who had pleural tumor foci or nodules on the ipsilateral lung and accepted primary tumor resection. Multivariate Cox regression analysis was performed to identify the factors associated with the prognosis. Survival was estimated with the Kaplan-Meier method.

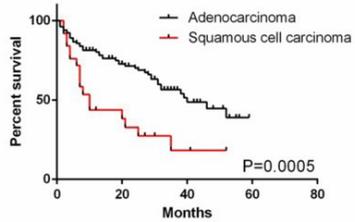
Results:

Of 1576 patients who staged with M1a with pleural seeding, 187 (11.9%) accepted resections of primary tumor, and 161 met the selection criteria., and 75 patients accepted lobectomy or bilobectomy. The median survival time (MST) after surgery was significantly longer in the group of adenocarcinomas than squamous cell carcinoma (40 mo vs 10 mo). Patients in the lobectomy group had better OS than limited resection group($p=0.0001$). In subgroup of limited resection, there was no significant survival difference between lymph node dissection and those unremoved or biopsy. Cox regression analysis showed that elder age (hazard ratio(HR)=2.037; 95% confidence interval (CI), 1.012- 4.101), squamous cell carcinoma (HR, 2.632 ; 95%CI, 1.307- 5.302), limited resection(HR, 2.704 ; 95%CI, 1.442- 5.073)and N positive (HR, 1.863 ; 95%CI, 1.096- 3.167) were independent risk factor of worse prognosis.

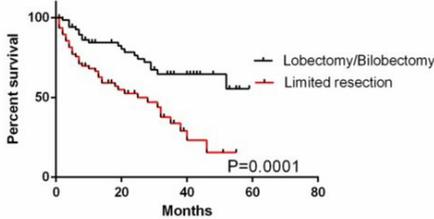
Overall Survival - Age



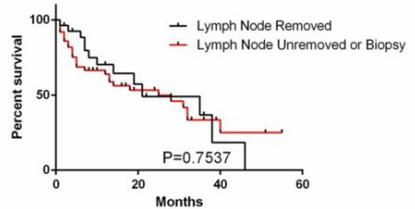
Overall Survival - Histological type



Overall survival - Surgery approach



Overall survival - Limited resection



Conclusion:

Patients of M1a stage NSCLC only with pleural seeding had better prognosis in adenocarcinomas group than in squamous cell carcinoma group. Lobectomy for primary tumor showed better survival benefits compared with limited resection.

Disclosure: No significant relationships.

Keywords: lobectomy, limited resection, SEER database, lung cancer, pleural seeding

O-062

NEW PROPOSAL FOR THE CLINICAL T CLASSIFICATION OF MULTIPLE PRIMARY LUNG CANCERS BASED ON THE PRESENCE OF GROUND GLASS OPACITY (GGO) COMPONENT ON THIN-SECTION COMPUTED TOMOGRAPHYAritoshi Hattori, T. Matsunaga, K. Takamochi, S. Oh, K. Suzuki*General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan***Objectives:**

We evaluated the prognostic impact of multiple primary lung cancers focusing on the presence of GGO component on thin-section computed tomography (CT) for the novel proposal of clinical T classification.

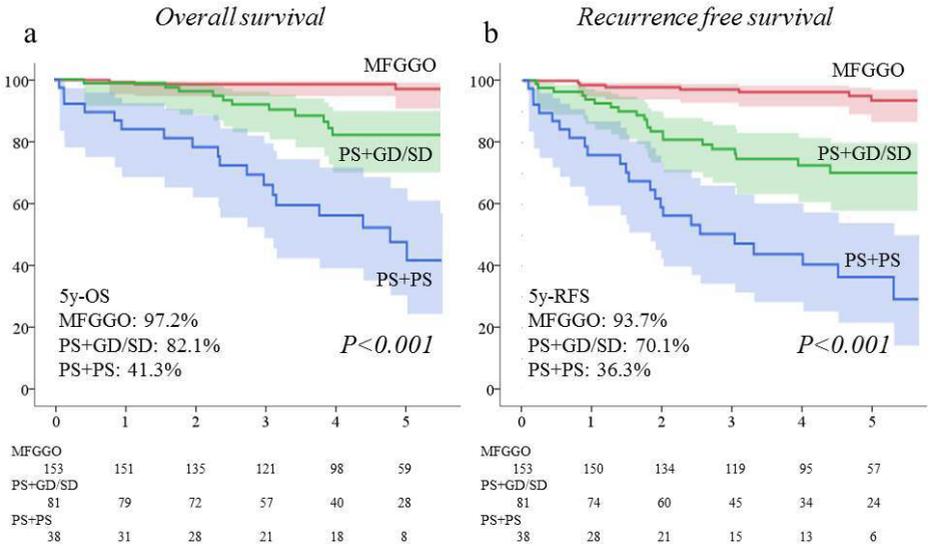
Methods:

We reviewed 272 surgically resected multiple primary lung cancers (maximum tumor size less than 50mm, clinical-stage I based on the 7th TNM staging system) between 2008 and 2015. Dominant tumors were classified into 3 group based on consolidation tumor ratio (CTR), i.e., GGO-dominant (GD; $0 \leq \text{CTR} < 0.5$), solid-dominant (SD; $0.5 \leq \text{CTR} < 1.0$) and pure-solid (PS; $\text{CTR} = 1.0$). Furthermore, multifocal GGO (MFGGO) was defined that showed GGO component for all. Their prognoses were evaluated using Cox proportional hazard model.

Results:

The number of MFGGO was 153 (56%), and the 5y overall survival (OS) was significantly better in the MFGGO group than that of non-MFGGO group (97.2% vs. 68.5%, $p < 0.001$ with a median follow-up time (MFT) of 52 months). A multivariable analysis revealed that MFGGO, maximum tumor size and nodal involvement were independently significant prognosticators of the survival for all ($p = 0.004, 0.008, 0.047$). Furthermore, among the non-MFGGO group, a multivariable analysis revealed that PS+PS group, nodal involvement and tumor size were independently significant prognosticators ($p = 0.003, 0.008, 0.019$). Based on the results, when we divided the overall cohort into 3 groups focusing on the presence of GGO component, i.e., MFGGO ($n = 153$), PS+GD/SD ($n = 81$) and PS+PS ($n = 38$), the 5y-OS was clearly split among them (MFGGO=97.2%, PS+GD/SD=82.1%, PS+PS=41.3%, $p < 0.001$).

Figure: Oncological outcomes of multiple primary lung cancers based on the GGO presence



Conclusion:

Our results suggest that presence of a GGO component has the ability to distinguish differences in survival even for multiple primary lung cancers. Presence of a GGO based on thin-section CT is extremely important when considering the correlation between radiological classification of multiple lung cancers and its prognosis. Further study is required for refining the novel clinical T staging based on the GGO presence in the future.

Disclosure: No significant relationships.

Keywords: lung cancer, multiple lung cancer, clinical T stage, prognosis

Tuesday A.M.
Abstracts 043-066

O-063

ADJUVANT TREATMENTS FOR PATIENTS WITH COMPLETED RESECTED SMALL CELL LUNG CANCER

Kaiqi Jin, P. Zhang, G. Jiang

*Department of Thoracic, Shanghai Pulmonary Hospital, School of Medicine, Tongji University, Shanghai, China***Objectives:**

This study aimed to explore optimal adjuvant or neo-adjuvant therapies for patients with complete resected limited-stage small cell lung cancer (SCLC).

Methods:

Patients with limited-stage SCLC who underwent complete resection in our hospital from 2005 to 2014 were included in this study. Overall survival (OS) was compared using Kaplan-Meier method between patients who underwent neo-adjuvant chemotherapy and patients who underwent surgery directly. For patients who underwent surgery directly, OS was compared among patients who received no adjuvant therapy, adjuvant chemotherapy and adjuvant chemo-radiotherapy. A multivariable Cox regression model was constructed to evaluate multiple factors associated with survival.

Results:

A total of 241 patients were included in this study with a 5-year OS rate 34.5%. Neo-adjuvant chemotherapy was not associated with a longer OS for the entire cohort ($P=0.950$), or for pN0 ($P=0.660$), pN1 ($P=0.440$) and pN2 ($P=0.831$) cases. For pN0 cases who underwent surgery directly, adjuvant chemotherapy was associated with a longer OS, compared to surgery only, (5-year OS rate 57.7% vs. 31.4%, $P=0.003$); adjuvant chemo-radiotherapy was not associated with a longer OS, compared to surgery only. For pN1/2 cases who underwent surgery directly, adjuvant chemotherapy (5-year OS rate, 20.7%) was not associated with a longer overall survival, compared to surgery only (5-year OS rate 26.6%, $P=0.690$); while adjuvant chemo-radiotherapy (5-year OS rate, 41.3%) was associated with a longer survival, compared with surgery only ($P=0.049$) or adjuvant chemotherapy ($P=0.029$). Multivariable Cox regression revealed that prophylactic cranial irradiation (PCI, HR, 0.487, 95%CI, 0.258-0.919), absence of postoperative complications (HR, 0.595, 95% CI, 0.399-0.887) and pTNM stage was independent factors associated with overall survival.

Conclusion:

Neo-adjuvant chemotherapy was not associated with a longer OS for patients with limited stage SCLC. For pN0 cases, adjuvant chemotherapy and PCI should be considered after surgery. Patients with complete resected pN1/2 SCLC should consider chemo-radiotherapy and PCI as adjuvant therapy.



Multivariable Cox analysis for patients with complete resected small cell lung cancer			
Variables	HR	95% CI	P
Prophylactic cranial irradiation	0.487	0.258 to 0.919	0.026
Absence of postoperative complications	0.595	0.399 to 0.887	0.011
pTNM stage			0.001
II vs. I	1.661	1.014 to 2.720	0.044
III vs. I	2.293	1.496 to 3.514	< 0.001
Adjusted for age, sex, comorbidities, laterality of tumor, Open/VATS, surgery methods, neo-adjuvant chemotherapy, adjuvant chemotherapy and postoperative radiotherapy.			

Disclosure: No significant relationships.

Keywords: adjuvant therapy, prophylactic cranial irradiation, surgery, small cell lung cancer

O-064

PROPOSAL FOR THE STRATIFICATION OF NODAL STAGE CLASSIFICATION - COMBINATION OF THE NUMBER AND ANATOMICAL LOCATION OF METASTATIC LYMPH NODES

Shinya Katsumata¹, K. Aokage¹, G. Ishii², T. Sakai¹, T. Ueda¹, S. Okada¹, T. Miyoshi¹, K. Tane¹, M. Tsuboi¹

¹*Thoracic Surgery, National Cancer Center Hospital East, Kashiwa, Japan*

²*Pathology, Exploratory Oncology Research and Clinical Trial Center, National Cancer Center, Kashiwa, Japan*

Objectives:

Although current nodal staging of solid tumors in the other field are determined by the number of involved lymph nodes (nN), that of non-small cell lung cancer (NSCLC) is defined by only anatomical location of lymph nodes (pN). This study was conducted to reveal the prognostic significance of nN and investigate whether the combination of nN and pN could show the patient's prognosis more concisely.

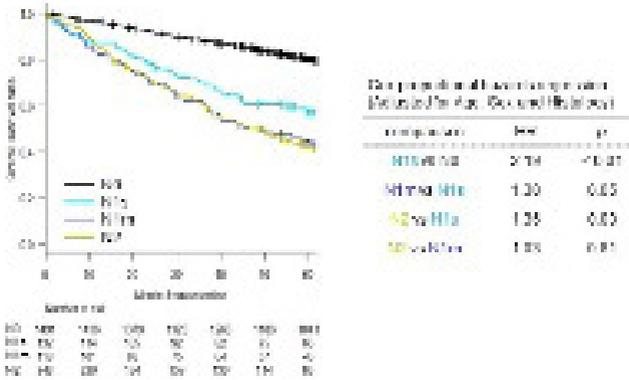
Methods:

We analyzed 1989 patients with NSCLC who underwent complete resection by lobectomy or pneumonectomy involving dissection of the hilar and mediastinal lymph nodes from 2003 to 2012. We evaluated the survival outcome (overall survival, OS) according to nN, pN, and the number of involved lymph node stations.

Results:

Median follow-up time was 6.1 years. We classified the patients according to nN: N0, absence of metastatic nodes; Ns, single node metastasis; Nm, multiple nodes metastases. Both Ns and Nm showed significantly worse prognosis than N0 ($p < 0.01$). In the patients with lymph node metastasis, Nm showed worse prognosis than Ns ($p = 0.03$), pN2 tended to show worse prognosis than pN1 ($p = 0.10$). Multiple station metastases had no significant prognostic impact compared to single station metastasis ($p = 0.25$). Nm (ref. Ns) was an independent prognostic factor ($p < 0.01$) by multivariate analysis in pN1 patients, but Nm did not show prognostic impact in pN2 patients ($p = 0.42$). To explore the prognostic impact of the combination of nN and pN, we stratified pN1 patients into two groups (N1s, single N1; N1m, multiple N1) and compared them to pN0 and pN2 patients. N1m showed significantly worse prognosis than N1s ($p = 0.05$) and had no prognostic difference from pN2 ($p = 0.81$).

Fig. Overall survival curve according to the combination of n1m and p1



Conclusion:

Nm was an independent prognosticator in pN1 patients, but not in pN2 patients. In nodal staging of NSCLC, stratification of pN1 (N1s and N1m) will provide more accurate prognostic information to us.

Disclosure: No significant relationships.

Keywords: lymph node metastasis, number of involved lymph nodes, prognosis, non-small cell lung cancer

Tuesday A.M.
Abstracts 043-066

O-065

QUALITY OF PERIOPERATIVE CARE IN ANATOMICAL LUNG RESECTIONS IN THE NETHERLANDS

Erik Von Meyenfeldt¹, F. Hoeijmakers², E. Van Thiel³, G. Marres¹, H. Schreurs⁴

¹*General Thoracic Surgery, Albert Schweitzer Hospital, Dordrecht, Netherlands*

²*Surgery, Leiden University Medical Center, Leiden, Netherlands*

³*Thoracic Oncology, Albert Schweitzer Hospital, Dordrecht, Netherlands*

⁴*Surgery, NWZ Alkmaar, Alkmaar, Netherlands*

Objectives:

Good perioperative care results in rapid recovery after surgery, with a minimum of complications and low readmissions rates. Length of stay (LOS) has been used as a measure for quality of perioperative care. Short LOS, however, does not automatically equate to good perioperative care. Perioperative care protocols play a role, but so do patient, tumour and treatment characteristics. The objective of this study is to determine whether variation in LOS between hospitals is present that cannot be accounted for by known parameters including comorbidity and type of surgery and relate this variation in LOS to outcome measures.

Methods:

This study uses data from the Dutch Lung Cancer Audit for Surgery (DLCA-S) to evaluate LOS in patients undergoing anatomical lung resection for NSCLC from 2012-2016 in 51 hospitals. Only LOS of patients with an uncomplicated course (no complications, readmission or reintervention) was analysed, in order to evaluate the standard care protocol. The percentage of patients with LOS above the overall median was calculated per hospital and corrected for patient, tumour and treatment characteristics. In order to evaluate quality of care, median LOS data were correlated to readmission and complication data on a hospital level, to identify best practices in peri-operative care.

Results:

In 5475 uncomplicated patients median LOS was 6 days (IQR 4-7). Hospital median LOS varied from 4 to 8 days. Overall, 38% of patients had a LOS of >6 days. Variation between hospitals remained after adjustment for possible confounders. No clear relation was found between LOS and complicated course. (figure 1).

Conclusion:

Even after adjustment for patient and treatment factors, important variation in LOS is seen between hospitals. Some hospitals were able to combine short LOS with low complication rates. This suggest important differences in perioperative care for patients undergoing anatomical lung resection.

Disclosure: No significant relationships.

Keywords: lung cancer, surgery, length of stay, enhanced recovery after thoracic surgery



O-066

NOMOGRAM BASED ON RADIOMIC AND CLINICAL FEATURES TO PREDICT THE EPIDERMAL GROWTH FACTOR RECEPTOR MUTATION STATUS IN ASIAN PATIENTS WITH RESECTED LUNG ADENOCARCINOMA

Dong Xie¹, Y. She¹, G. Jiang², C. Chen¹

¹*Department of Thoracic Surgery, Shanghai Pulmonary Hospital, Tongji University School of Medicine, Shanghai, China*

²*Department of Thoracic, Shanghai Pulmonary Hospital, Shanghai, China*

Objectives:

Epidermal growth factor receptor (EGFR) tumor genotyping is crucial to guide treatment. However, some patients may not be able to obtain tumor testing, either because tissue is limited, or tests are not routinely offered. Hence, we aimed to develop and validate a nomogram based on radiomics and clinical features for predicting EGFR mutation status in Asian patients with resected lung adenocarcinoma.

Methods:

We retrospectively collected clinical and pathological data on 1157 patients who had their tumors genotyped for EGFR mutations. Preoperative chest computed tomographic were retrospectively evaluated, a 3D U-net model trained with lung image database consortium (LIDC) datasets was employed for nodule segmentation. A total of 1080 quantitative 3-D features were extracted, and Lasso regression model was performed for feature selection and radiomics signature building. Combined with clinical features, a nomogram was developed with a multivariate logistic regression model. The performance of the nomogram was assessed with respect to its discrimination with an external validation cohort including 384 patients.

Results:

Overall, 602 (52.0%) and 207 (53.9%) tumors harbored an EGFR activating mutation in the primary and validation cohort, respectively. The radiomics signature consisting of 15 features was significantly associated with EGFR mutation status that successfully predicted EGFR mutation with a AUC of 0.71 (95%CI: 0.68-0.74). Based on patient age, sex, and smoking status, we developed a clinical model with a moderate accuracy (AUC: 0.66; 95%CI: 0.63-0.70). Combined this clinical model with the radiomics signature (a complex model), we found significant improvement on prediction accuracy (AUC: 0.78; 95%CI: 0.75-0.81, $p < 0.05$). In validation cohort, the complex model has showed a good discrimination (AUC: 0.73; 95%CI: 0.70-0.76).

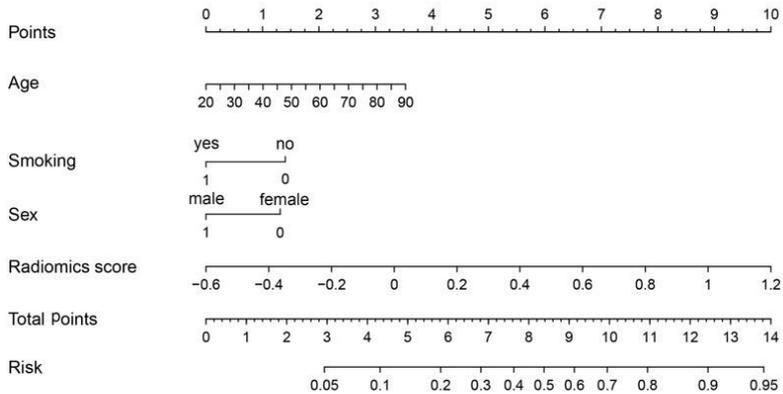


Figure: Nomogram to predict the epidermal growth factor receptor mutation status in Asian patients with resected lung adenocarcinoma

Conclusion:

We have developed and validated a nomogram to predict EGFR mutation status in Asian patients with resected lung adenocarcinoma based on radiomics and clinical features. This nomogram may have a clinical impact in selecting patients for targeted therapies.

Disclosure: No significant relationships.

Keywords: radiomics, nomogram, epidermal growth factor receptor, lung adenocarcinoma

TUESDAY, 29 MAY 2018**14:00 - 15:00****CHEST WALL/DIAPHRAGM/PLEURA****O-067****INFLAMMATORY INDICES ARE SIGNIFICANTLY ELEVATED IN PATIENTS WITH MALIGNANT PLEURAL EFFUSION: ON BEHALF OF THE ESTS PLEURAL EFFUSION WORKING GROUP**

Achilleas Antonopoulos¹, M. Scarci¹, S. Mitsos¹, D. Patrini¹, M. Hayward¹, N. Panagiotopoulos¹, D.R. Lawrence¹, K. Papagiannopoulos², R. George¹

¹*Department of Thoracic Surgery, University College London Hospitals NHS Foundation Trust, London, United Kingdom*

²*Thoracic Surgery, St. James's University Hospital, Leeds, United Kingdom*

Objectives:

The inflammatory response indices fibrinogen, C-reactive protein (CRP), platelets, neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) have been shown to have a significant impact on the prognosis of various types of cancers. The aim of this study was to evaluate the prognostic significance of plasma fibrinogen, CRP, platelets, NLR, and PLR in patients with malignant pleural effusion (MPE).

Methods:

Patients who underwent surgery for pleural effusion between 1st of January 2014 and 31st of December 2016 were studied retrospectively. Preoperative fibrinogen, CRP, neutrophils, lymphocytes and platelets were analyzed.

Results:

472 patients were identified. 274 patients had MPE (MPE group) and 198 were diagnosed with non-malignant effusion (BPE group). The average operative age was 68.9±9.5 years (54.4% males). The diagnosis of MPE was made on both pleural tissue and cytology (n=249), pleural tissue histology alone (n=21) or pleural cytology alone (n=4). The overall mortality was significantly higher in the MPE group (68.6% vs 37.4%, p<0.001). Table 1 illustrates the mean values of the inflammatory indices in both groups. Patients with MPE had significantly higher fibrinogen, platelet, neutrophil and CRP. Only platelet lymphocyte ratio was elevated in the MPE group (p=0.015).

Conclusion:

We have demonstrated in our cohort of patients that inflammatory indices are elevated in malignant pleural effusions and may have diagnostic and prognostic values in this group of patients.

Disclosure: No significant relationships.

Keywords: malignant pleural effusion, benign pleural effusion, Inflammatory indices

O-068

VIDEO-ASSISTED THORACOSCOPIC SYMPATHECTOMY VERSUS MODIFIED WITTMOSER METHOD IN SURGICAL MANAGEMENT OF PRIMARY HYPERHIDROSIS

Duilio Divisi¹, G. Zaccagna¹, F. Gabriele¹, M. Vaccarili¹, W. Di Francescantonio¹, R. Crisci²

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²*Division of Thoracic Surgery, University of L'Aquila, Mazzini Hospital, Teramo, Italy*

Objectives:

The best minimally invasive technique of hyperhidrosis is still debated. We compared two different surgical methods evaluating the effectiveness of procedures and the quality of life (QoL) of patients.

Methods:

From January 2010 to November 2017 we carried out 476 biportal video-assisted thoracoscopic surgery (VATS) approaches of sympathetic chain in 238 patients, 106 males (44,5%) and 132 females (55,5%). One hundred and twenty-nine (54%) patients underwent conventional sympathectomy (CS) while 109 (46%) patients underwent to sympathectomy associated with the division of the rami communicantes (MWT). The level of sympathetic chain interruption was in agreement with the Society of Thoracic Surgeons suggestions. Bilateral procedure was performed in the same surgical session in 43 patients (18%) while in 195 (89%) the right surgical approach was delayed 30 days from the first intervention. QoL was classified as follows: from 20 to 35 excellent; from 36 to 51 very good; from 52 to 68 good; from 69 to 84 poor; and > 84 very poor.

Results:

We noticed the reduction of complications comparing CS with MWT approaches (chest pain from 36.4% to 4.5%; paresthesias from 8.5% to 3.6%; compensatory sweating from 9.3% to 6.4%; bradycardia from 28.6% to 10%, respectively). The preoperative and postoperative quality of life index evaluation revealed a statistically significant improvement after surgery (CS: 86 ± 2 versus 35 ± 1 , $p=0.00001$; MWT: 85 ± 1 versus 33 ± 2 , $p=0.00001$), with general satisfaction of the two techniques. Minor compensatory sweating was seen in 8% patients overall and disappeared in 45 ± 6 days.

Conclusion:

Modified Wittmoser method seems to be a valid alternative to conventional sympathectomy, minimizing the percentage rate of complications and showing significant effectiveness in the quality of life improvement.

Disclosure: No significant relationships.

Keywords: sympathectomy, sympathectomy, complications, quality of life, vats



O-069

FREE MUSCULOCUTANEOUS FLAP TRANSPLANTATION IN THE TREATMENT OF CHRONIC INTRACTABLE EMPYEMA: A SINGLE INSTITUTE 13-YEAR EXPERIENCE WITH 21 CONSECUTIVE CASES

Li Jiaqi, W. Haifeng, X. Boxiong, J. Gening

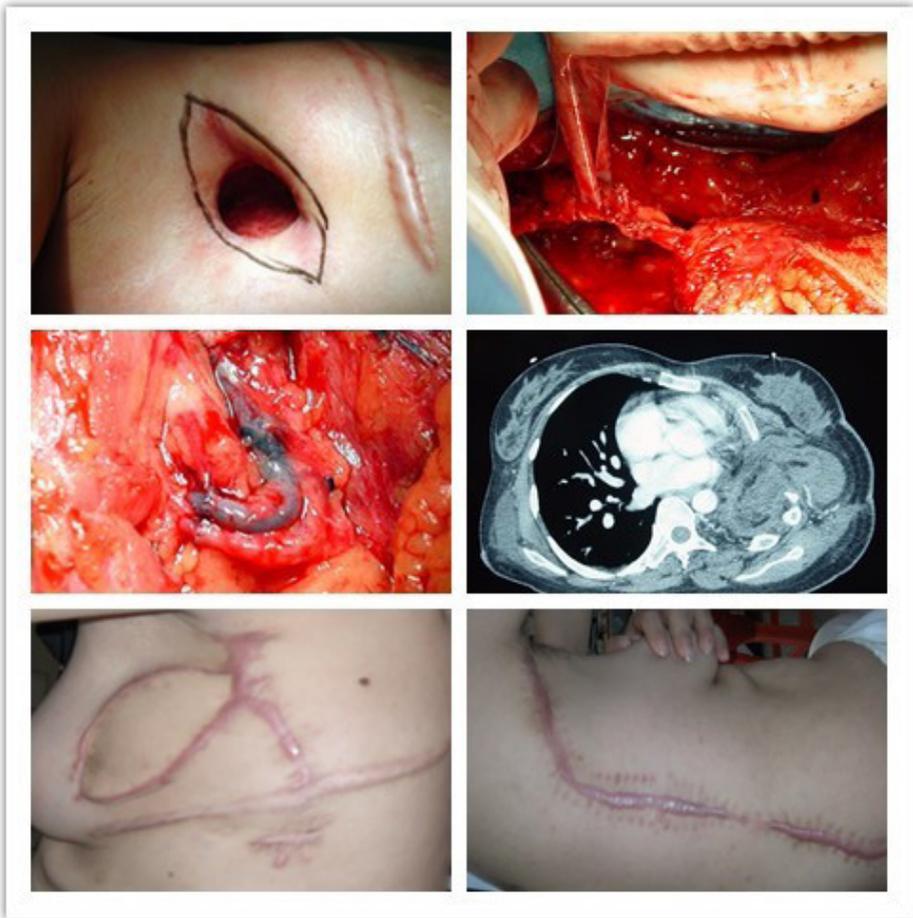
Thoracic Surgery, Shanghai Pulmonary Hospital, Shanghai, China

Objectives:

To evaluate the safety and efficacy of free musculocutaneous flap transplantation in the treatment of chronic intractable empyema.

Methods:

A retrospective single institution review of 21 consecutive patients suffering from chronic intractable empyema, who were treated by free musculocutaneous flap transplantation from November 2004 to December 2017. The treatment consisted of two steps. In the first step, open window thoracostomy (OWT) was performed, after which daily dressing changes and repeated debridement were applied until the empyema cavity became clean and healthy granulation tissues grew in. If a large fistula persisted, an improved occluder was inserted to stop air leak. In the second step, free musculocutaneous flap transplantation was performed to obliterate the empyema cavity. First, the rectus abdominis muscle or latissimus dorsi muscle was harvested. Then, the musculocutaneous flap was transplanted by microscopic vascular anastomosis. An end-to-end anastomosis between the donor artery and vein and their counterparts could be done at the anterior border of the latissimus dorsi muscle. An operating microscope at original magnification X10 was used. In one case, nerve anastomosis was also performed in order to prevent long-term muscular atrophy.

**Results:**

There was no mortality or major morbidity during the perioperative period. At a mean follow-up of 46 months, flaps survived well in 18 patients. Failure occurred in 3 patients, who underwent a second OWT. The causes of failure were persistent BPF in two cases, and intrathoracic infection in one case. Five patients with BPF were cured by insertion of the improved occluders.

Conclusion:

Free musculocutaneous flap transplantation following OWT is a reliable procedure for the management of chronic intractable empyema, in cases when a traditional muscle transposition is not feasible.



Disclosure: No significant relationships.

Keywords: open window thoracostomy, empyema, free musculocutaneous flap transplantation

O-070**SEALLS EVALUATION OF AIR LEAKS AFTER LUNG SURGERY (SEALLS) TRIAL: PRELIMINARY RESULTS OF A PROSPECTIVE RANDOMIZED CLINICAL TRIAL**

Francisco Javier Moradiellos, S. Amor, A.P. Valdebenito, M. Córdoba, A. Varela
Thoracic Surgery Department, Quirónsalud Madrid University Hospital, Pozuelo de Alarcón, Madrid, Spain

Objectives:

To compare the efficacy and safety of Hemopatch™ sealing patch to standard techniques for the treatment and prevention of postoperative air leaks after lung resection.

Methods:

SEALLS is a phase IV prospective, randomized, controlled, single-blind trial comparing application of Hemopatch [HM]) with a control group [C] (standard surgical technique) with a sample size of 144 subjects and an enrollment period of two years. The SEALLS trial was ethics-board approved and registered. Consented subjects were enrolled according to inclusion/exclusion criteria and randomized within strata according to surgical procedure. Intervention was performed on the suture lines and vulnerable or leaking areas before closure. The primary endpoint is the digitally-measured duration of postoperative air leaks. Secondary endpoints were: presence of postoperative or prolonged air leaks, duration of chest drain, hospital stay and costs, and complications associated with air leaks, among others. This preliminary report describes early data and monitors safety variables in an ongoing trial.

Results:

As of December 2017 there were 62 randomized subjects (HM/C: 30/32) subjects). There were no unexpected adverse events or HM-attributable adverse events. HM patients were older compared to controls (64 vs 55 years-old) and showed poorer lung function (preopFEV1% 80.04% vs 96.4%). Patients in the HM group had shorter average duration of air leaks (32.28h vs 59.42h in controls) and shorter duration of chest drains (69.3h vs 86.5h in controls). The percentage of patients without air leaks was 40% HM group and 34.4% in the control group.

Conclusion:

Early data from the SEALLS trial did not raise safety concerns about the use of Hemopatch. The differences seen in the primary variable (average duration of air leaks) and other secondary variables point towards a clinical advantage in using Hemopatch in lung resections. Updated results with full statistical analysis, including strata, will be presented and primary endpoint will be checked for early completion.

Disclosure: F.J. Moradiellos: Funded via a competitive research project grant by Baxter. Company had no participation on design, data collection and analysis or any other aspect of research.

Keywords: air leaks, sealing, lung resection, hemopatch



O-071

A COMBINATION OF THREE TUMOR MARKERS FOR THE MANAGEMENT OF MESOTHELIOMA

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Objectives:

Malignant pleural mesothelioma (MPM) is a rare, aggressive tumor of the pleura that recurs in most patients after treatment. To date, the follow-up of patients with MPM after treatment remains challenging for most thoracic surgeons. Moreover, little research has been conducted to evaluate tumor markers in MPM. This study aims to elucidate the efficacy of tumor markers in the monitoring of patients with MPM.

Methods:

We retrospectively examined 145 patients who underwent complete macroscopic resection after induction chemotherapy for MPM between July 2004 and September 2017 at our hospital. We evaluated soluble mesothelin-related peptide (SMRP), cytokeratin 19 fragment (Cyfra21-1), and tissue polypeptide antigen (TPA) preoperatively, postoperatively, and recurrently.

Results:

While 78 patients were treated with pleurectomy/decortication (54%), 67 were treated with extrapleural pneumonectomy (46%). Histological assessment revealed the final pathology as epithelial for 136 patients (94%) and nonepithelial for 9 patients (6%). The elevation in preoperative tumor marker levels was as follows: SMRP, 23.1%; Cyfra21-1, 8.3%; and TPA, 9.4% of patients. The elevation in postoperative tumor marker levels was as follows: SMRP, 2.4%; Cyfra21-1, 5.1%; and TPA, 5.2% of patients. Of 145 patients, recurrence was reported in 87 (60%) patients. In this study, the median follow-up period was 18 months, and the median time to recurrence was 12 months. When radiographic findings suspected recurrence in patients, elevation in tumor marker levels was as follows: SMRP, 40.5%; Cyfra21-1, 38.5%; and TPA, 34.7% of patients. In fact, half of the patients (52.5%) who had recurrence exhibited an increase in one or more tumor marker levels.

	Preoperative		Postoperative		Recurrently	
	mean	positive rate	mean	positive rate	mean	positive rate
SMRP	1.46 ± 2.13	23.1%	0.79 ± 0.59	2.4%	1.88 ± 2.04	40.5%
Cyfra21-1	1.89 ± 3.14	8.3%	1.74 ± 1.96	5.1%	6.36 ± 14.58	38.5%
TPA	35.46 ± 33.10	9.4%	33.34 ± 33.61	5.2%	88.88 ± 140.25	34.7%

Data are presented as mean ± SD

SMRP: soluble mesothelin-related peptide, Cyfra21-1: cytokeratin 19 fragment, TPA: tissue polypeptide antigen

Conclusion:

Although the positive rate of these preoperative tumor marker levels is low, recurrent tumor marker levels dramatically increased. Hence, the combination of SMRP, Cyfra21-1, and TPA could enhance the management efficacy of patients with MPM.

Disclosure: No significant relationships.

Keywords: malignant pleural mesothelioma (MPM), soluble mesothelin-related peptide (SMRP), cytokeratin 19 fragment (Cyfra21-1), tissue polypeptide antigen (TPA), tumor marker



O-072

THE INITIAL EXPERIENCE OF USING BIOMATERIAL ARTIFICIAL RIB FOR CHEST WALL RECONSTRUCTION IN THORACIC SURGERY

Lanjun Zhang, Y. Wen

Department of Thoracic Surgery, Sun Yat-Sen University Cancer Center, Guangzhou, China

Objectives:

Various prosthetic materials were used to reconstruct the chest wall after the extended resection of tumor. Our aim is to introduce an alternative method using artificial ribs derived from porcine tissues to construct a chest wall with skeletal defects in a series of patients.

Methods:

From 2006 to 2016, 29 patients (10 were female and 19 were male) were received the operation of chest wall reconstruction with porcine-derived artificial rib. The rate of postoperative complication and the chest wall contour were investigated to evaluate the availability of artificial rib.

Results:

The reconstruction was successful in all 29 cases. The average age was 38 ± 20 years old. 8 patients were ed the infection of wounds on the 7th postoperative day and was cured by debridement, the others were no postoperative complication. The longest follow-up time was ten years.

Conclusion:

Biomaterial artificial rib is an ideal material for chest wall reconstruction. It has good biocompatibility, plasticity, and strength to accommodate human bodies and can be successfully used in the reconstruction of the chest wall and thoracic cavity.

Disclosure: No significant relationships.

Keywords: artificial rib, chest wall reconstruction, biomaterial

TUESDAY, 29 MAY 2018**14:00 - 15:00****INTERESTING CASES****O-073****MULTIORGAN HYDATIDOSIS WITH VV ECMO SUPPORT. A THERAPEUTIC AND SURGERY CHALLENGE**Anca Asaftei, C. Paleru, I. Cordos, R. Istrate, O. Danaila*Thoracic Surgery, M Nasta Institute of Pneumology, Bucharest, Romania***Objectives:**

Persisting bilateral bronchial fistula on a total collapsed right empyema and multiple left pleural and parenchyma hydatid cyst pathology had required VV ECMO (veno venous extracirculatory membrane oxygenation) support for passing through operative process.

Case description:

A 51 years old patient, shepherd, with no significant medical history, is admitted to our department with old neglected plurivisceral hydatidosis – pulmonary, hepatic and peritoneal-and right total tension pneumothorax with pleural effusion. Emergency right axillary thoracotomy, evacuation of a large volume of hydatid pleural effusion containing multiple hydatid membranes and removal of 7 pulmonary hydatid cysts with pleuro-pulmonary decortication was proceed. An efficient fistula suture or parenchymal resection were 'nt possible because of the inflamatory status and the pneumonia-like destruction on the inferior and medium right lobe. After operation air loss persistence on right side with partial collapsed lung and bacteriologic contamination- empyema low antibiotic sensitive. 2 episodes of hydatid ptysis required double left pleural drainage, with hydatid cystic membrane extravasation on the pleural catheter. In collaboration with an intensive care and bronhological team with ethical committee approvement, after a review of the strategical surgical approachment and the patient status, we decided to proceed a left axillary thoracotomy. An inferior left bronchial blocker and VV ECMO support are used, with the superior left lobe being the only lobe under ventilation. Left thoracotomy, evacuation of cystic membrane and incomplete fistula repair in pneumonic left inferior lobe was performed, resection was not possible. ECMO was mentained 4 days p.o with complete recovery of left lung function.

Conclusions:

ECMO is a debitable indication in lung surgery especially in diseases with disseminating potential. Extreme cases require it as a last option. Bilateral hydatid lung disease with empyema, fisula and associated pneumony is such a case. We present our only case experience for further discussion with step by step evolution.

Disclosure: No significant relationships.**Keywords:** multiple malignant hydatidosis, hydatid cyst surgery with ECMO support, bilateral fistula

O-074

INSTABILITY OF THE AIRWAY AFTER EXTENDED PLEURAL LOBECTOMY: HOW TO DETECT IT

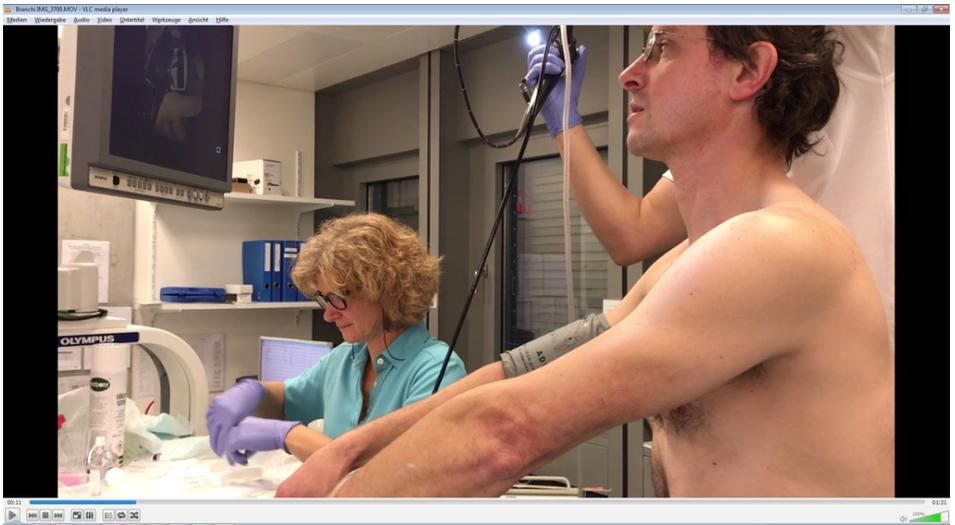
Rudolf Bumm¹, G. Somaini², P. Ludwig², T.D. Latshang², M. Furrer²

¹Department of Thoracic Surgery, Kantonsspital Graubünden, Chur, Switzerland

²Department of Thoracic Surgery, Kantonsspital Chur, Chur, Switzerland

Objectives:

Dyspnoea caused by an instability of the main bronchus after extended upper lobe resection is a very uncommon clinical entity. The very particular case is presented and especially the post-operative diagnostic work-up by cine-MRI and flexible video-bronchoscopy under ergometry conditions is highlighted.



Case Description:

A 44-year-old male patient was submitted with a bulky tumor in the pleural cavity which was related to the right upper lobe and the chest wall. A soft tissue sarcoma was suspected, and the patient underwent an extended open and extrapleural lobectomy of the right upper lobe with chest wall resection. Histology revealed a giant intrapleural leiomyoma. The postoperative course was uneventful. However, 6 weeks later the patient presented with progressive dyspnoea and chest pain. Conventional diagnostics did not clarify the situation. The patient underwent bodyplethysmography, which yielded a combined and serious restrictive / obstructive ventilation disorder. In order to further evaluate the functional deficit, the patient was scheduled for a cine-MRI scan as well as a flexible bronchoscopy under ergometry conditions. Dynamic MRI scan did not detect an instability of the chest wall or herniation of the lung. However, bronchoscopy under ergometry (101 watts, i.e. 80% predicted) showed a progressive stenosis of the right main bronchus during inspiration with related collapse of the lateral bronchial wall at the tracheobronchial angle. In addition, an expiratory protrusion of the pars membranacea of the trachea into the right main bronchus was obvious. The disorder had an inspiratory and expiratory component.

Conclusions:

Dynamic bronchoscopy under physical effort was able to demonstrate a clinically significant airway constriction that occurred after uneventful extended lobectomy of the right upper lobe. The patient is under consideration for rethoracotomy and sleeve resection or airway-stenting of the respective bronchial segment.

Disclosure: No significant relationships.

Keywords: extended lobectomy, dynamic bronchoscopy, dynamic MRI

O-075

CHALLENGING DIAGNOSIS AND TREATMENT OF CHRONIC THROMBOEMBOLIC HYPERTENSION IN THE SETTING OF ACUTE PULMONARY EMBOLISM

Isabelle Opitz¹, L. Korotcenko¹, S. Benussi², D. Bettex³, T. Horisberger³, F. Nietlisbach⁴, R. Schüpbach⁵, S. Ulrich⁶, D. Keller⁷, M. Friess¹, W. Weder¹

¹*Division of Thoracic Surgery, University Hospital Zurich, Zurich, Switzerland*

²*Division of Cardiovascular Surgery, University Hospital Zurich, Zurich, Switzerland*

³*Institute for Anesthesiology, University Hospital Zurich, Zurich, Switzerland*

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⁷*Interdisciplinary Emergency Department, University Hospital Zurich, Zurich, Switzerland*

Objectives:

To illustrate the difficulty to diagnose chronic thromboembolic hypertension (CTEPH) in the setting of acute pulmonary embolism (PE) and to describe the therapeutic management.

Case Description:

A 49-year-old man presented in the emergency room of a regional hospital with progressive dyspnea, orthopnea and tachycardia. TEE revealed a right heart decompensation with D-shaping, a systolic pulmonary artery pressure around 50mmHg and a large thrombus in a persistent Foramen ovale (PFO). The patient was referred to our institution after initiation of intravenous therapeutic anticoagulation. CT scan showed a massive central, segmental and subsegmental bilateral PE as well as signs of chronic thromboembolic disease (CTEPH). Interdisciplinary indication for surgery was taken for suspicion of “acute on chronic CTEPH” as well as a free-floating thrombus in the PFO. After cardiopulmonary bypass (CBP), pulmonary embolectomy and pulmonary endarterectomy were performed in moderate hypothermia after closure of the PFO during the cooling phase. The patient could not be weaned from CBP, and therefore VA ECLS was installed. Postoperatively, the patient recovered slowly after a moderate to severe systemic inflammatory response syndrome (SIRS), but was weaned off ECLS on postoperative day 6. After 15 days at the intensive care unit (ICU) the patient was transferred to the ward and discharged from hospital after 5 weeks. The first outpatient control showed a completely recompensed patient with NYHA I-II and TEE revealed hemodynamic improvement with a pressure gradient between RV and RA of 23mmHg and normal FAC (38%).

Conclusions:

Diagnosis of CTEPH is challenging in the setting of acute PE, which is mandatory for the correct operative approach. A pulmonary endarterectomy is the only curative treatment of this disease; conversely pulmonary embolectomy only will not improve the patients' outcome. Elevated RVSP in the context of acute PE warrants the patients' evaluation at an expert PH center.

Disclosure: No significant relationships.

Keywords: acute on chronic, CTEPH, acute pulmonary embolism

O-076

OPTIMIZATION OF LUNG FUNCTION DURING EX-VIVO LUNG PERFUSION

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¹*Thoracic Surgery and Lung Transplantation Unit, University of Milan, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*

²*Thoracic Surgery and Lung Transplantation Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy*

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⁴*Thoracic and Lung Transplantation Unit, University of Milan, Ca' Granda Foundation, Milan, Italy*

Objectives:

Ex-vivo lung perfusion is a tool

Objectives:

We describe a successful case of lung transplant using a graft tailored with the help of selective blood samples obtained from each pulmonary vein.

Case Description:

We accepted the lungs from a 46 years old controlled donor after cardiac death. OTO score at time of proposal was 9 due to a right lung opacity reported on chest X-ray and PaO₂/FiO₂ of 276 mmHg. Lungs procurement was performed after treatment withdrawal and institution of normothermic regional perfusion. After retrieval, lungs were stored in ice and subsequently evaluated with ex vivo lung perfusion (EVLP) at recipient site. EVLP was performed with an open atrium technique and hematocrit 3-5%. The first assessment at 1 hour revealed a difference in terms of PaO₂/FiO₂ between the two lungs: 586 mmHg left and 292 mmHg right. Inspection of the lungs demonstrated a non-ventilated area in the posterior part of the right lower lobe without improvement after recruitment maneuvers. We performed a new evaluation collecting blood samples from each pulmonary vein showing the following PaO₂/FiO₂ (mmHg): right upper and middle lobe 354; right lower lobe 281; left upper lobe 573; left lower lobe 358. We decided to perform an atypical resection of the right lower lobe during EVLP. Final assessment after 4 hours was PaO₂/FiO₂ (mmHg) 370 and 490 in the right left lung, respectively. The lungs were allocated to a 45 years old woman with end-stage idiopathic pulmonary fibrosis (LAS 68.6). We performed a bilateral lung transplant on central VA-ECMO due to severe pulmonary hypertension. We did not observe primary graft dysfunction and ICU stay lasted 6 days. Patient was discharged from hospital in post-op day 30 and she is alive at 3 months from surgery.

Conclusions:

We believe that selective lobar assessment during EVLP in particular cases could help to optimize graft function.

Disclosure: No significant relationships.



Keywords: lung resection, selective blood gas analysis, lung transplantation, ex-vivo lung perfusion

O-077

SAFE RESECTION OF THE LEFT SUBCLAVIAN ARTERY INFILTRATED BY LOCALIZED MALIGNANT PLEURAL MESOTHELIOMA AFTER THORACIC AORTIC ENDOGRAFTS.

Takashi Sakai¹, H. Uehara¹, T. Imazuru², K. Saito³, Y. Yamauchi¹, N. Matsutani¹, T. Shimokawa³, M. Kawamura¹

¹*Surgical Department, Teikyo University School of Medicine, Tokyo, Japan,*

²*Cardiovascular Surgery, Teikyo University School of Medicine, Tokyo, Japan*

³*Pathology, Teikyo University School of Medicine, Tokyo, Japan*

Objectives:

Thoracic endovascular aortic repair (TEVAR) is a minimally invasive approach for thoracic aortic pathologies. This technique makes the internal aortic wall tight and rigid by stent graft insertion and decreases the risk of vessel rupture while allowing removal of thoracic malignant tumors with aortic invasion. A 50-year-old man was admitted to our hospital because of a voice change, and chest computed tomography showed an approximately 25-mm solid mass in the left upper pulmonary lobe above the aortic arch; the mass appeared to invade the mediastinum and left subclavian artery. It was highly suspected to be malignant (cT4N0M0).

Objectives:

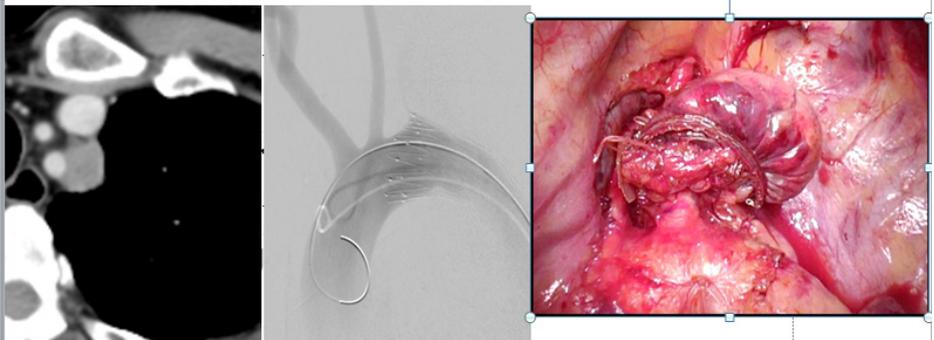
Resection of left subclavian artery (LSA) infiltrated by thoracic malignant tumors may cause the risk of temporary cardiopulmonary bypass, direct clamping of aorta, or extracorporeal circulation techniques. The off-label use of a thoracic endovascular aortic repair (TEVAR) avoid introducing these high risk surgical techniques.

Methods:

Lobectomy with arterial resection was considered as salvage treatment. Debranching of the subclavian artery was planned first because the cutting line on the subclavian artery must be placed 10 mm above the aortic arch for maximal safety. TEVAR was performed before mass resection to avoid massive hemorrhage and use of an on-pump system. We performed a left neck incision for bypass grafting of the left common carotid and left subclavian arteries. TEVAR was then introduced, and a stent graft was launched in zone 2 between the left common carotid and left subclavian arteries.

Case Description:

A 50-year-old man was admitted our hospital with hoarseness. Chest computed tomography showed a 25-mm solid mass in the left upper pulmonary lobe and none of mediastinal lymph nodes swelling. The tumor appeared to invade the LSA. He was diagnosed with clinical T4N0M0 non-small cell lung cancer (NSCLC). Lobectomy with LSA resection was considered as curative treatment. Debranching of the LSA was planned first because the cutting line on the LSA must be placed 10 mm above the aortic arch for maximal safety. TEVAR was performed before tumor resection to avoid massive hemorrhage and use of an on-pump system. We performed a left neck incision for bypass grafting of the left common carotid and LSA. TEVAR was then introduced, and a stent graft was launched in zone 2 between the left common carotid and LSA. Upon completion of TEVAR and bypass grafting, the left upper lobectomy combined with resection of the LSA, left vagus nerve, and left phrenic nerve was performed. Pathological examination unexpectedly revealed a localized malignant pleural mesothelioma that had directly invaded the vagus nerve, phrenic nerve, mediastinum, and left upper pulmonary lobe. No obvious direct invasion in the outer layer of the LSA wall, but the malignant tumor surrounded LSA extensively. The patient was uneventfully discharged 12 days postoperatively.

**Results:**

Upon completion of TEVAR and bypass grafting, combined resection of the left subclavian artery, left venous nerve, and left phrenic nerve was performed. The left upper pulmonary lobe was partially resected. Pathological examination revealed a localized malignant pleural mesothelioma that had directly invaded the venous nerve, phrenic nerve, mediastinum, and left upper pulmonary lobe. No obvious invasion was present in the outer layer of the left subclavian artery. The patient was uneventfully discharged 12 days postoperatively.

Conclusions:

TEVAR allowed a safe en bloc resection of malignant tumors infiltrating LSA, avoiding the need for extracorporeal circulation techniques, cross-clamping, and interposition graft replacement. Such an extended indication for TEVAR seems promising for selected oncological cases.

Conclusion:

The combination of surgery with TEVAR has greatly impacted the surgical field. It reduces surgical complications, shortens the operating time, and increases the indications for surgical treatment of complicated cases.

Disclosure: No significant relationships.

Keywords: surgery with TEVAR, reconstruction of the left subclavian artery, thoracic endovascular repair, tumors infiltrating left subclavian artery



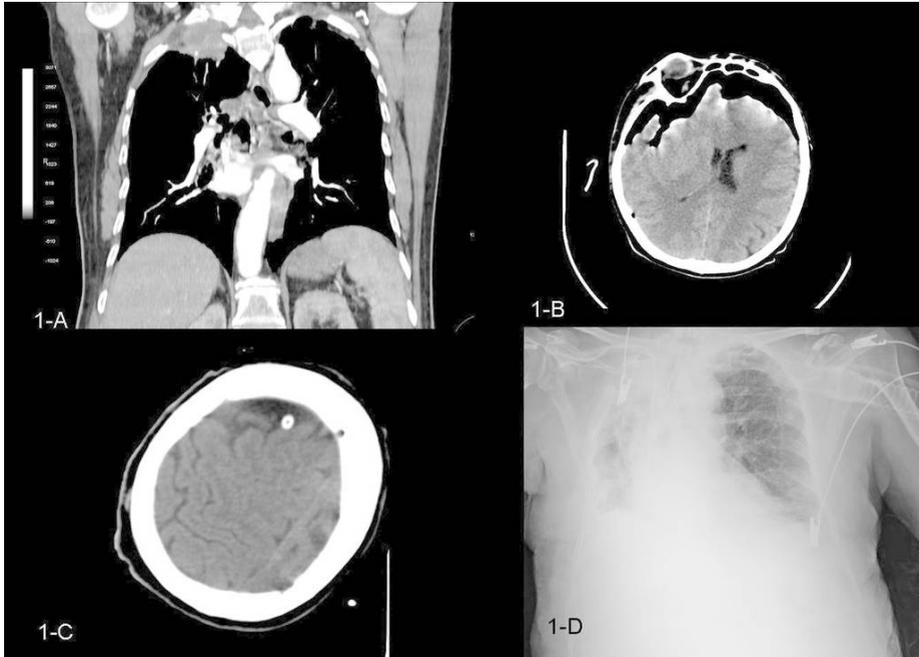
O-078

A RARE COMPLICATION AFTER THE RESECTION OF SUPERIOR SULCUS TUMOURS. Yazgan¹, S. Gürsoy¹, A. Üçvet¹, A. Acar¹, Özgür Samancılar¹, F. Özer²¹*Department of Thoracic Surgery, University of Health Sciences, Dr Suat Seren Chest Diseases and Surgery Medical Practice and Research Center, İzmir, Turkey*²*Department of Neurosurgery, University of Health Sciences, Tepecik Medical Practice and Research Center, İzmir, Turkey***Objectives:**

Pneumocephalus is a clinical condition presented with air collection in the intracranial cavity. It is usually seen after trauma, neoplasms, infections and intracranial operations. Developing pneumocephalus due to a subarachnoid-pleural fistula in thoracic surgery is a very rare condition. Based on its rarity, a case with a developed pneumocephalus postoperatively after neoadjuvant chemotherapy for superior sulcus tumour is presented.

Case Description:

A 70-year-old male patient was diagnosed squamous cell carcinoma in the upper lobe of his right lung. Because it was evaluated as a superior sulcus tumour (Figure1-A), patient was treated with neoadjuvant chemotherapy. Afterwards, patient underwent a right upper lobectomy and resection of the first three ribs via thoracotomy. In the postoperative fifth day, patient developed impaired consciousness and had a brain computed tomography (CT). Pneumocephalus was diagnosed (Figure1-B) and the clinic of neurosurgery admitted the patient and performed decompression via single burr hole (Figure1-C). Antibiotherapy was arranged against meningitis. Cranial drain was removed after improvement in Glasgow Coma Scale and regression of pneumocephalus in the control brain CT in the postoperative eighth day. Patient's thorax drains were removed after air leakage was stopped; however due to pulmonary infection and respiratory insufficiency (Figure1-D) patient got intubated and the follow up in the intensive care unit continued with mechanical ventilation support. Despite the administration of antibiotherapy and mechanical ventilation, patient died in the 35th day after thoracic operation by the reason of severe pulmonary infection and hypoxia.

**Conclusions:**

Clinical awareness is really important because pneumocephalus after thoracotomy is a rare complication. Persistent air leak from thorax drain and presence of a subarachnoid-pleural fistula could lead to this clinical condition. There are limited numbers of studies in the literature which practices conservative or invasive treatment methods for these kinds of patients. Either way, infection control proposes critical clinical importance.

Disclosure: No significant relationships.

Keywords: pneumocephalus, thoracotomy, complication

**TUESDAY, 29 MAY 2018****15:00 - 16:00****VIDEO III****V-079****TREATMENT OF A COMPLEX TRACHEA-ESOPHAGEAL PATHOLOGY**Tugba Cosgun¹, E. Kaba¹, B. Basaran², K. Ayalp³, M.R. Alomari³, A. Toker³¹*Thoracic Surgery, Istanbul Bilim University, Istanbul, Turkey*²*Otorhinolaryngology, Istanbul University, Faculty of Medicine, Istanbul, Turkey*³*Thoracic Surgery, Istanbul Florence Nightingale Hospital, Istanbul, Turkey***Objectives:**

Tracheal stenosis and trachea-esophageal fistulas are detrimental complications that occur after intubation or injury. Here we present the treatment of complex trachea-esophageal pathology including 2 cm subglottic tracheal stenosis and 6 cm trachea-esophageal fistula.

Video Description:

A 21 years old man from Jordan who was injured in a fire two years ago is presented. He was intubated for two months and he survived with tracheostomy and trachea-esophageal fistula for two years. Operation strategy was developed after assessments. Computer tomography revealed 2 cm subglottic tracheal stenosis and 6 cm trachea-esophageal fistula. We detected localizations of these pathologies with fiberoptic bronchoscopy. Firstly, preoperative assessment by otorhinolaryngology was performed, there were no pathology at vocal cords. To estimation of high post operative risk, we placed feeding jejunostomy and aspiration gastrostomy. Our strategy was starting with mobilization of trachea and resection of stenotic part. We planned reconstruction the posterior wall of trachea with m. pectoralis major and primary repair of esophagus or repairing both trachea and esophagus with this muscle. Because of the inherent tissue between trachea and esophagus was healthy, we decided to repair trachea's posterior wall with this tissue and primary repair of esophagus. As the wall of trachea was managed with the inherent tissue, we changed our strategy and placement of m. sternocleidomastoideus between trachea and esophagus was performed. Finally, crico-thyro-tracheal anastomosis was performed. Postoperative period was uneventful. He was discharged from the hospital on tenth day.

Conclusions:

In conclusion, the current case suggested that surgery is the best treatment option for appropriate complex trachea esophageal pathologies with good outcomes. A proper planning should be done before surgery. But intraoperative findings may change our strategies.

Disclosure: No significant relationships.

Keywords: crico-thyro-tracheal anastomosis, tracheal stenosis, trachea-esophageal fistula, musculus sternocleidomastoideus

V-080

PARENCHYMA-SPARING RESECTION OF THE LEFT MAIN BRONCHUS: AN UNUSUAL MANAGEMENT

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Objectives:

Low-grade bronchial tumours have an indolent evolution justifying parenchyma-sparing resections. This allows to diminish the surgical risk, to maintain the respiratory function and the quality of life of patients, while achieving satisfactory oncological results. Carinal or main bronchi tumours carry the following challenges: adequate surgical approach, intraoperative ventilation management, and reconstruction of the airways. We report the technical aspects of the management of a left main bronchus cylindroma.

Video Description:

We report the surgical management of a 44 years old woman presenting with a cylindroma of the left main bronchus, who previously had an endoscopic debulking to palliate acute dyspnea. Selective ventilation using a White oro-tracheal tube was put in place under endoscopic control. A Masaoka approach combining partial longitudinal sternotomy with left antero-lateral muscle sparing thoracotomy in the 5th intercostal space, was performed. Both transpericardial approach of the carina and transpleural control of the pulmonary hilum were achieved. The whole left main bronchus was resected *in sano*, while the lung was spared. The left secondary carina was pulled towards the carina under the pulmonary artery, and the two structures were then sutured together. Tension on the anastomosis was prevented by the association of several releasing manoeuvres: section of the pulmonary ligament, circumferential opening of the pericardium and division of the ligamentum arteriosum. Post-operative course was uneventful. No respiratory or anastomotic complications were observed. Functional outcome and endoscopic controls were satisfactory. No recurrence occurred.

Conclusions:

The video focuses on the main steps of the operation: surgical approach, trans-pericardial and trans-pleural control of the carina and the left main bronchus, releasing manoeuvres, end-to-end anastomosis of the left secondary carina to the carina, lymphadenectomy. To the best of our knowledge, complete left bronchus resection sparing the lung through a single approach has not been described in the literature yet.

Disclosure: No significant relationships.

Keywords: lung cancer, left main bronchus, parenchyma sparing resection, Masaoka approach



V-081

BRONCHO VASCULAR SLEEVE RESECTION OF RIGHT MIDDLE LOBE WITH N1 LUNG SQUAMOUS CELL CARCINOMA

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Objectives:

A 76-year-old woman was referred because of bloody sputum. Two lung cancers were noted: a 4.5-cm mass in right middle lobe involving the interlobar pulmonary artery (PA) and a 2.0-cm mass in the left upper lobe. They were diagnosed as simultaneous multiple squamous cell lung carcinoma: clinical T2aN1(#11s) M0 stage IIB in the right lung and T1bN0M0 stage IA2 in the left.

Video Description:

A posterior lateral thoracotomy was performed via the fourth intercostal space. After subcarinal lymph-node dissection, the upper lobe and intermedial bronchus were confirmed. From the ventral side, the superior pulmonary vein (PV) was dissected inside and outside of the pericardium, preserving the upper lobe PV and taping the right main PA. After dissection around the lower PV, the lower lobe PA was exposed at the level of the major fissure. The interlobar PA and middle PA were involved by the tumor, and the #11s lymph nodes showed extranodal invasion to the bronchus intermedius, requiring bronchial sleeve resection. After clamping the main PA and the upper and lower lobe PV, the interlobar PA was transected. The bronchus intermedius was cut off on the cranial side at the end of upper lobe bronchus and on the caudal side along the lower lobe bronchus inlet. An anastomosis was performed with interrupted 4-0 PDS sutures. After completing the sealing test, the interlobar PA was trimmed as the bronchus shortened and was anastomosed with a 5-0 Prolene running suture. The lower lobe was well expanded. The operative time was 307 minutes, and the blood loss was 200 g.

Conclusions:

The postoperative course was uneventful. Two months after surgery, planned radiotherapy was delivered. As of 18 months after surgery, no recurrence has been noted. Even in the right middle lobe lung cancer invading the intermedial PA and bronchus, bronchovascular sleeve resection is considered a good treatment option.

Disclosure: No significant relationships.

Keywords: lung cancer, sleeve resection, right middle lobe

V-082

PLEURECTOMY/DECORTICATION FOR PLEURAL DISSEMINATION OF PSEUDOMYXOMA PERITONEI FROM THE CAECUM

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Objectives:

The purpose of this presentation with video is to show Pleurectomy/Decortication for left pleural dissemination of pseudomyxoma peritonei from the caecum. Particularly, total resection of the visceral pleura can be successfully performed.

Video Description:

The patient was mid-40s male. In 2015, he underwent complete reduction surgery (18 hours 13 minutes) with intra-peritoneal heated chemotherapy for pseudomyxoma peritonei from the caecum. Eight months after the operation, he was referred to us to treat left pleural dissemination of pseudomyxoma peritonei by Pleurectomy/Decortication. In November 2015, he underwent left Pleurectomy/Decortication. The operation was comprised of the following procedures, total resection of the left parietal pleura, total resection of the left visceral pleura, and partial resection of the left diaphragm with reconstruction. In right decubitus position, a 24 cm postero-lateral incision was made. The extrapleural plane was entered in the sixth interspace. The seventh rib was shingled posteriorly. The entire parietal pleura was dissected bluntly and sharply. It was dissected from the pericardium and the diaphragm. The diaphragm was partially resected and reconstructed. The entire visceral pleura was dissected using a periosteum elevator with the lung inflated. Operation time was 9 hours 11 minutes. Bleeding amount was 1,240 g. Pathologically, the tumor was consistent with pseudomyxoma peritonei. No invasion into lung parenchyma was detected. This operation was classified as R0 resection. Elevated blood carcinoembryonic antigen (CEA) value of 32.6 (normal range: 0 – 5) ng/ml went down to normal two weeks after the operation. Post operative course until 2 years has been uneventful with excellent performance status. No definite tumor in the whole body has been pointed out, and the CEA is normal.

Conclusions:

As shown in the video, the entire visceral pleura could be successfully dissected using a periosteum elevator with the lung inflated. Pleurectomy/Decortication is feasible for selected patients with pleural dissemination of pseudomyxoma peritonei.

Disclosure: No significant relationships.

Keywords: pleurectomy/decortication, pleural dissemination, pseudomyxoma peritonei, visceral pleura, parietal pleura



V-083

CARINAL RESECTION AND DOUBLE BARREL RECONSTRUCTION FOR BRONCHIAL STUMP RECURRENCE AFTER RIGHT UPPER LOBECTOMY FOR LUNG CANCER

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Objectives:

In case of the indication of pneumonectomy, carinal resection and reconstruction is very important procedure for preserving lung function. Though carinal reconstruction has been established and reported in several literatures, most of them dealt with bilateral main bronchus. Here we report a case which needed carinal resection and reconstruction for lung cancer which developed in the bronchial stump after right upper lobectomy. Thus, carinal reconstruction needed anastomosis between trachea and left main bronchus and right intermedium, so-called double barrel type.

Video Description:

A 74-year old man with a history of interstitial pneumonia underwent right upper lobectomy for lung squamous cell carcinoma 9 years ago. Positron emission tomography taken for prolonged cough revealed abnormal uptake at the stump of right upper bronchus. Bronchoscopy revealed bronchial mucosa tumor extended from the stump at right upper bronchus to right main bronchus. Biopsy revealed the tumor as squamous cell carcinoma. There were no findings of distant metastases, so we performed operation. At the beginning, we intended to perform segmental resection of the right upper bronchus. However intraoperative frozen section diagnosis revealed positive tumor cells in the proximal margin. Thus, we decided to perform carinal resection. Cross field ventilation with 6mm bronchial tube was used for carinal reconstruction. To release tension at bronchial anastomosis, we opened pericardium at the caudal side of right lower pulmonary vein. Anastomosis was made between trachea and the left main bronchus, then right intermedium using polypropylene sutures (Prolene 3-0). Intraluminal ligation at the new carina between left main bronchus and intermediate bronchus was performed with polydioxanone sutures (PDS 3-0). Then, anastomosis at the membranous side of trachea to left main bronchus and intermediate bronchus was performed with polypropylene sutures (Prolene 3-0).

Conclusions:

Although the carinal resection and double-barreled reconstruction is difficult in surgical technique, the technique is extremely useful for local control of central lesion.

Disclosure: No significant relationships.

Keywords: double barrel reconstruction, bronchial stump recurrence, carinal resection, lung cancer

V-084

TRACHEO-BRONCHOPLASTY FOLLOWING RIGHT UPPER LOBE SLEEVE RESECTION COMBINED WITH TRACHEAL RESECTION

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Objectives:

Tracheo-bronchoplasty following right upper lobe sleeve resection combined with tracheal resection could be challenging due to the size discrepancies between the opening of trachea and bronchus intermedius. Bronchus intermedius trimming method to adjust the size discrepancies are described and compared with partial closure of the opening of trachea.

Video Description:

A 67-year-old gentleman was diagnosed with lung squamous cell carcinoma 3.2 cm in diameter, which occluded the orifice of right upper lobe bronchus and involved right lateral side of trachea. Through posterolateral incision in 5th intercostal space, right upper lobe and right main bronchus combined with azygos vein arch and 2.5 rings of right lateral side of tracheal cartilages were resected. The negative margins of both trachea and bronchus intermedius were pathologically confirmed. Right hilum was released aiming to elevate the bronchus intermedius and to reduce the anastomotic tension. To adjust the size discrepancies for anastomosis, bronchus intermedius stump was trimmed instead of partial closure of the opening of trachea. Bronchus intermedius was incised for 2 bronchial cartilages on the mediastinal side, the opening of bronchus intermedius was trimmed to be oblique and wide. Trachea and bronchus intermedius were anastomosed with 18 of interrupted 3-0 Vicryl sutures and covered with pedicled intercostal muscle flap.

Conclusions:

Bronchus intermedius trimming method to adjust the size discrepancies in trachea-bronchoplasty was presented. The advantages of bronchus intermedius trimming over partial closure of the opening of trachea could be avoiding T-junction of the anastomosis and keep the diameter of anastomosis wider, while could not be applied for those cases with larger defect on tracheal opening and/or tumor involving bronchus intermedius. His postoperative course was uneventful, and 2 months postoperative bronchoscope findings showed nice healing of trachea-bronchoanastomosis. Pathological findings revealed a hilar lymph node and azygos vein arch were involved, pT3N1M0. He underwent postoperative adjuvant chemotherapy.

Disclosure: No significant relationships.

Keywords: tracheo-bronchoplasty, trachea, bronchus intermedius, lung cancer, size discrepancies, right hilar release

TUESDAY, 29 MAY 2018
16:30 - 17:30
TRANSPLANT

O-085

TRACHEAL RESECTION IN STENOSIS AND ANASTOMOSIS PLUS THE APPLICATION OF COLLAGEN POLYVINYLPIRROLIDONE AS A MODULATOR OF HEALING

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Objectives:

To assess the clinical changes, spirometry and presence of restenosis in patients with tracheal stenosis undergoing resection and anastomosis according to the site of the location of the stenosis combined with the application of Colagena polyvinylpyrrolidone sponge at the site of the anastomosis.

Methods:

Three types of anastomosis were performed according to the site of trachea-trachea, cricoid-trachea and laryngotracheal stenosis in 158 patients with combined tracheal stenosis with and without polyvinylpyrrolidone collagen: Group I (n = 72): resection and tracheal anastomosis treated with sponge polyvinylpyrrolidone collagen at the site of the anastomosis, Group II (n = 86): Only with resection and tracheal anastomosis. The postoperative follow-up was 2 years and the presence of tracheal re-stenosis after surgery was evaluated clinically and by spirometry.

Results:

Table 1 Characteristics of the 158 cases by study group

Groups, No. (%)	tracheal resection + collagen polyvinylpyrrolidone 72 (45.56)	tracheal resection 86 (54.43)	Value of p
Age, Average, SD	38.25 (14.06)	34.73 (14.03)	0.119
Sex, No. (%)			
Man	49 (31.01%)	57 (36.07%)	0.474
Resected rings, Average, SD	4.19 (1.30)	4.27 (1.28)	0.707
Type of anastomosis, No. (%)			0.009
Trachea-trachea	41 (25.94)	52 (32.91)	
Cricoides-trachea	27 (17.08)	17 (10.75)	
Laryngotracheal	4 (2.53)	17 (10.75)	
Re-stenosis, No. (%)	3 (1.89)	11 (6.96)	0.05*

Tuesday P.M.
Abstracts 067- 090

The type of anastomosis performed was trachea-trachea in 93 cases (58.8%), cricoid-trachea in 44 cases (27.8%), laryngotracheal in 21 cases (13.2%). The two groups showed similar spirometric values after surgery. Clinically, only patients with re-stenosis presented dyspnea and stridor. Only 3 (4.1%) patients treated with polyvinylpyrrolidone collagen and 11 of those who only received surgical treatment (12.72%) had re-stenosis before 30 days post-surgery ($p < 0.05$, Chi square).

Conclusion:

The use of polyvinylpyrrolidone collagen in a sponge after a resection and tracheal anastomosis in patients with tracheal stenosis reduces the presence of re-stenosis regardless of the type of tracheal anastomosis performed and maintains spirometry values within normal parameters.

Disclosure: No significant relationships.

Keywords: tracheal stenosis, tracheal re-stenosis, collagen-polyvinylpyrrolidone, tracheal anastomosis, laryngotracheal anastomosis, tracheal resection



O-086

IS DOUBLE-LUMEN ENDOBRONCHIAL TUBE COMFORTABLE AT EXTUBATION? SUPRAGLOTTIC AIRWAY AS A NEW METHOD TO PREVENT LUNG INJURY ASSOCIATED WITH COUGHING AFTER PULMONARY LOBECTOMY

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Objectives:

We presented the efficacy of supraglottic airways (SGAs) in preventing coughing at extubation of double-lumen endobronchial tubes (DLTs) in patients with emphysema (at extubation of DLTs, sore throat, and prolonged air leakage were high even in patients with normal lungs. The aim of this study was to evaluate the efficacy of SGAs in preventing coughing at extubation following pulmonary lobectomy in patients with normal lungs.

Methods:

Among 576 patients who underwent lobectomy at between April 2010 and October 2017, 310 patients with normal lungs were examined retrospectively. We performed conventional extubation of DLTs (DLT group) until December 2016 and SGAs were placed under adequate anaesthesia from January 2017 (SGA group). The following parameters were evaluated: sex, age, operative factors, coughing at extubation, sore throat or postoperative cough on postoperative day (POD) 2, prolonged air leakage (> POD 5), and duration of chest tube drainage.

Results:

Among 310 patients, 250 patients were in the DLT group and 60 patients in the SGA group. The number of male patients (48.4% vs. 70%; $p < 0.01$) was significantly lower in DLT group. Coughing at extubation was observed only in the DLT group in 39 of 250 patients (15.6%, $p < 0.01$). Cases of sore throat (22.2% vs. 0%; $p < 0.01$), postoperative cough on POD 2 (15.6% vs. 0%; $p < 0.01$), and prolonged air leakage (15.2% vs. 5.0%; $p = 0.036$) were significantly higher in the DLT group. Duration of chest tube drainage was also significantly higher in DLT group than in the SGA group (3.7 ± 0.2 vs. 2.9 ± 0.2 ; $p = 0.044$).

Conclusion:

SGA is effective in preventing coughing at extubation or prolonged coughing, and prolonged air leakage in patients with normal lungs.

Disclosure: No significant relationships.

Keywords: coughing, air leakage, double-lumen endobronchial tube, supraglottic airways

O-087

TREATMENT OF DONOR LUNGS WITH PERFLUOROCARBON BASED OXYGEN CARRIER DURING EX VIVO LUNG PERFUSION IN UNCONTROLLED DONATION AFTER CARDIAC DEATH

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Objectives:

Ex vivo lung perfusion (EVLP) has proven its efficacy in assessing marginal donor lungs prior to transplantation. However, the use of EVLP for treatment of injured donor lungs remains limited. Oxygen (O₂) carriers mimic blood O₂ transport properties and may be used as a therapeutic agent by preserving microvascular and organ function during EVLP. Our objective was to test the efficacy of systemic administration of a perfluorocarbon based O₂ carrier (PFCOC) in an uncontrolled donation after cardiac death (DCD) model.

Methods:

Domestic female pigs were subjected to a cardiac death with administration of potassium chloride and left in supine (Group 1; n=2) or prone (Group 2; n=4) positions at room temperature. At the end of 2h of warm ischemic period, the lungs were flushed with Perfadex® and retrieved followed by 6h of EVLP according to the Toronto protocol. One lung in Group 1 and two lungs in Group 2 were treated with PFCOC at a dose of 1.1 g/100mL of STEEN. EVLP physiology and biochemistry were monitored hourly. A lung X-ray was performed at the end of EVLP.

Results:

Lactate levels were significantly lower throughout EVLP in the treated lungs (p<0.05; FigA). When we look at the effect of donor positioning, STEEN consumption was significantly higher in group 1 (960±210 mL) than in group 2 (363±55 mL; p<0.05; FigB). Delta PaO₂ was significantly higher in the prone group throughout perfusion (p<0.05; FigC). Radiologic lung injury scoring was also higher in the supine group (Group 1: 6.5±0.5 vs. Group 2: 3.8±0.5; FigD).

Conclusion:

Lactate production, a marker of donor quality during EVLP was significantly better in the PFCOC treated lungs regardless of donor positioning. Supine versus prone positioning affects the quality of donor lungs in this uncontrolled DCD model. Further experiments are currently performed to understand the efficacy of PFCOC treatment during EVLP.

Disclosure: No significant relationships.



Keywords: oxygen carrier, lung transplantation, ex vivo lung perfusion, donation after cardiac death

O-088

LATE AIRWAY COMPLICATIONS AFTER LUNG TRANSPLANTATION COULD BE PREDICTED WITH AUTO-FLUORESCENCE BRONCOSCOPY

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Objectives:

The pathogenesis of bronchial complications after lung transplantation is associated to peri-anastomotic ischemia related to multiple risk factors. Auto-fluorescence bronchoscopy currently used in oncological diseases, can differentiate between ischemic and normal mucosa. The aim of this prospective study was to find a relationship between the degree of bronchial vascularization evaluated with auto-fluorescence bronchoscopy and the onset of late airway complications.

Methods:

Study design: observational prospective cohort study. Patients were enrolled between January 2015 and August 2016. Exclusion criteria were: pediatric patient, ICU stay > 7 days, mortality < 6 months. All patients underwent auto-fluorescence bronchoscopy weekly during the first month after operation and next quarterly up to the first year. All procedures were performed by the same physician. Anastomosis were classified according to MDS grading system and considered complicated when rated greater than M0D0S0. The fluorescence was measured in terms of ratio between Red (ischemic mucosa) and Green (normal vascularized mucosa). We considered each anastomosis as a unit for statistical purpose. t-test or q-squared were used as appropriate. Generalized Estimating Equations (GEE) were used to account for R/G ratio repeated measure after $\log_{0.5}$ transformation.

Results:

Thirty-one patients were eligible for the study. Forty-five anastomosis (Group A) were non complicated while we observed 10 complicated anastomosis (Group B). There's no statistical differences between the two groups in terms of age and gender of both donor and recipient, BMI, cold ischemic time, donor smoking history. R/G ratio was similar in both groups at baseline ($p=0.521$). There was statistical difference regarding R/G ratio over time ($p=0.037$) - Figure 1. Decreasing trend regarding R/G ratio on $\log_{0.5}$ scale is statistical significant in both groups ($p=0.001$).

Figure 1

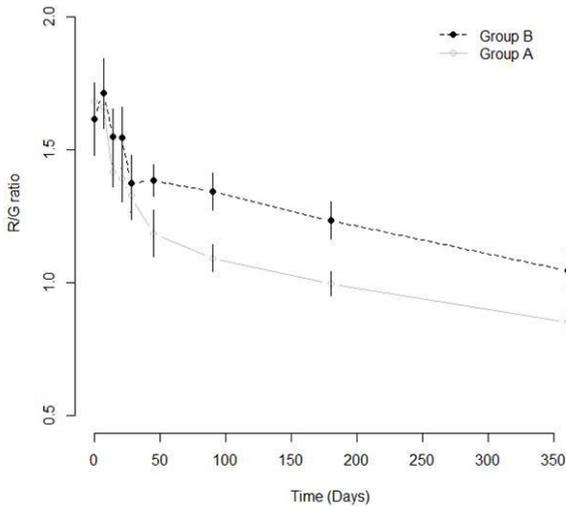


Figure 1: Mean values with relative error bars of R/G ratio over time in two groups (Group A: non-complicated anastomosis; Group B: complicated anastomosis) $p=0.037$.

Conclusion:

Auto-fluorescence bronchoscopy allows the assessment of vascularization of graft mucosa. R/G ratio could be a potential instrument to help clinician to predict airway complications in lung transplant.

Disclosure: No significant relationships.

Keywords: lung transplantation, airway complications, auto-fluorescence bronchoscopy

O-089

ASSESSMENT OF UNILATERAL CHRONIC LUNG ALLOGRAFT DYSFUNCTION USING INSPIRATORY AND EXPIRATORY COMPUTED TOMOGRAPHIC VOLUMETRY IN BILATERAL LIVING-DONOR LOBAR LUNG TRANSPLANTATION

Masao Saito, T.F. Chen-Yoshikawa, H. Kayawake, J. Tokuno, S. Ueda, H. Yamagishi, F. Gochi, R. Okabe, A. Takahagi, M. Hamaji, H. Motoyama, A. Aoyama, H. Date
Department of Thoracic Surgery, Kyoto University, Kyoto, Japan

Objectives:

Chronic lung allograft dysfunction (CLAD) is a major cause limiting long-term survival after lung transplantation. However, early diagnosis of unilateral CLAD is difficult because the unaffected contralateral lung functions as a reservoir in bilateral living-donor lobar lung transplantation (LDLLT). The present study aimed to examine the usefulness of inspiratory and expiratory computed tomography (I/E CT) volumetry for detection of unilateral change in CLAD patients.

Methods:

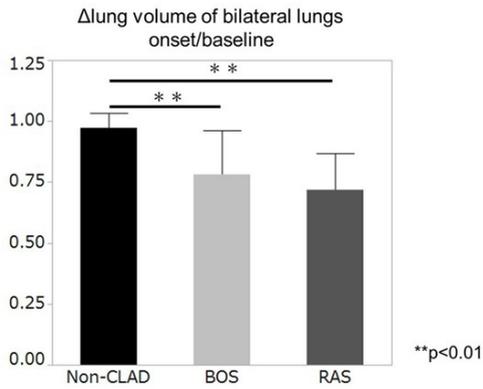
This was a retrospective single-center, observational study using prospectively collected data. A total of 64 consecutive patients who underwent bilateral LDLLT from August 2008 to February 2017 were enrolled. Respiratory function tests, I/E CT and 133Xe ventilation scintigraphy were prospectively conducted at 3, 6, and 12 months after transplantation and once yearly thereafter. Δ lung volume was defined as the value obtained by subtracting expiratory lung volume from inspiratory lung volume.

Results:

Fourteen cases (22%) were clinically diagnosed with CLAD, of which 10 (71%) were diagnosed as unilateral CLAD. Δ lung volume of bilateral lungs strongly correlated with FVC ($r=0.92$, $p<0.01$) and FEV1 ($r=0.80$, $p<0.01$). Δ lung volume of unilateral lungs negatively correlated with the mean transit time of 133Xe ventilation scintigraphy ($r=-0.31$, $p<0.01$). Regardless the phenotypes (bronchiolitis obliterans syndrome or restrictive allograft syndrome) of CLAD, Δ lung volume onset/baseline significantly decreased compared to that in the Non-CLAD group. Among the ten unilateral CLAD patients, three with clinically suspected unilateral rejection yet did not show a 20 % decline in FEV1. In two of these, Δ lung volume of unilateral lungs on the rejection side decreased by 20 % or more.

Conclusion:

Our findings suggest that I/E CT volumetry may be useful for assessment and early diagnosis of unilateral CLAD after bilateral LDLLT.



Disclosure: No significant relationships.

Keywords: CT volumetry, CLAD, LDLLT

O-090

POSTINTUBATION MULTISEGMENTAL TRACHEAL STENOSIS, A 24-YEAR EXPERIENCE

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Objectives:

Postintubation tracheal stenosis (PITS) rarely happens in more than one segment of the airway. Management of such a difficult situation is very much challenging, and report of a focused and prolonged single-center experience is helpful in this field.

Methods:

A retrospective analysis of 2167 patients with PITS, whose data have been prospectively entered to Alborz database since September 1993, identified 83 (3.83%) patients with multisegmental stenosis. According to the length, location and severity of the stenoses, tracheal infection and/or mucositis, laryngeal function, and patient's symptoms, general condition, and co-morbidities, four types of management were considered. Type-1: one-stage resection of both strictures, Type-2: two-stage resection of both strictures, Type-3: resection of one stricture and nonresectional management of the other one, Type-4: nonresectional management of both strictures.

Results:

There were 83 patients (62 males) with a mean age of 23.6 years. Thirteen, 6, 40 and 24 patients were managed as types 1 to 4, respectively. History of previous Tracheostomy/T-tube insertion and airway resection were confirmed in 70 (84.34%) and 11 (13.25%) patients, respectively. Follow-ups were completed in 70 (84.34%) patients (mean 40.81 months). There were 7 (11.86%) recurrences in types 1-3. Multivariate analysis for evaluation the effects of demographics, previous Tracheostomy/T-tube insertion or airway resection, bronchoscopic characteristics, length of resection and types 1-3 on recurrence rate showed no significant association. However, all recurrences happened in patients with history of previous Tracheostomy/T-tube insertion. At final follow-ups, the outcome in all groups was assessed as good (no dyspnea, no airway prosthesis), acceptable (no dyspnea but cannulated airway), and poor (cannulated airway required repeated interventions and/or death related to airway stenosis) (Table-1).

Table 1: Length of resection and outcome

Types of management	Length of Resection(mm)	Outcome		
		Good	Acceptable	Poor
Type 1	46.42± 10.68	10(100%)	0	0
Type 2	72.50± 19.68	4(80%)	1(20%)	0
Type 3	39.90± 11.70	31(81.6%)	6(15.8%)	1(1.9%)
Type 4	_____	11(73.3%)	3(20%)	1(6.7%)
Total		56(82.35%)	10(14.71%)	2(2.94%)

Conclusion:

One-stage or two-stage resection of both strictures is associated with good results in most of the patients. If it is not feasible, good results is still achievable by a combination of surgical and nonresectional methods.

Disclosure: No significant relationships.

Keywords: tracheostomy, tracheal surgery, stents, airway, tracheal stenosis

WEDNESDAY, 30 MAY 2018**09:00 - 10:00****MIXED THORACIC II****O-091**

THE CURRENTLY USED NODAL STAGE CLASSIFICATION OR THE NUMBER OF METASTATIC LYMPH NODES AND THE NUMBER OF METASTATIC LYMPH NODE STATIONS; WHICH OF THOSE IS THE BEST PROGNOSTIC FACTOR IN COMPLETELY RESECTED NON SMALL CELL LUNG CANCER (NSCLC) PATIENTS?

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Objectives:

The purpose of this retrospective study was to compare nodal staging system currently used (pN) with the number of metastatic lymph-node stations (sN) and the number of metastatic lymph-nodes (nN) as the prognostic factor in NSCLC.

Methods:

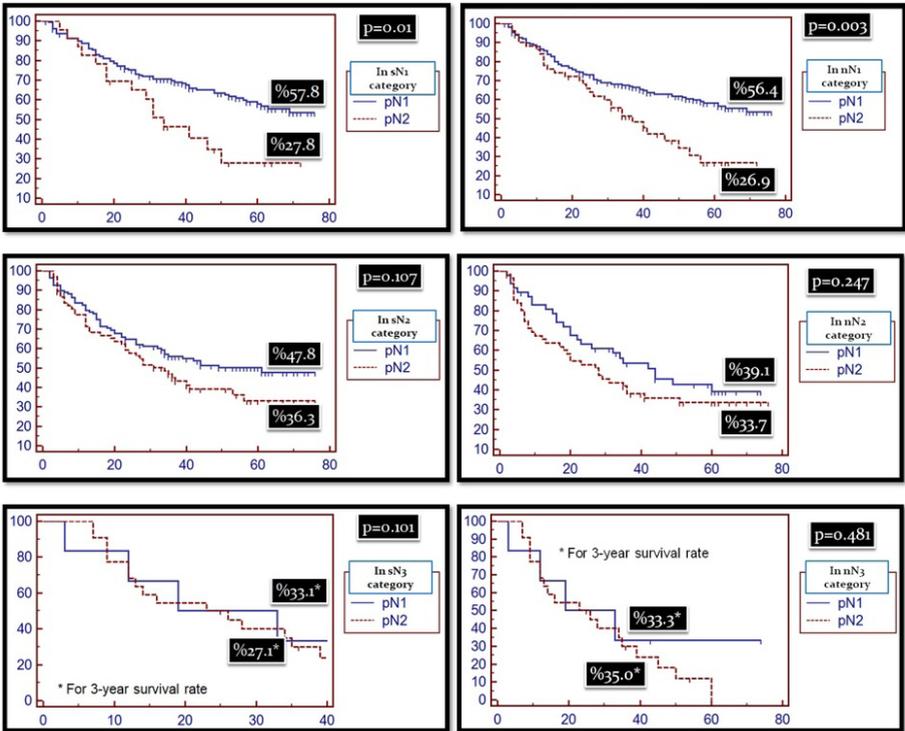
Between 2010 and 2017, 1038 patients resected for NSCLC were analyzed. Patients were divided into three-subgroups according to nodal classifications; pN0, pN1 and pN2 in pN category; sN0, sN1 (one station metastasis), sN2 (two-three stations metastases) and sN3 (≥ 4 stations metastasis) in sN category; nN0, nN1 (one-three nodes metastasis), nN2 (four-six nodes metastasis), and nN3 (≥ 7 nodes metastasis) in nN category.

Results:

Five-year survival rate was 70.1% for N0 categories in all classifications. It was 54.3% for pN1, and 26.4% for pN2 ($p < 0.0001$). Similarly, gradual deterioration was found in terms of survival in sN and nN. Five-year survival rates for patients with N1, N2 and N3 categories were 54.1%, 42.4% and 16.1% according to sN, and 51.4%, 36.1%, and 7.9% according to nN, respectively ($p < 0.0001$). In multivariate analysis, sN and nN were independent risk factors such as pN ($p < 0.0001$). Hazard ratios versus N0 for N1, N2, and N3 were found to be more significant for sN and nN than pN (Table 1).

Hazard ratios for pN, sN, and nN categories	
	Hazard ratio
pN0 vs pN1	1.763
sN0 vs sN1	1.777
nN0 vs nN1	1.812
pN0 vs pN2	3.422
sN0 vs sN3	4.550
nN0 vs nN3	4.655
pN1 vs pN2	1.895
sN1 vs sN3	2.675
nN1 vs nN3	2.507

When the subcategories of sN and nN were divided into pN1 and pN2 subgroups and survival was compared, it was observed that the anatomic location of the lymph-node involvement lost importance as the stational and nodal tumor burden increased (Fig 1).



Wednesday A.M.
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Conclusion:

The number of metastatic lymph nodes and stations are more powerful prognostic factors than currently used nodal classification in NSCLC. As the nodal and station tumor burden increases, the anatomic location of the lymph node metastasis has no meaning. Therefore, we recommend adding the number of metastatic lymph-nodes and the number of metastatic stations to the next TNM staging system.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, staging, N component, N descriptors, lymph node metastasis, lymph node station metastasis

O-092

TREATMENT OF PULMONARY ARTERIAL HYDATIDOSIS: IS PULMONARY ENDARTERECTOMY EFFECTIVE?

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³*Cardiovascular Surgery, Kartal Kosuyolu Training and Research Hospital, Istanbul, Turkey*

Objectives:

Pulmonary arterial localization of Hydatid Disease is extremely rare. The aim of this study was to review our experience in the surgical treatment of patients with pulmonary arterial hydatidosis.

Methods:

Between March 2011 and December 2017, 480 consecutive patients underwent pulmonary endarterectomy (PEA). The medical records of ten patients (2.1%) with the diagnosis of pulmonary arterial hydatidosis were reviewed to evaluate the clinical characteristics, operative findings, post-operative outcomes, and long-term results. All data were collected prospectively and entered into a database.

Results:

Ten patients (six males, four females, mean age: 34 ±1.2) were identified with pulmonary arterial hydatidosis. Seven patients had the diagnosis before referral and were on albendazole treatment. Five had history of surgical treatment of hydatidosis either on lungs, liver or both. Pulmonary arterial hypertension was detected in 9 (90%) patients. New York Heart Association (NYHA) functional class was II in 6 (60%) patients, III in three and IV in one. The mean 6 minute-walk test was 240 metres. Seven patients underwent PEA. Mortality was observed in three patients due to massive hemoptysis in two patients and sepsis in one. The mean pulmonary arterial pressure (mPAP) fell significantly from 52 ±0.7mmHg to 20 ±0.3 mmHg after surgery ($p < 0.05$). After a median follow-up of 26 months, all survived patients improved to NYHA functional class I. Three patients were defined as inoperable due to having multiple lung hydatid cyst lesions in addition to pulmonary arterial hydatidosis. One patient died due to intracranial hydatidosis at 2-year of follow-up. The mean follow-up of two patients was 29 months with a mean PAP of 56 mmHg. One is on single PAH-specific treatment whereas the other is double.

Conclusion:

This is the largest number of pulmonary hydatidosis patients on the literature. Although perioperative mortality is high, pulmonary endarterectomy may be a salvage operation for treatment of pulmonary arterial hydatidosis who had pulmonary hypertension. Patients with associated pulmonary lesions need to be treated conservatively due to difficulties on postoperative period and high mortality rates.

Disclosure: No significant relationships.

Keywords: pulmonary endarterectomy, PEA, pulmonary hydatidosis, hydatid Disease

O-093

PROGNOSTIC IMPACT OF THE INTEGRATION OF VOLUMETRIC QUANTIFICATION OF THE SOLID-PART ON THREE-DIMENSIONAL COMPUTED TOMOGRAPHY (CT) AND FLUORODEOXYGLUCOSE (FDG) POSITRON EMISSION TOMOGRAPHY (PET) IMAGING IN CLINICAL STAGE IA ADENOCARCINOMA OF THE LUNG

Hideyuki Furumoto, Y. Shimada, K. Imai, S. Maehara, J. Maeda, M. Hagiwara, T. Okano, M. Kakihana, N. Kajiwara, T. Ohira, N. Ikeda

Thoracic Surgery, Tokyo Medical University Hospital, Tokyo, Japan

Objectives:

The aim of this study is to conduct comparative analyses of the biological malignant potential of clinical stage IA adenocarcinoma by using positron emission tomography/computed tomography (PET/CT), high-resolution CT (HRCT), and three-dimensional CT (3DCT). The predictive performance of these parameters was evaluated in terms of clinical outcomes and pathological invasiveness (positive lymphatic permeation, blood vessel invasion, pleural invasion, and lymph node metastasis).

Methods:

We enrolled 170 patients with c-IA adenocarcinoma who underwent PET/CT, HRCT, and 3D reconstruction of lung structures using the Synapse Vincent system (Fujifilm Corporation, Tokyo, Japan) followed by complete resection. Maximum standardized uptake values (SUV_{max}) of F-18 fluorodeoxyglucose, the solid-part size, and the solid-part volume were quantified and analyzed in relation to surgical outcomes.

Results:

Univariate analysis demonstrated all the three parameters and whole tumor volume were associated with unfavorable disease-free survival (DFS) while the solid-part volume was the independent predictor on multivariate analysis ($p < 0.001$). The receiver operating characteristic curves for pathological invasiveness, determined using the variables dichotomized at each cut-off level (SUV_{max} , 2.4; solid-part size, 1.23 cm; solid-part volume, 779 mm³), showed that all were significantly correlated with pathological invasiveness and prognosis, whereas the combination of SUV_{max} and the solid-part volume was the most powerful predictor of survival and pathological invasiveness compared to any other parameters (the 4-year DFS and proportion of pathological invasiveness in patients with $SUV_{max} > 2.4$ and solid-part volume > 779 mm³ vs. those with $SUV_{max} \leq 2.4$ or solid-part volume ≤ 779 mm³ were 81.2% vs. 98.3% ($p < 0.001$), and 84.3% vs. 15.1% ($p < 0.001$), respectively).

Conclusion:

In c-IA adenocarcinoma, the solid-part volume was the independent predictor for unfavorable DFS and the integration of solid-part volume and SUV_{max} was highly beneficial for the prediction of survival and pathological invasiveness.

Disclosure: No significant relationships.



Keywords: adenocarcinoma, tumor volume, three-dimensional CT, PET/CT, Stage IA

O-094

PATHOLOGICAL COMPLETE RESPONSE (YPT0N0) AFTER INDUCTION TREATMENT: WHERE IS YPT0N0'S PLACE IN THE TNM CLASSIFICATION?

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Thoracic Surgery, Uludag University, Bursa, Turkey

Objectives:

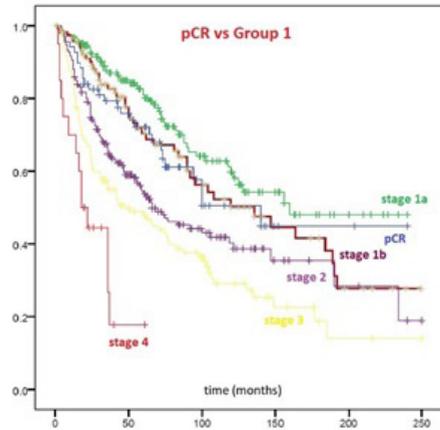
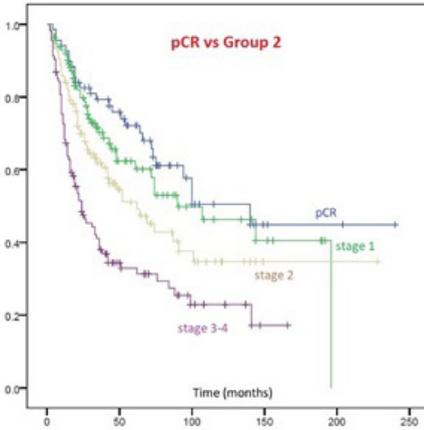
The prognosis in patients with NSCLC who had surgery after induction therapy and had a pathological complete response (ypT0N0-pCR) is expected to have better prognosis. However, the place of the pCR patients in the TNM staging is not defined. The aim of this study is to investigate the long-term survival in patients with pCR and to find the appropriate staging of these patients according to the TNM staging of NSCLC.

Methods:

In this study, we retrospectively reviewed the prospectively recorded data of 1076 patients undergoing surgery (segmentectomy or more) for NSCLC between 1996 and 2016. The patients were staged according to the 8th edition of TNM staging and divided into two groups. Group 1: clinical early stage patients who underwent direct surgical resection (n:660), group 2: patients who received induction treatment before surgical resection for locally advanced NSCLC (n:416). The morbidity, mortality, survival rates and prognostic factors were analyzed in the groups.

Results:

Postoperative histopathological investigation revealed pCR in 72(17%) patients. Five-year survival rate in all patients was 58,7% (group 1= 62,3%, group 2= 52,8%, p=0,001). However, 5-year survival rate was 72,2% for pCR. For patients with stage Ia disease, survival rates were 82,6% for group 1 and 63,2% for group 2 (p=0,008). Patients with stage Ib had 5-year survival rates of 70,3% for group 1 and 60,5% for group 2 (p=0,08). Patients with stage II had 5-year survival rates of 53,9% for group 1 and 51,1% for group 2 (p=0,35).



Conclusion:

This study shows that pCR after induction treatment has the best long-term survival in patients with locally advanced NSCLC. When comparing clinical early stage patients to pCR patients, the results show that while long term survival is unfavorable when compared to Stage Ia patients, survival rates of pCR patients were similar to Stage Ib patients.

Disclosure: No significant relationships.

Keywords: pathological complete response, induction treatment, lung resection

O-095

INCREASE IN VOLUME AND QUALITY IN LUNG CANCER SURGERY

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⁶*Dept Thoracic Surgery, St. Olav Hospital, Trondheim, Norway*

⁷*Dept. Pulmology, University Hospital North-Norway, Tromsø, Norway*

⁸*Dept. Pulmonary Onkology, The Norwegian Radium Hospital, Oslo, Norway*

⁹*Dept. Thoracic Medicine, St Olav Hospital, Trondheim, Norway*

¹⁰*Dept. Pulmology, Molde Hospital, Molde, Norway*

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Objectives:

In this report, national data on volume and quality of surgery are presented and compared with an overall increased survival among lung cancer patients.

Methods:

The nationwide cancer registry has comprehensive data for cancer patients. All inhabitants have a unique identification number which enables cross linking to several other national registries. Thus, studies on epidemiology, treatment and outcome in cancer diseases in a complete population, based on official data are facilitated. In the period 1986–2015, 63 858 lung cancer patients were diagnosed. Of these 11 883 have been classified having localized disease, thus eligible for potentially curative treatment.

**Results:**

In the periods 1986–90 and 2011–15 the median survival in the group with localized disease was 10.3 and 62.1 months, respectively. In 1995 the 30 and 90 days mortality after lung cancer surgery was 3.9% and 7.0%. In 2015 these figures were 0.9% and 2.1%. In 2011–15 the 5-year survival was 60% for all patients operated. In the whole group with lung cancer the median survival was 5.8 months in 1986–90 and 10.1 months in 2011–2015. Since 1995, the 5-year survival for all lung cancer patients has been doubled and was 26% in females and 19% in males in 2015. Since 1995, the percentage of the patients given treatment with intention to cure has been tripled, and in 2015, 21% were treated with surgery, 8% were given stereotactic radiation, and 8% chemo-radiation. Thus, 37% were treated with curative intent.

Conclusion:

The extent and quality of lung cancer surgery have increased pronouncedly and is together with an increase in oncological treatments the main reason for the marked improved survival in lung cancer patients. We are not aware of comparable data on a national level.

Disclosure: No significant relationships.

Keywords: epidemiology, quality, lung cancer, surgery

O-096

DOES THORACOSCORE EFFICIENTLY PREDICT EARLY MORTALITY IN THORACIC SURGICAL PATIENTS? LARGEST SINGLE CENTRE RETROSPECTIVE VALIDATION

Bartłomiej Szafron, R. Shah, P. Krysiak, K. Rammohan, E. Fontaine, J. Thekkudan, F. Granato
Cardiothoracic Surgery, Manchester University Foundation NHS Trust, Manchester, United Kingdom

Objectives:

This study aims to validate Thoracoscore as an early mortality risk model and to evaluate its ability to predict prolonged hospital stay following thoracic surgery.

Methods:

Data from 3338 patients undergoing thoracic surgery in a single institution from January 2015 to December 2017 were retrospectively analysed. Discriminating power of Thoracoscore was evaluated by area under receiver operating characteristic curve (AUC). Model calibration was assessed with Hosmer-Lemeshow (HL) test. Performance of Thoracoscore was also analysed in various subgroups. Additionally, Thoracoscore was evaluated as a predictor of prolonged hospital stay above 5 and above 20 days.

Results:

Observed early mortality was 2.25% (75 patients). Mean Thoracoscore value was 2.46 (95% CI: 2.36-2.56) in all patients, 2.38 in survivors (95% CI: 2.28-2.48), 5.86 in non-survivors (95% CI: 4.68-7.05). For all patients, ROC curve analysis showed good discrimination (AUC 0.776); HL test, however, showed poor calibration (Chi^2 18.4, $p=0.02$). In subgroup analysis, discrimination was sub-optimal ($\text{AUC}<0.70$) in lobectomy and sub-lobar resection. Good discrimination was observed in complex lobectomy (AUC 0.817), decortication (AUC 0.918), diagnostic procedures (AUC 0.923), pneumothorax surgery (AUC 0.961) and pneumonectomy (AUC 0.855). Good calibration was maintained in complex lobectomy (Chi^2 4.22, $p=0.75$), decortication (Chi^2 3.79, $p=0.80$), pneumothorax surgery (Chi^2 2.12, $p=0.83$) and pneumonectomy (Chi^2 10.16, $p=0.25$). The prediction of length of hospital stay was poor in most subgroups apart from decortication for stay above 20 days (AUC 0.750) and sub-lobar resection for stay above 20 days (AUC 0.809).

Conclusion:

Thoracoscore is not accurate in predicting early mortality after non-complex lung resections. However, Thoracoscore is an effective risk model in extensive lung resections, decortication and pneumothorax surgery. Its value as a predictor of the length of hospital stay seems to be limited. Recalibration or remodelling of the system should be considered.

Disclosure: No significant relationships.

Keywords: risk model, thoracic surgery, mortality

SUNDAY, 27 MAY 2018**12:00 - 13:00****JUNIOR POSTERS****P-01****OUTCOME AFTER PERIOPERATIVE VENO-VENOUS EXTRACORPOREAL LIFE SUPPORT AS BRIDGE TO LUNG VOLUME REDUCTION SURGERY IN PATIENTS WITH SEVERE HYPERCAPNIA: A SINGLE-CENTER PROSPECTIVE STUDY**Ali Akil, I. Karfis, J. Reichelt, S. Freermann, M. Semik, S. Fischer*Thoracic Surgery and Lung Support, Klinikum Ibbenbueren, Ibbenbueren, Germany***Objectives:**

Extracorporeal lung support (ECLS) represents an essential support tool especially for critically ill patients undergoing thoracic surgical procedures. Lung volume reduction surgery (LVRS) is an important treatment option for end-stage lung emphysema in carefully selected patients. Here we report our experience with the application of veno-venous ECLS as bridge to LVRS in patients with end-stage lung emphysema and severe hypercapnia.

Methods:

Between January 2016 and March 2017, all patients with end-stage lung emphysema and severe hypercapnia due to acute failure of the breathing pump and which were bridged to LVRS using low-flow ECLS were included in this study. All data were prospectively recorded and retrospectively analyzed.

Results:

N=51 patients (n= 23 female) with a mean age of 62 years (32-86 years) undergoing LVRS with veno-venous ECLS support were included and analyzed. In n=31 patients uniportal VATS-LVRS was performed. N=17 patients underwent bilateral LVRS. In n=5 patients v-v-ECLS was already implemented preoperatively. In n=46 cases v-v-ECLS was applied intraoperatively and continued postoperatively. Mean length of postoperative ECLS support was 3 days (1-14 days). In n=9 tracheostomy was performed preoperatively. From those patients n=4 patients were successfully weaned and decanulated during the postoperative course. The mean ICU stay was 13 days (1-62 days) and the postoperative hospital stay was 20 days (1-64). N=4 patients died due to disseminated intravascular coagulation (n=2) and sepsis (n=2). Postoperatively, a significant improvement was observed regarding the quality of life, exercise capacity and dyspnoea symptoms (Borg scale, all $p < 0.0001$).

Conclusion:

The application of veno-venous ECLS in patients with severe hypercapnia undergoing LVRS is an effective and well tolerated treatment option. In particular, it increases the intraoperative safety, supports de-escalation of ventilatory strategies, even in patients with tracheostomy and reduces the rate of postoperative complications such as re-intubation requiring respiratory failure.

Disclosure: No significant relationships.

Keywords: ECLS, lung volume reduction surgery, lung emphysema, hypercapnia



P-02

SELECTIVE ASSESSMENT OF EPIDURAL CATHETER PLACEMENT BY EPIDUROGRAM IN SUPPORT OF EARLY POSTOPERATIVE DECISION MAKING FOLLOWING ESOPHAGECTOMY

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²*Department of Anesthesiology, Virginia Mason Medical Center, Seattle, United States of America*

Objectives:

Adequate pain control immediately following esophagectomy is critical to patient recovery and may be compromised by uncertainty regarding correct epidural catheter placement. The aim of the current study was to determine the role of performing an epidurogram in selective patients to assess epidural placement following esophagectomy.

Methods:

Patients undergoing esophagectomy in a high-volume center were retrospectively reviewed to identify those in whom an epidurogram was performed <24hrs following surgery. Since 2012 epidurograms have been selectively performed in patients demonstrating features concerning for incorrect epidural placement, including: difficult/complicated insertion; negative sensory test; non-reassuring intraoperative haemodynamic response, and; inadequate postoperative pain control. Epidurograms were obtained by instilling 5ml iopamidol radiopaque contrast through the epidural catheter prior to obtaining an anteroposterior spinal radiograph.

Results:

Forty-eight (24.4%: 41♂; 65±11yrs) of 197 patients who underwent esophagectomy since 2012 had an epidurogram. An open two-stage (44%) or left-thoracoabdominal (48%) surgical approach was most commonly utilized. Epidurograms were not associated with any adverse events. In 11 (23%) patients epidurogram findings led to a direct change in patient management, prompting either: removal/replacement of an incorrectly sited catheter (n=9), or; partial withdrawal of a catheter associated with unilateral contrast distribution (n=2). Median postoperative day 1 pain score was 2.5 (IQR,2-5) in this group. Of the remaining 37 patients in whom correct epidural placement was confirmed by epidurogram, this information endorsed the clinical decision to modify analgesic regimen in 8 (17%) patients with inadequate postoperative pain control. Incorrect epidural placement, that was rescued, was not associated with longer ICU/hospital stay or postoperative morbidity (P>0.05)

Conclusion:

This is the first study to review selective epidurogram use in esophagectomy patients to determine its role in ‘rescuing’ inadequate pain control through expediting clinical decision-making. Findings confirm that in selected patients epidurograms are safe and can directly contribute to patient care in up to 40% of cases.

Disclosure: No significant relationships.

Keywords: esophagectomy, epidural catheter, epidurogram, postoperative analgesia

P-03

UNFORESEEN N2 DISEASE AFTER (MINIMAL) INVASIVE MEDIASTINAL STAGING OF NON-SMALL CELL LUNG CANCER: A SYSTEMATIC REVIEW AND META-ANALYSIS

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¹*Surgery, Máxima Medical Center, Veldhoven, Netherlands*

²*Surgery, Noordwest Ziekenhuisgroep, Alkmaar, Netherlands*

³*Surgery, KU Leuven, Leuven, Belgium*

⁴*Clinical Research Unit, Academic Medical Center, Amsterdam, Netherlands*

⁵*Pulmonary Medicine, Academic Medical Center, Amsterdam, Netherlands*

Objectives:

Mediastinal staging is vital in determining prognosis and treatment of non-small cell lung cancer (NSCLC). Additional surgical staging after negative endosonography is associated with morbidity and delay in start of definite treatment. The proportion of unforeseen N2 disease for various staging strategies and the complications of surgical staging were evaluated.

Methods:

Systematic review and meta-analysis for studies on invasive mediastinal staging of NSCLC were conducted in PubMed, ISRCTN and Cochrane Databases. Selection of studies, assessment of methodological quality and data extraction was done by two authors independently. Results of EBUS, EUS (B), mediastinoscopy and surgical reference standard as well as complications of cervical video-mediastinoscopy were extracted.

Results:

A total of 2,951 unique records were identified, 55 studies including 7,684 patients were included for analysis. The weighted percentages of unforeseen N2 found after surgical lymphadenectomy following negative EBUS, EUS or EBUS and EUS were 11.2%, 14.5% and 8.3% respectively. The percentages of unforeseen N2 following negative EBUS and mediastinoscopy, EUS and mediastinoscopy or EBUS and EUS and mediastinoscopy were 6.5%, 14.5% and 9.1% respectively. Additional mediastinoscopy after negative EBUS, EUS or EBUS and EUS provided an overall decrease of 3.0% in unforeseen N2 disease. Overall complication rate of video-mediastinoscopy was 5.6%, with a procedure related mortality rate of 0.06%. The percentage of patients with morbidity classified as Clavien-Dindo grade III or IV was 1.4% and recurrent laryngeal nerve palsy was reported in 2.5%.

Conclusion:

Confirmatory staging by cervical video-mediastinoscopy following negative endosonography results in a small decrease in unforeseen N2 disease and is associated with significant increase in morbidity. The added value of cervical videomediastinoscopy after negative endosonography in mediastinal staging of NSCLC is currently under investigation in the MEDIASTrial (NTR6528).

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, mediastinal staging, mediastinoscopy, endosonography, thoracic surgery



P-04

OPIOID SPARING EFFECT OF DEXAMETHASONE AS ANALGESIC ADJUVANT IN MINIMALLY INVASIVE THORACIC SURGERY

Giulia Colussi, M. Crisman, G. Paluzzano, E. Moro, M. Stella, G.M. Baldo, V. Carpanese, V. Moro, M. Segat, M. Zuliani, L. Comuzzi, M. Umari, U. Lucangelo
Perioperative Medicine, Intensive Care and Emergency, Azienda Sanitaria Universitaria Integrata di Trieste, Trieste, Italy

Objectives:

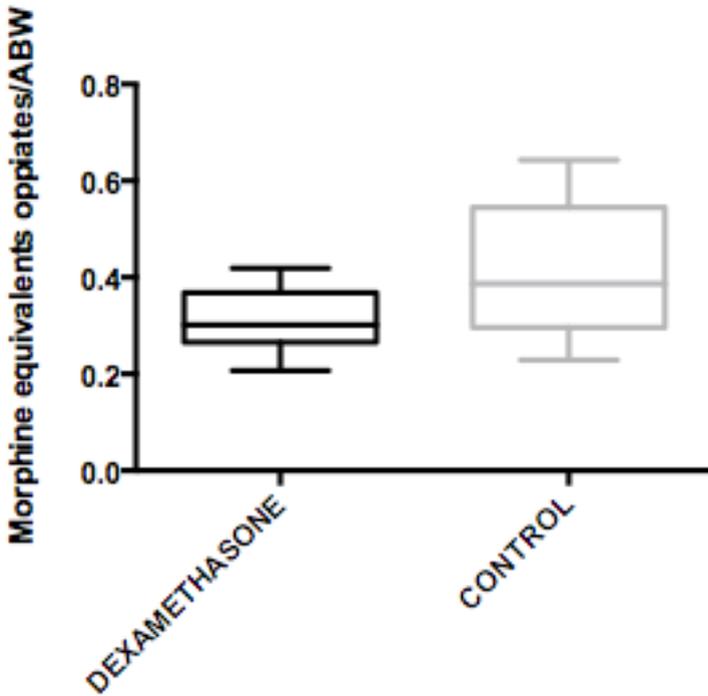
We designed a randomised, observational prospective study in order to validate the use of dexamethasone as opioid-sparing agent after mini-invasive thoracic surgery.

Methods:

We enrolled 18 consecutive patients, 9 for each group. Our population was homogeneous for independent parameters and comorbidities (including diabetes) and for operative parameters such as type of resection, since we recruited in the study only patients who underwent mini-invasive procedures (muscle sparing mini-thoracotomy or VATS) for wedge lung resection, segmentectomy or lobectomy. Patients also received the same general anaesthesia technique; the intraoperative opioid bolus was based on type of surgery and Adjusted Body Weight (ABW). The same loco-regional analgesic technique was performed (Serratus Anterior Plane Block and Paravertebral Block) and morphine administered for postoperative pain using Patient Controlled Analgesia. Dexamethasone was given as a single 8 mg dose at induction of anaesthesia, while in the control group Ondansetron 4 mg IV 30 minutes before awakening was used as antiemetic. Post-operative analgesic consumption, static and dynamic Numeric Rating Scale (NRS) were assessed 24 hours after surgery.

Results:

Pain control at 24 hours was comparable in the two groups, but the use of opioids (evaluated as Morphine equivalents for kg of ABW) was inferior in the dexamethasone group with a trend towards significance ($p=0,0665$). Neither hyperglycaemia nor an increased incidence of surgical site infection was recorded in the study group.

**Conclusion:**

Glucocorticoids have many established properties, including analgesic and anti-emetic effects, that make them an interesting choice as adjuvant in general anaesthesia. Moreover, consistently with its opioid-sparing effect already described after abdominal surgery your study confirms the role of dexamethasone as analgesic adjuvant in the context of a multimodal analgesic strategy for thoracic surgery. The results of our study could be partially explained by possible prolongation effect of dexamethasone on loco-regional nerve block, which has been already documented in orthopaedic surgery.

Disclosure: No significant relationships.

Keywords: postoperative pain management, multimodal analgesia, mini-invasive thoracic surgery, dexamethasone

P-05

CAN LOBE-SPECIFIC LYMPH NODE DISSECTION BE AN ALTERNATIVE TO SYSTEMATIC LYMPH NODE DISSECTION IN TREATING EARLY-STAGE NON-SMALL CELL LUNG CANCER? A COMPREHENSIVE SYSTEMATIC REVIEW AND META-ANALYSIS.

Han-Yu Deng

Department of Thoracic Surgery/Lung Cancer Center, West China hospital, Sichuan University, Chengdu, China

Objectives:

Whether lob-specific lymph node dissection (L-SLND) could serve as an alternative to systematic lymph node dissection (SLND) in treating early-stage non-small cell lung cancer (NSCLC) remains unclear. Therefore, we conducted this comprehensive meta-analysis to compare L-SLND with SLND in treating early-stage NSCLC.

Methods:

A systematic literature search in PubMed and Embase was conducted to identify relevant studies up to 30 November 2017. Data including 5-year overall survival (OS) and disease-free survival (DFS) rates, recurrence rates, and morbidity rate were extracted and analysed.

Results:

A total of six studies (one randomized controlled trial and five cohort studies) consisting of 2037 patients with early-stage NSCLC were included for analysis. Meta-analysis showed that there was no significant difference of 5-year OS (81.7% and 79.5%, respectively; Risk ratio (RR)=1.021; 95%confidence interval (CI)= [0.977, 1.068]; P=0.352) and 5-year DFS (76.4% and 69.9%, respectively; RR=1.061; 95%CI= [0.999, 1.128]; P=0.054) between patients treated with L-SLND and those with SLND. Moreover, there was also no significant difference of total recurrence rate (24.3% and 25.8%, respectively; RR=0.892; 95%CI= [0.759, 1.048]; P=0.166) and loco-regional recurrence rate (7.9% and 9.3%, respectively; RR=0.851; 95%CI= [0.623, 1.162]; P=0.310) between patients treated with L- SLND and those with SLND. However, patients treated with L-SLND yielded significant lower rate of morbidity than those treated with SLND (10.2% and 13.5%, respectively; RR=0.681; 95%CI= [0.521, 0.888]; P=0.005).

Conclusion:

L-SLND yielded significantly less risk of morbidity compared to SLND without compromising long-term oncologic outcomes. L-SLND could serve as an alternative to SLND in treating early-stage NSCLC.

Disclosure: No significant relationships.

Keywords: systematic, meta-analysis, non-small cell lung cancer, lymphadenectomy, lobe-specific

P-06

TREATMENT OF SURVEILLANCE DETECTED DISEASE AFTER RESECTION OF PRIMARY NON-SMALL CELL LUNG CANCER (NSCLC)

Anee Sophia Jackson¹, A.S. Carlson¹, M.A. Cattoni¹, K.E. Costas², E. Vallières¹, A.S. Farivar¹, A.J. Bograd¹, R.W. Aye¹, B.E. Louie¹

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²*Cardiac and Thoracic Surgery, Providence Regional Medical Center Everett, Everett, WA, United States of America*

Objectives:

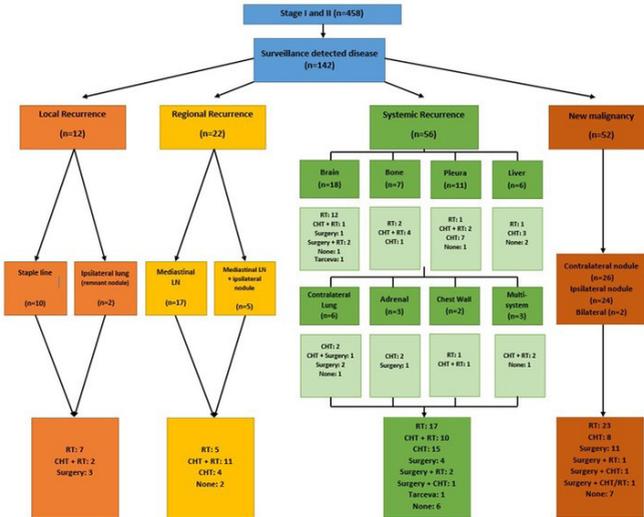
The objective of surveillance after resection of lung cancer (NSCLC) is to detect recurrent or new/developing disease earlier in hopes of improving survival. The optimal treatment for such recurrent or new disease is left to the discretion of the treating physician. We aim to describe our patterns of treatment for surveillance detected disease found within the 5-year surveillance window and assess the overall survival (OS) of treated patients.

Methods:

Retrospective, multicenter review of patients with resected, pathologic stage I-II NSCLC treated with curative intent from 2003-12. Recurrences were local, regional, or systemic. New malignancies were defined by ACCP criteria. Mean OS was calculated in months from detection of new/recurrent disease.

Results:

There were 458 patients (60% female) with mean age 67 years. Surveillance detected disease occurred in 142/458 (31%) with local (12/142, 8.5%), regional (22/142, 15.5%), systemic (56/142, 39.4%) and new malignancies (52/142, 36.6%). There were no baseline differences between the recurrence and non-recurrence groups. Figure 1 describes detected disease locations/treatments. Seven local recurrences were treated with RT, 2 CHT+RT, 3 had completion lobectomies. OS was 41.5mos for the group, but 28.5mos for RT compared to 66.5mos for surgery (p=0.14). Regional recurrences were all treated non-operatively (OS=34.5mo). The majority (43/56) of systemic recurrences were treated non-operatively, though 7 had surgery +/- systemic treatment. OS of the systemic recurrences was 25.5mos. Fifty-two new nodules led to the diagnosis of a new malignancy (OS=60.8mos). Separated by treatment, the OS of the 11 treated with isolated surgery was compared to the 23 RT. Surgery had a higher OS, although not significant (84.2 vs 54.1mos, p=0.06). OS of those that received no treatment was 28mos.



Conclusion:

In surveillance detected disease, treatment leads to additional survival. RT is the dominant salvage therapy. In selected patients with local recurrence or newly detected malignancy, resection should be considered as an overall survival beyond five years can be seen.

Disclosure: No significant relationships.

Keywords: recurrence, surveillance, lung resection, chemotherapy, radiation therapy, non-small cell lung cancer (NSCLC).

P-07

HIGHER DOSES OF RADIATION DURING INDUCTION THERAPY FOR ESOPHA-GEAL CANCER DO NOT INCREASE COMPLETE PATHOLOGICAL RESPONSE RATES OR IMPROVE SURVIVAL

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Objectives:

Improvement in survival of esophageal cancer patients after preoperative chemoradiation (CR) is commonly attributed to the high pathological complete response (PCR) rates achievable with CR. It's been suggested that higher doses of radiation (RT) might further enhance PCR and subsequent survival. However, a direct comparison of the various commonly used doses of RT for their impact on PCR and survival has not been performed.

Methods:

NCDB was queried (2004-2014) to identify EC patients (cStages I-III) who underwent esophagectomy after induction CT or CR. Patients treated with CR were grouped according to commonly-utilized RT doses: 50.4Gy, 45Gy, 35-44Gy. The 3 cohorts of CR were propensity matched to the CT cohort (age, gender, comorbidities, histology and clinical stage) (1:1, Caliper 0.2).

Results:

Six thousand, one hundred and ninety six patients were identified. 557 (9%) received CT alone and 5639 induction-CR. Patients characteristics are shown in Table1. The median RT doses in the CR-groups were 41.4Gy, 45Gy and 50.4Gy. PCR was observed in 23% of all patients who received CR. A higher dose of RT was not associated with a higher rate of CPR either in the entire cohort nor in the 2main cell-types. PCR rates were significantly higher in squamous cancers compared to adenocarcinoma across all RT doses (39%vs20%; $p<0.001$). On multivariate analysis (MVA), independent predictors of PCR included non-adenocarcinoma cell-types (HR2.47, $p<0.001$) and c-stage (stage3:HR0.8, $p<0.001$) but not RT dose. Higher doses of radiation were also not associated with significant improvement in survival (Table2). Independent predictors of survival on MVA were age, co-morbidity index and c-stage but not RT dose (Table 2). When the 3 cohorts of CR were propensity-matched to the CT (n=539 in each group), there was no statistically-significant difference in five year overall survival (36.9%vs36.6%, $P=0.533$).

Table 1	35-45Gy (n=742)	45Gy (n=2336)	50.4Gy (n=2561)	P value
Age	63 (57-69)	63 (57-69)	63 (57-69)	0.170
Gender (male)	595 (80.2%)	1985 (85%)	2162 (84.4%)	0.007
Comorbidity index				0.162
0	559 (75.3%)	1756 (75.2%)	1869 (73%)	
≥1	183 (24.7%)	580 (24.8%)	692 (27%)	
Median RT dose	41.4 (39.5-41.4)	45 (45-45)	50.4 (50.4-50.4)	<0.001
Histology (n=5634)				<0.001
Adenocarcinoma	578 (78%)	1984 (85%)	2135 (83.4%)	
Squamous cell carcinoma	150 (20.2%)	328 (14.1%)	395 (15.4%)	
Others	13 (1.8%)	22 (0.9%)	29 (1.1%)	
cStage				0.025
Stage I	61 (8.2%)	185 (7.9%)	166 (6.5%)	
Stage II	328 (44.2%)	951 (40.7%)	1023 (39.9%)	
Stage III	353 (47.6%)	1200 (51.4%)	1372 (53.6%)	
Complete path response				
Whole cohort	178 (24%)	518 (22.2%)	629 (24.6%)	0.136
AdenoCA (n=4697)	111 (19.2%)	384 (19.4%)	463 (21.7%)	0.134
Squamous CC (n=873)	62 (41.3%)	126 (38.4%)	153 (38.7%)	0.818
≤10 days	322 (52.1%)	1093 (57.3%)	1218 (56.7%)	
>10 days	296 (47.9%)	813 (42.7%)	930 (43.3%)	
30 days readmission (n=5434)	59 (8.3%)	146 (6.5%)	170 (6.8%)	0.279
30/90 days mortality (n=4590/4547)	4.4%, 8.4%	3.1%, 7.2%	3.4%, 8.6%	0.290, 0.262

Table 2	Logistic Regression MVA Clinical Predictors of CPR		Cox Regression MVA Clinical Predictors of OS	
	HR (95% CI)	p value	HR (95% CI)	p value
Age	NS*		1.02 (1.01-1.02)	<0.001
Gender (male)	0.95 (0.80-1.13)	0.548	1.07 (0.96-1.19)	0.247
Comorbidity Index (≥1)	NS*		1.11 (1.02-1.21)	0.019
Histology				
Adeno CA	Reference		Reference	
Sq. CC	2.47 (2.11-2.91)	<0.001	0.92 (0.82-1.03)	0.145
Others	2.36 (1.42-3.94)	0.001	1.18 (0.85-1.64)	0.326
cStage (III)	0.85 (0.75-0.96)	0.010	1.33 (1.23-1.43)	<0.001
CR Groups				
35-45Gy	Reference		Reference	
45Gy	0.97 (0.80-1.19)	0.790	1.00 (0.88-1.14)	0.987
50.4Gy	1.10 (0.91-1.34)	0.328	1.00 (0.88-1.13)	0.997
NS*: not significant in univariate analysis.				

Conclusion:

In patients with EC in the NCDB who received induction CR, higher doses of radiation were not associated with higher PCR rates or improved OS. Furthermore, addition of radiation to a preoperative chemotherapy regimen did not improve survival in this cohort.

Disclosure: No significant relationships.

Keywords: esophageal cancer, Induction, radiation



P-08

¹⁸F-FLUORODEOXYGLUCOSE (FDG) POSITRON EMISSION TOMOGRAPHY (PET/CT) SCAN RESULTS IN STAGE-I PULMONARY ADENOCARCINOMAS ACCORDING TO THE INTERNATIONAL ASSOCIATION FOR THE STUDY OF LUNG CANCER (IASLC)/ AMERICAN THORACIC SOCIETY(ATS)/EUROPEAN RESPIRATORY SOCIETY (ERS) CLASSIFICATION: A MULTICENTRIC ANALYSIS

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Objectives:

Despite ¹⁸F-FDG PET/CT-scan represents a pivotal tool in diagnosing NSCLC, false-negative (FN) cases are not so uncommon, especially in pulmonary adenocarcinoma (PA). Only few studies have tried to identify different variables associated with PET/CT FN-results. Herein, we explored the PET/CT diagnostic performance by stratifying PAs according to IASLC/ATS/ERS classification.

Methods:

We retrospectively reviewed clinical information, radiological findings, PET/CT-records, and pathological features (classified by IASLC/ATS/ERS subtyping criteria) of 531 Stage-I PAs undergone surgery in 6 Centers. We also sub-grouped the population according to 2 validated histological sub-classifications. The diagnostic performance of ¹⁸F-FDG PET/CT was analyzed according to histological features. Univariate and multivariate logistic analysis were used to identify and weigh the independent predictors of PET-findings.

Results:

There were 344 males and 187 females (mean age: 69yrs, range 63-74). Ninety-three lesions (17.5%) were judged as PET-negative and 438 lesions (82.5%) as PET-positive with a mean SUVmax was 4.5. Main characteristics of population are summarized in Fig.1. The rate of PET/CT FN-cases was significantly different ($p < 0.001$) between the IASLC/ATS/ERS-subtypes with about 40% of FN-cases in lepidic-PAs. Significantly different PET/CT FN-rates were observed even when adopted the Nakamura ($p < 0.001$) and Yoshizawa ($p = 0.002$) sub-classifications (Fig.1). At univariate analysis (Fig.1), we estimated the “risk” to be related with a PET/CT FN-result for each IASLC/ATS/ERS histological subtype with lepidic pattern presenting about a 3-fold risk (OR:3.36,95%CI:1.88-5.98, $p < 0.001$) compared with others. Adopting Nakamura and Yoshizawa sub-classifications, we found a significant correlation between histological subclasses and PET-results (Nakamura: $p < 0.001$; Yoshizawa: $p < 0.001$). Finally, multivariate analysis adjusted for TNM and grading (Fig.1) confirmed as histological Yoshizawa subclasses were independently associated to PET/CT FN-results in our population.

Factor (n= 533)	Value
Age, median (IQR)	69 (63-74)
Gender	
Female	187 (35.2%)
Male	344 (64.8%)
Smoking history	
No	81 (15.3%)
Not known	76 (14.3%)
Yes	354 (66.7%)
Side	
Left	232 (43.8%)
Right	309 (58.2%)
Location	
Upper zone	161 (30.2%)
Lower zone	368 (69.3%)
PET - SUVmax, median (IQR)	4.5 (3.4-6.1)
PET - SUVmax <2.5	93 (17.5%)
ERIS/IASLC	
Acinar	213 (40.0%)
Colloid	4 (0.8%)
Lepidic	74 (13.9%)
Micropapillary	27 (5.1%)
Mucinous	26 (4.9%)
NOS - Colloid	1 (0.2%)
Papillary	88 (16.5%)
Solid	81 (15.3%)
Nakamura	
Acinar - Papillary - Mucinous	343 (64.5%)
Lepidic	74 (13.9%)
NOS - Colloid	1 (0.2%)
Solid - Micropapillary	109 (20.4%)
Yoshizawa	
Solid Mucinous Colloid Micropapillary (High Grade)	113 (21.2%)
Lepidic Papillary Acinar (Intermediate Grade)	89 (16.7%)
NOS - Other	8 (1.5%)
Via di accesso	
Transcristina	479 (90.2%)
VATS	52 (9.8%)
Surgical resection	
Major	469 (88.2%)
Sub-totalar	62 (11.7%)
pT1M	
IA	373 (70.0%)
IB	118 (22.3%)
II	89 (16.7%)
III	20 (3.8%)
IV	15 (2.8%)

FN - ERS/IASLC ($\chi^2 P < 0.001$)

	VP	FN	Total
Acinar	150	19	211
%	83.12	16.88	100
Colloid	4	0	4
%	100	0	100
Lepidic	46	36	74
%	59.46	40.54	100
Micropapillary	21	1	22
%	95.45	4.55	100
Mucinous	22	4	26
%	84.62	15.38	100
NOS - Colloid	4	1	5
%	80	20	100
Papillary	75	13	88
%	85.23	14.77	100
Solid	76	5	81
%	93.83	6.17	100
OVERALL	438	93	531
%	82.49	17.51	100

FN - NAKAMURA ($\chi^2 P < 0.001$)

	VP	FN	Total
Acinar - Papillary - Mucinous	289	56	345
%	83.77	16.23	100
Lepidic	44	30	74
%	59.46	40.54	100
NOS - Colloid	8	1	9
%	88.89	11.11	100
Solid - Micropapillary	97	6	103
%	94.17	5.83	100
OVERALL	438	93	531
%	82.49	17.51	100

FN - YOSHIZAWA ($\chi^2 P = 0.002$)

	VP	FN	Total
High Grade	123	10	133
%	92.48	7.52	100
Intermediate Grade	311	82	393
%	79.13	20.87	100
NOS - Other	4	1	5
%	80	20	100
OVERALL	438	93	531
%	82.49	17.51	100

UNIVARIATE

ERIS/IASLC	ODDS RATIO (reference)	OR95% P
Acinar	3.36	1.88-5.98 <0.001
Lepidic	0.29	0.29-2.74 0.45
Micropapillary	1.28	0.19-9.15 0.85
Mucinous	0.85	0.43-1.69 0.65
Solid	0.32	0.12-0.85 0.022

NAKAMURA	ODDS RATIO (reference)	OR95% P
Acinar-Papillary-Mucinous	1.51	1.04-2.07 <0.001
NOS - Colloid	0.65	0.079-5.26 0.68
Solid - Micropapillary	0.32	0.13-0.76 0.01

YOSHIZAWA	ODDS RATIO (reference)	OR95% P
High Grade	3.24	1.63-6.46 <0.001
Intermediate	1.07	0.31-30.2 0.34

MULTIVARIABLE (adjusted pT1M, Grading)	ODDS RATIO (reference)	OR95% P
ERIS/IASLC		
Acinar	1.62	0.80-3.26 0.18
Lepidic	0.24	0.058-0.97 0.17
Mucinous	0.43	0.092-2.02 0.29
NOS - Colloid	0.86	0.088-8.42 0.9
Papillary	0.86	0.42-1.76 0.64
Solid	0.46	0.18-1.15 0.17
NAKAMURA		
Acinar - Papillary - Mucinous	1.79	0.91-3.50 0.09
Lepidic	0.53	0.063-4.49 0.56
Solid - Micropapillary	0.45	0.19-1.11 0.083
YOSHIZAWA		
High Grade	2.61	1.18-5.74 0.017
Intermediate	2.06	0.19-22.2 0.55

Conclusion:

Among pulmonary adenocarcinoma, histopathological findings were significantly associated with FDG-uptake. In particular, it warrants attention that some histotypes (mostly lepidic pattern and, to a lesser extent, acinar and papillary patterns) have a tendency for negative PET-findings.

Disclosure: No significant relationships.

Keywords: false negative, 18F-FDG PET/CT-SCAN, PET, IASLC/ATS/ERS CLASSIFICATION, pulmonary adenocarcinoma

P-09

PAIN MANAGEMENT OF PATIENTS WITH RIB FRACTURES USING SERRATUS ANTERIOR CATHETER BLOCK – A NOVEL TECHNIQUE

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Objectives:

Timely analgesia is the cornerstone for the management of rib fractures. Currently, this includes routine opioid based analgesia, intercostal blocks and epidural catheters. Serratus anterior catheters (SACs) have been suggested as a potential alternative to control pain without significant side effects.

Methods:

Thirty consecutive patients admitted with multiple rib fractures, not requiring rib fixation and pain score (according to our validated questionnaire) >5 are to be enrolled and receive SAC. A trained anaesthetist inserts an SAC under ultrasound guidance [Figure A]. A loading dose of 40mLs of 0.25% Chirocaine is given into the serratus anterior plane, followed by maintenance infusion of 0.1% Bupivacaine. This is thought to diffuse the local anaesthetic into the intercostal spaces and perform sustained effective intercostal block. Concurrent use of oral analgesia and the use of patient-controlled analgesia (PCA) was recorded. Frequent pain scoring by the patient was recorded along with the need for antibiotics for chest infection, upper limbs movement, length of stay (LOS), escalation of care to High Dependency Unit (HDU) and the need for non-invasive ventilation (NIV).

Results:

We have recruited 10 of the prospective 30 patients. The mean age of patients is 66.3, with an average LOS of 8.3 days and the catheter being in for an average of 3 days. The mean pain score pre-catheter insertion was 9.7, STER 0.15 and 1 hour post catheter insertion was 4.6 STER 0.51 [Figure B]. The mean pain score difference was 5.14, $p < 0.0001$, 95% CI 4.02-6.27. Only 2 patients were admitted to HDU, both being admitted to HDU prior to the use of SAC. No patient required epidural catheters or NIV. 3 patients were initially started on PCAs. This was weaned off within 6 hours post SAC insertion in all 3 patients to oral paracetamol, ibuprofen, codeine or morphine sulphate as required.

Conclusion:

The interim results of this ongoing study has shown significant reduction in the pain and improved patient satisfaction score after institution of SACs in patients with rib fractures, without the need for epidural catheters.

Disclosure: No significant relationships.

Keywords: serratus anterior catheter, analgesia, rib fractures

P-10

OUTCOME OF LARYNGOTRACHEAL SURGERY AFTER INTERVENTIONAL ENDOSCOPIC PRE-TREATMENT

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Objectives:

Treatment modalities for laryngotracheal stenosis comprise surgical resection, endoscopic interventions or combinations of both approaches. Literature on surgical outcome in endoscopically pre-treated patients receiving laryngotracheal surgery is sparse.

Methods:

From January 2012 to April 2017 154 patients received laryngotracheal at our institution. Treatment-naïve patients were compared to patients pre-treated by endoscopic interventions. Surgical outcome was determined by freedom from restenosis/intervention, postoperative voice quality and swallowing function.

Results:

Out of 154 patients, 21 (14%) had received an interventional pretreatment before laryngotracheal surgery. Seven (33%) patients were male and the median age at surgery was 49 years (range 4-77). 15 (71%) patients had undergone laser resection/dilatation and 6 (29%) patients were referred after failed airway stenting. Indication for surgery was idiopathic subglottic stenosis in 10 (48%) cases, acquired laryotracheal stenosis in 8 (38%), a tracheoesophageal fistula in 2 (10%) and a tracheal tumor in 1 case (5%). Laryngotracheal surgery was performed by means of tracheal resections (n=5), cricotracheal resections (n=7) and cricotracheal resections with a dorsal mucosectomy (n=6). Moreover, three patients required complex reconstructive techniques with rib cartilage grafts. In general, more extended techniques had to be applied in the pre-treated group compared to treatment-naïve patients operated within the same time period. Surgical outcome, was excellent or satisfying in 90% in the non-pretreated group and 83% of patients in the pre-treatment group (p=n.s.). Despite the high percentage of complex surgical procedures in the pretreatment group, the median intensive care stay was one day (range 0-17) and the median total hospital stay 7 days (range 3-37).

Conclusion:

Endoscopic pre-treatment of patients with laryngotracheal problems usually require more complex resection and reconstructions techniques compared to pre-treatment naïve patients. Despite this, the surgical outcome is comparable between the two groups in a specialized high-volume center.

Disclosure: No significant relationships.

Keywords: laryngotracheal, cricotracheal, subglottic



P-11

VIDEO-ASSISTED THORACOSCOPIC SURGERY (VATS) SENTINEL NODE BIOPSY COULD REDUCE THE NEED FOR SYSTEMATIC MEDIASTINAL LYMPHADENECTOMY IN EARLY STAGE NON SMALL CELL LUNG CANCER (NSCLC)N. Ilic¹, Ivan Simundza¹, J. Juricic², D. Krnic², D. Ilic²¹*Thoracic Surgery Department, University Surgical Hospital, Split, Croatia*²*Anesthesiology Department, University Surgical Hospital, Split, Croatia***Objectives:**

Systematic mediastinal lymphadenectomy is still essential for an adequate postoperative staging of NSCLC. We tried to investigate the controversial role of sentinel node biopsy (SNB) in early stage non small cell lung cancer (NSCLC) surgery using videothoroscopic approach (VATS).

Methods:

A total of 72 patients with clinical T1N0M0 NSCLC underwent SN navigation VATS lobectomy using Tc-99 labeled tin colloid followed by systematic mediastinal lymphadenectomy (SML) in three years time period (2012-2015). Mapping of the mediastinal lymph nodes by their number and station followed by hystopathological evaluation was performed. Patients data were statistically analyzed.

Results:

Intraoperative SN was identified in 65 (87%) of these patients with 92% of accuracy. We found lobe specific skip nodal metastases in 7 (10%) patients resulting in upstaging. The incidence of ML metastases seemed to be more often in adenocarcinoma patients ($p < 0.05$), but skip nodal metastases showed higher rate in squamous cell carcinoma patients. Intraoperative frozen section was not confirmed accurate for detecting micrometastases in three (4%) patients. Operative time was prolonged for 10 (8-25) minutes showing no difference in complication rate.

Conclusion:

Minimally invasive VATS SNB showed absolute safety and high accuracy. Our results indicated that SN identification could reduce mediastinal lymph node dissection in early stage NSCLC. Further clinical studies should be carried out in order to prove that minimally invasive SNB could be curative for T1N0M0 NSCLC.

Disclosure: No significant relationships.

Keywords: early stage lung cancer, sentinel node biopsy, vats

P-12

CLINICAL AND FUNCTIONAL RESULTS OF PULL-DOWN HELLER-DOR AND ESOPHAGECTOMY FOR END-STAGE ACHALASIA: A PROSPECTIVE STUDYValentina Tassi¹, M. Lugaresi², B. Mattioli³, N. Daddi³, S. Mattioli⁴¹*Dimec University Of Bologna, Policlinico Sant'orsola-malpighi, PhD Course in Cardio-Nephro-Thoracic Sciences, Bologna, Italy*²*Surgical And Medical Sciences, Maria Cecilia Hospital, University of Bologna, Bologna, Italy*³*Surgical And Medical Sciences, Surgical and Medical sciences, Bologna, Italy*⁴*Dimec University Of Bologna, Policlinico Sant'orsola-malpighi, Division of Thoracic Surgery Maria Cecilia Hospital (Cotignola), Bologna, Italy***Objectives:**

Conservative surgery or esophagectomy (E), may be indicated for therapy of dysphagia in end-stage achalasia. E aims to prevent the development of carcinoma, which may occur in end-stage achalasia. The Heller-Dor associated with the verticalization of distal esophagus (pull-down technique, PD-HD), achieved better long-term results than the standard Heller-Dor operation for the treatment of end-stage achalasia. We compared objective outcome and quality of life after PD-HD and E.

Methods:

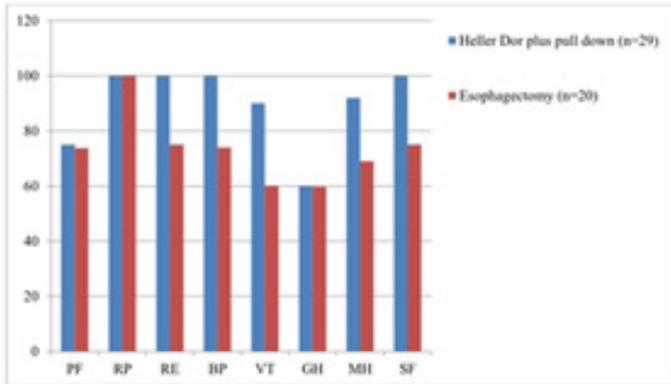
Data were extracted from a database finalized to prospective clinical research. The study cohort included 29 patients (median age 57 years IQR 49-69 years) submitted to PD-HD and 20 patients (median age 64 years IQR 56-69 years) (p=0.321) submitted to E for end stage achalasia or for cancer (patients recurrence free). The objective outcome of treatment was evaluated with semi quantitative scales investigating dysphagia, reflux symptoms and esophagitis. Quality of life was assessed by means of SF-36 questionnaire.

Results:

Median follow-up was 134.13 months (IQR 92.36 - 167.03 months) for PD-HD and 42.77 months (IQR 23.57 - 65.17 months) for E (p=0.001). No statistically significant differences were observed with regards to the objective evaluation of dysphagia, reflux symptoms and esophagitis (p=0.515). No statistically significant differences were calculated between the two groups as it concerns the domains general health (p=0.302), physical functioning (p=0.275), role physical (p=0.107) and bodily pain (p=0.057). Significant differences with regards to the domains role emotional (PD-HD 100, E 75, p=0.012), vitality (PD-HD 90, E 60, p<0.001), mental health (PD-HD 92, E 69, p=0.001) and social functioning (PD-HD 100, E 75, p=0.014) were observed in favour of PD-HD (Figure).

Conclusion:

PD-HD provided objective (dysphagia and GER) results similar to E, but PD-HD achieved better quality of life than E. PD-HD is the procedure of choice for patients with low or null risk for cancer.



Disclosure: No significant relationships.

Keywords: end-stage achalasia, esophagectomy, Heller-Dor, quality of life

TUESDAY, 29 MAY 2018**08:00 - 18:00****POSTERS****P-13****LIFE-THREATENING CARDIOVASCULAR COMPLICATIONS RELATED TO PECTUS EXCAVATUM SURGERY**Julien De Wolf¹, V. Loobuyck², E. Brian³, A. Wurtz²¹*Thoracic Surgery and Lung Transplantation, Foch Hospital, Suresnes, France*²*Cardiac and Thoracic Surgery Division, Lille University Hospital, Lille, France*³*Thoracic Surgery, Curie-Montsouris Thorax Institute, Paris, France***Objectives:**

To assess the life-threatening cardiovascular adverse events (LCAE) related to pectus excavatum surgery.

Methods:

Literature review of life-threatening adverse events affecting the heart, pericardium and large vessels related to open repair (Ravitch-type or other procedures) versus minimally invasive repair (Nuss).

Results:

Of 1262 patients undergoing a Willital-Hegemann open repair, we identified 1 death caused by intraoperative cardiac arrest in a patient with unspecified "cardiac anomaly". In patients undergoing a Ravitch-type repair, we identified 11 non-lethal LCAEs: 2 per/postoperative cardiac injuries; 6 delayed intracardiac bar migrations (Overall, 8 successful cardiac procedures under CPB were performed); 3 intrapericardial migrations of fractured sternal wire and consecutive tamponade treated by wire removal and pericardial drainage. Finally, we identified 1 case of ascending aortic injury caused by a fractured sternal wire 28 year after sternal turnover which required prosthetic aortic replacement. In patients undergoing a Nuss repair we identified: 24 procedural cardiac injuries and 3 during bar removal; 1 case of intracardiac migration of the Nuss-bar (Overall, 4 cases of mortality and 11 patients undergoing a cardiac procedure under CPB); 2 procedural vena cava injuries; 6 obstructions of the inferior vena cava (3) or right ventricular outflow tract (3); 3 delayed episodes of major bleeding from the ascending aorta (1 case of mortality); 2 pericardectomies for purulent and constrictive pericarditis, respectively; 2 delayed cardiac tamponades. Eight patients sustained a procedural or late-onset cardiac arrest (5 cases of mortality). Overall, we identified 51 LCAEs which required 20 cardiac/aortic procedures under CPB. There were 10 cases of mortality and 2 cases of severe hypoxic brain injury.

Conclusion:

During pectus excavatum surgery, a procedure under CPB is sometimes mandatory. Literature data show that the cardiovascular morbidity/mortality related to the Nuss procedure appears more significant, in comparison with open repair.



Disclosure: No significant relationships.

Keywords: cardiovascular severe adverse events, cardiovascular complications, pectus excavatum, surgery

P-14

PERIOPERATIVE INFLAMMATION STATUS PREDICTS POSTOPERATIVE SURVIVAL OF COMPLETELY RESECTED NON-SMALL CELL LUNG CANCER

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Objectives:

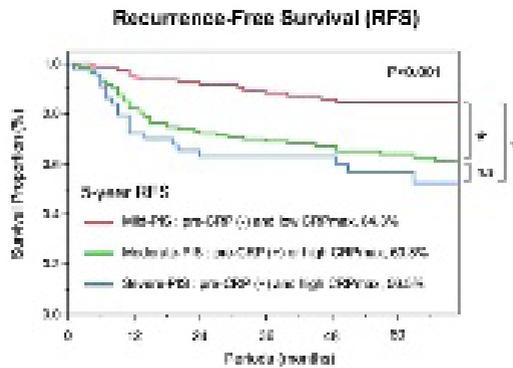
Inflammation has been postulated to influence tumourigenesis and progress. This study aimed to investigate the prognostic effect of perioperative inflammation in patients with surgically resected non-small cell lung cancer (NSCLC).

Methods:

A retrospective review was conducted on 273 patients with NSCLC who underwent complete resection by lobectomy with lymph node dissection between 2005 and 2014. Inflammation was evaluated based on levels of C-reactive protein (CRP) measured preoperatively, on day 1, 4, and 7, or as occasion arose. Clinicopathological features and prognosis were analysed according to perioperative inflammation status (PIS).

Results:

Positive pre-CRP was defined as preoperative CRP levels of >0.2 mg/dL. High CRPmax was defined as postoperative CRPmax levels of >6.4 mg/dL based on ROC curve analysis for predicting recurrence. Positive pre-CRP significantly correlated with old age, smoking, high serum carcinoembryonic antigen (CEA) levels, and large tumour size. High CRPmax significantly correlated with open thoracotomy, postoperative complications (Grade \geq 2), operative time, and blood loss. The 5-year recurrence-free survival (RFS) in the patients with positive pre-CRP and high CRPmax were significantly poorer compared with patients with negative pre-CRP and low CRPmax, respectively. Patients were stratified into mild-PIS group ($n = 119$) if patients had neither positive pre-CRP nor high CRPmax; moderate-PIS group ($n = 114$) if patients had either marker; severe-PIS group ($n = 40$) if patients had both markers. Five-year RFS rates in the mild-, moderate-, and severe-PIS groups were 84.3%, 63.8%, and 56.5%, respectively ($P < 0.001$). Multivariate analysis suggested that PIS was an independent prognostic factor of RFS ($P = 0.003$), along with CEA level and pathological T and N category.



Potential prognostic factor	Multivariate analysis	
	HR [95% CI]	P-value
Postoperative inflammation status (PIS)		0.001*
High vs Moderate	2.21 (1.25-3.90)	0.007*
High vs Low	2.20 (1.07-4.58)	0.033*
Moderate vs Low	1.30 (0.87-1.93)	0.19
Age	1.02 (1.00-1.05)	0.360
Gender (male)	1.16 (0.69-2.15)	0.62
EM (kg/m ²) per 1-point increase	0.96 (0.91-1.02)	0.29
Smoking (pack years) per 1-point increase	1.06 (1.00-1.09)	0.05
CRP level (0-5 mg/L)	2.20 (1.47-3.30)	<0.001*
Neutrophil-to-lymphocyte	0.75 (0.48-1.18)	0.19
PT-27	1.95 (1.19-3.20)	0.011*
pH 7.31	2.14 (1.07-4.28)	<0.001*
Types II resection	0.85 (0.47-1.62)	0.61
Postoperative complication (grade ≥2)	1.23 (0.77-1.92)	0.36
Adjuvant chemotherapy	0.88 (0.57-1.35)	0.57

CI=confidence interval; HR=hazard ratio; *p<0.05

Conclusion:

Our results indicate that PIS is an independent predictor of survival in patients undergoing complete resection of NSCLC. Postoperative inflammation would relate to prognosis, as well as preoperative inflammation.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, surgery, prognosis, inflammation, C-reactive protein

P-15

LONG-TERM RESULTS AFTER SURGICAL RESECTION FOR SYNCHRONOUS OR METACHRONOUS PULMONARY AND HEPATIC COLORECTAL METASTASES: WHO ARE THE BEST CANDIDATES?

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Objectives:

Surgical resection of isolated pulmonary or hepatic metastases from colorectal cancer prolongs survival in selected patients. On the contrary, appropriate selection criteria and benefits of resection in patients who develop both hepatic and pulmonary metastases are still debated.

Methods:

Of 489 patients who underwent operation for lung or liver colorectal metastases in 2 Institutions between 01/1994 to 12/2014, we retrospectively reviewed clinical information, surgical notes and pathological features of 85 patients with colorectal cancer who underwent resection of both hepatic and pulmonary metastases. Median follow-up was 8.1 years from the time of colorectal resection. Patient, treatment, and outcomes variables were analyzed using log-rank, Cox regression, and Kaplan-Meier methods.

Results:

The main clinical characteristics and surgical notes are summarized in Table 1. A total of 200 operations were performed (mean 2.35 for patient). The liver was the first site of metastasis in more than 80% of cases and multiple hepatic lesions were resected in about 2/3 of patients. Unlikely, multiple pulmonary metastases were resected in about one third of patients by wedge resection (~90% of cases) or lobectomy. There were no in-hospital deaths. Overall survival rates (Fig. 1A) calculated at 3-, 5-, and 10-year from the colorectal resection were 94%, 79%, and 38%, respectively while median overall and disease-free survivals were 100 and 21 months. An analysis of prognostic factors revealed that survival was significantly longer when the liver was the first site of recurrence ($p < 0.001$, Fig. 1B). Moreover, a better long-term survival could be predicted in patients with unique pulmonary metastases ($p = 0.028$).

Table 1

Clinical and Surgical Characteristics of the Population	
Age mean ; SD	62.18±9.9
Sex n. %	
<i>male</i>	44 (51.76)
<i>female</i>	41(48.24)
Site of primary tumor n. %	
<i>Colon</i>	56 (65.88)
<i>Rectum</i>	29 (34.12)
Site of first metastasis n.%	
<i>liver</i>	70 (82.35)
<i>lung</i>	13 (15.29)
<i>liver and lung</i>	2 (2.35)
Multiple metastases	
<i>liver</i>	56 (65.88)
<i>lung</i>	32 (37.65)
Surgical Operation	
All	200
<i>operation for patients (mean)</i>	2.35
Thoracic procedures n. %	113
<i>first resection</i>	85 (75.22)
<i>second resection</i>	24 (21.24)
<i>third resection</i>	4 (3.54)
Mode of Thoracic Procedures n. %	
<i>wedge resection</i>	92 (91.42)
<i>lobectomy</i>	11 (9.73)
Hepatic procedures n. %	87
<i>first resection</i>	85 (97.70)
<i>second resection</i>	2 (2.30)
Mode of Hepatic procedures n. %	
<i>segmental/wedge resection</i>	48 (55.17)
<i>partial hepatectomy</i>	37 (42.53)
Hospitalization days (mean; range)	
<i>Pulmonary procedures</i>	5.5 (2-10)
<i>Hepatic procedures</i>	7 (1-23)

Figure 1A

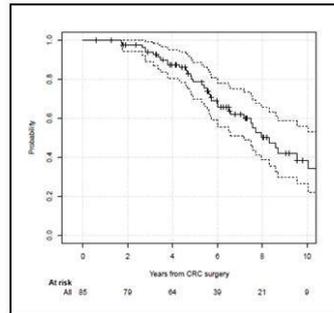
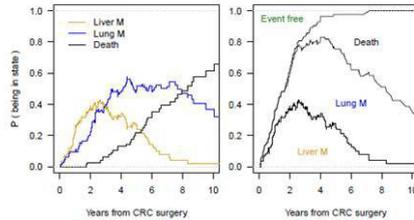


Figure 1B



Conclusion:

An aggressive strategy of care consisting of surgical resection of both hepatic and pulmonary colorectal metastases could be associated with prolonged survival in selected patients. Patients with a hepatic metastases diagnosed as first site of recurrence, and patients with single pulmonary lesion had the best outcomes.

Disclosure: No significant relationships.

Keywords: pulmonary metastases, lung metastases, surgery

P-16

SURGICAL STRATEGY FOR SECOND SURGERY AFTER PRIOR PULMONARY LOBECTOMY: THE SAFETY OF BILATERAL PULMONARY LOBECTOMY

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Objectives:

Bilateral pulmonary resection was high-risk procedure, but a little is known about the safety of bilateral pulmonary lobectomy. In this study, we investigated morbidity and mortality of two-stage lung resection after prior pulmonary lobectomy.

Methods:

A total of 151 consecutive patients underwent two-stage bilateral lung resection after prior pulmonary lobectomy in our institution between 2007 and 2017. We compared morbidity and mortality rate between the patients who underwent pulmonary lobectomy as second surgery (L-L group) and those who underwent sublobar resections (L-S group). Among L-L group, we explored the risk factors of postoperative respiratory failure and 30-day mortality.

Results:

The L-L group was 46 patients (30.5%) and the L-S group was 105 patients (69.5%). Morbidity rate of L-L group was significantly higher than that of L-S group (39% vs 11%, $p<0.01$), especially respiratory failure occurred in more L-L group (20% vs 2.9%, $p<0.01$). The two patients in L-L group died within 30 days (4.3% vs 0%, $p=0.09$). Five patients in L-L group re-intubated postoperatively (11%), and home oxygen therapy (HOT) was introduced in 6 patients (13%). Surgical procedure and resected lobe was the risk factor of re-intubation (the cases with left lower lobectomy for first surgery ($p=0.04$) and the cases with right lower lobectomy for second surgery ($p=0.03$)). The older age with 75 or more ($p=0.03$), pack-year smoking ≥ 40 ($p=0.03$), %FVC before second surgery < 80 ($p<0.01$), history of heart disease ($p=0.01$), the interval between first and second surgery less than 1 year ($p=0.04$) were the risk factors of HOT. Right lower lobectomy as a second surgery was the risk factor of the 30-day mortality in L-L group ($p=0.03$).

Conclusion:

Morbidity and mortality rate of L-L group were higher than those of L-S group. For patients with the history of pulmonary lobectomy, it should be considered to apply sublobar resection whenever possible.

Disclosure: No significant relationships.

Keywords: Bilateral pulmonary lobectomy, second surgery, sublobar resections, two-stage pulmonary resection, morbidity and mortality

P-17

INTRATUMORAL VESSEL INVASION (VASCULAR AND LYMPHATIC INVASION) HAS AN ADVERSE EFFECT TO THE SURVIVAL OF PATIENTS WITH NON SMALL CELL LUNG CANCER (NSCLC) AND MAY BE PREDICTED BY PREOPERATIVE 18F- FLUORODEOXYGLUCOSE (FDG) POSITRON EMISSION TOMOGRAPHY (PET)

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Objectives:

Selection of surgical procedure is important for non-small-cell lung cancer (NSCLC). The post-operative pathological diagnosis of intratumoral vessel invasion from the primary tumor in NSCLC plays an important role as metastasis and recurrence. However, it is difficult to predict before surgery. In this retrospective study, we will reveal that vascular and lymphatic invasion can be evaluated by FDG uptake intensity thereafter contribute to selection of surgical procedure.

Methods:

Between January 2006 and December 2012, 393 patients with NSCLC (Stage I to IV) who underwent R0 surgery were targeted. The intratumoral vessel invasion was adjusted pathologically. In all cases, SUVmax of the carcinomas were measured from the image of 18F FDG-PET examination.

Results:

Among the 393 NSCLC patients, 117 tumors (29.8%) showed vascular invasion (V1), 127 tumors (32.1%) showed lymphatic vessel invasion (Ly1), 82 tumors (20.7%) showed both V1 and Ly1. The 5-year overall survival rate was 69.5% considering all patients. Patient with both invasion (V1&Ly1) had significantly worse survival rate than those without (V0&Ly0) or either (V1 or Ly1) (40.0%, 79.8% and 71.4%; $p<0.0001$, $p=0.0006$, respectively). Though SUVmax was significantly higher in squamous cell carcinoma (Sq) than that in adenocarcinoma (Ad) (15.8 ± 8.6 vs. 7.7 ± 7.2 , $p<0.0001$), the SUVmax was significantly higher for V1 or Ly1 tumors in comparison to V0 or Ly0 tumors in the same tissue type corespectively (Ad,V1: 14.54, V0: 8.78, $p<0.0001$; Ly1: 11.55, Ly0: 6.09, $p<0.0001$) (Sq,V1: 17.78, V0: 14.48, $p=0.0456$; Ly1: 17.45, Ly0: 14.90, $p=0.1347$). Especially for p-stage I adenocarcinoma, a reliable significant difference was observed (V1: 11.13, V0: 4.43, $p<0.0001$; Ly1: 9.42, Ly0: 4.68, $p<0.0001$) (Figure.A and B).

Conclusion:

Intratumoral vessel invasion (vascular and lymphatic invasion) was proved to be predict for patient with NSCLC. PET intensity examination is associated with vascular and lymphatic invasion and may thereby used as a preoperative indicator for selection of surgical procedure.

Disclosure: No significant relationships.

Keywords: lungcancer, PET, intratumoral vessel invasion

P-18

ANALYSIS OF RECURRENCE AFTER INTENTIONAL SEGMENTECTOMY FOR PERIPHERAL SMALL LUNG CANCER

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Objectives:

We report the characteristics of tumors which saw recurrence and discuss recurrence after intentional segmentectomy.

Methods:

Recurrences in 194 intentional segmentectomies, between 1995 and 2012, for clinical T1N0 non-small cell lung cancer ≤ 20 mm were evaluated to identify recurrence-free interval and recurrence patterns. We stratify cT1b tumors as solid versus partially solid (i.e. tumor diameter equal to versus greater than solid component size). Local-regional recurrences were classified as ipsilateral hilar-mediastinal lymph node metastases or recurrence in preserved segments. Recurrence-free interval and survival were assessed by Kaplan-Meier estimates.

Results:

The median follow-up time was 79 months. There was no recurrence in the T1mi or T1a groups (both 31 patients). Comparing the T1b-solid group (72 patients) with the T1b-partially solid group (60 patients), there were 21 (29.2%) recurrences versus 14 (23.3%) ($p=0.450$), the median of recurrence-free interval was 27 [17-41] and 42 [30-72] ($p = 0.289$), and the 5/10 year recurrence-free survival rates were 64.9 / 53.5, 83.2% / 63.0% ($p = 0.310$). The T1b-solid group had 12 distant metastases, four ipsilateral mediastinum, and five recurrences only in the preserved segments, all occurred within 60 months. The T1b-partially solid group had six distant metastases, one ipsilateral mediastinum, and seven recurrences only in the preserved segments. The five recurrences after 60 months were all surgical stump recurrences. Recurrence treatments were surgery for four patients with secondary tumor nodules (or secondary cancers) and three patients with surgical stump recurrence, and chemoradiotherapy for five patients with surgical stump recurrence. Only two of those patients had no further recurrence.

Conclusion:

For our T1b-partially solid group, post-operative follow-up monitoring was necessary beyond 5 years. Considering the high incidence of surgical stump recurrence in particular, intentional segmentectomy should be selected discriminately.

Disclosure: No significant relationships.

Keywords: segmentectomy, recurrence, lung cancer

P-19

SAFETY AND FEASIBILITY OF TUBELESS SINGLE PORT THORACOSCOPIC LUNG RESECTION SURGERY

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Objectives:

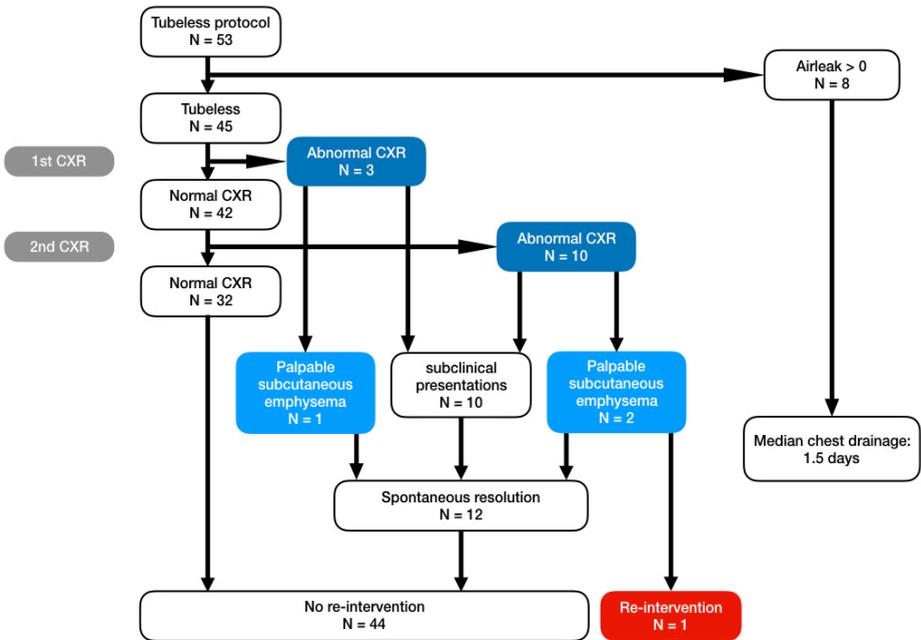
“Single port” video-assisted thoracoscopic surgery (VATS) and “tubeless” VATS, defined as non-intubated anesthesia and no postoperative chest drainage, are both developed to enhance patient recovery. However, concerns regarding safety and feasibility have been raised. We aim to investigate the early postoperative outcomes after tubeless single port VATS for lung resection.

Methods:

Our protocol includes non-intubated general anesthesia, a single 3 cm utility incision, and digital drainage system to ensure no airleak after resection and omission of chest drainage. If persistent airleak was detected, a 16 Fr. catheter would be retained in the pleural cavity. The first and second chest x ray (CXR) were taken in the postoperative recovery room and at 24-48 hours after operation, respectively. The primary outcome was grade III/IV complication rate of this protocol. The secondary outcomes included overall complication and re-intervention rates after tubeless single port VATS for lung resection.

Results:

A total of 53 patients after sublobar lung resections were enrolled. Persistent airleak was noted in 8 patients and chest drainage catheters were retained for a median period of 1.5 days. In other 45 “tubeless” patients, 3 had abnormal 1st CXR, which included subcutaneous emphysema in 1 and minimal (less than 2 rib space) pneumothorax in 2 patients). Another 10 had abnormal 2nd CXR, which included minimal pneumothorax in four and subcutaneous emphysema in six patients. In these 13 patients with abnormal CXR, 10 had subclinical presentation and 3 had palpable subcutaneous emphysema. One of them need re-intervention with chest tube insertion for progressive pneumothorax.



Conclusion:

Grade III/IV complication rate was 1.9% (1/53) in our protocol. The tubeless single port VATS for lung resection was associated with radiographical complication (abnormal CXR) rate of 28.9% (13/45), clinical complication (palpable subcutaneous emphysema) rate of 6.7% (3/45), and re-intervention rate of 2.2% (1/45).

Disclosure: No significant relationships.

Keywords: single port, tubeless, vats

P-20

DO PRE-OPERATIVE ACTIVITY LEVELS INFLUENCE POST-OPERATIVE COMPLICATIONS IN PATIENTS UNDERGOING ANATOMICAL LUNG RESECTION? – THE USE OF PEDOMETERS

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Objectives:

To assess whether physical activity over 15 days pre-operatively correlates with the incidence of post-operative complications in patients undergoing anatomical lung resection.

Methods:

Consecutive patients undergoing anatomical lung resection from December 2015 to October 2017, VATS or thoracotomy, were issued with pedometers (**3D Trisport Realalt**) prior to admission. Daily measurements of steps, distance and estimated calories expended were collected for 15 consecutive days prior to admission. Post-operatively measured outcomes were cardiac and respiratory post-operative complications and 30-day re-admission rate. Surgery related complications (prolonged air leak, bleeding) were excluded from analysis.

Results:

Ninety patients were issued with pedometers, with a mean age of 69, 12 were excluded due to non-compliance. 78 (87%) were available for analysis, of which 42(54%) were male and 67 (86%) had a smoking history. The mean FEV1 was 85% predicted, the KCO was 81%. Patients were divided into quartiles based on total steps over the 15-day period (Table 1). There was no difference in age, pack years, BMI, percentage predicted FEV1 or KCO between the groups. There were significantly fewer total complications in quartiles 3 and 4 compared to quartiles 1 and 2 ($p=0.01$) and between quartiles 4 and 1 ($p=0.01$). There was no difference ($p=0.17$) in length of stay between quartiles 3 and 4 (mean 5.8 days) and quartiles 1 and 2 (mean 7.5 days).

Quartiles (n)	Total steps	Average steps /day	Respiratory Complications (n)	Cardiac Complications (n)	Total Complications (n)
1 (20)	31,838	2123	8	5	13
2 (19)	50,318	3355	6	3	9
3 (19)	77,364	5158	4	1	5
4 (20)	181,877	12125	2	1	3

Conclusion:

There was a significant reduction in post-operative respiratory and cardiac complications in those patients with greater pre-operative physical activity levels. Activity levels did not affect the length of stay. Further research is required to validate average daily steps as a predictive factor for post-operative complications following anatomical lung resection.

Disclosure: No significant relationships.



Keywords: post operative care, pedometer, post operative complications, activity levels, lung cancer

P-21

POSTOPERATIVE COMPLICATIONS AND PERIOPERATIVE MANagements FOR LUNG RESECTION WITH POST- ESOPHAGECTOMY FOR ESOPHAGEAL CANCERYukio Watanabe, T. Matsunaga, K. Takamochi, S. Oh, K. Suzuki*General Thoracic Surgery, Juntendo University School of Medicine, Tokyo, Japan***Objectives:**

We sometimes experience lung resection for the patients with post-esophagectomy. Although, perioperative management for lung resection with post-esophagectomy have not known well. The purpose of this study was to investigate postoperative complication and perioperative management for lung resection with post-esophagectomy.

Methods:

Of 4266 patients who underwent lung resection, 70 (1.6%) patients had a history of esophagectomy for esophageal cancer. We evaluated postoperative complication between groups with (A) and without post-esophagectomy (B). Furthermore, we investigated the relationships in group A between postoperative complication and the following characteristics; type of lung resection, fasting time of before operation, recurrent nerve palsy, thoracotomy site, duration after previous esophagectomy, and intraoperative adhesion.

Results:

Type of lung resection was as follow: 28 (40%) with lobectomy, 9 (12.9%) with segmentectomy and 33 (47.1%) with partial resection. Regarding postoperative complications, prolonged air leak (PAL), aspiration pneumonia, pleural effusion flowing into contralateral thoracic cavity, contralateral pneumothorax, arrhythmia and hoarseness were 18 (25.7%), 6 (8.6%), 3 (4.3%), 2 (2.9%), 2 (2.9%) and 2 (2.9%). Among 6 patients with pneumonia, 2 patients had aspiration pneumonia immediately after surgery and necessitated into mechanical ventilator. Compared group A with B, aspiration pneumonia ($P < 0.001$), PAL ($P < 0.001$) and recurrent nerve palsy ($P = 0.02$) were common in the group A. In group A, no fasting time before operation ($p = 0.04$) were common in aspiration pneumonia. Regarding PAL, older age ($p = 0.04$), lobectomy or segmentectomy ($P = 0.03$), intraoperative wide-spread adhesion ($P = 0.01$) and longer duration after post-esophagectomy ($P = 0.03$) were common in PAL.

Conclusion:

The groups of lung resection with post-esophagectomy had high risks of postoperative pneumonia, especially immediately after operation, PAL, and recurrent nerve palsy. Fasting time before operation is suggested to be an important management for preventing pneumonia. In addition, intra-operative management with air leak by adhesion is important for preventing PAL.

Disclosure: No significant relationships.

Keywords: post-esophagectomy, pulmonary resection, postoperative complication, perioperative management



P-22

SECRETORY PHOSPHOLIPASE A2 IIA INHIBITION IN NON-SMALL CELL LUNG CANCER DECREASES PGE2 PRODUCTION AND LUNG CANCER INVASIVENESS THROUGH THE INTERCELLULAR ADHESION MOLECULE-1 (ICAM-1) PATHWAY

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Objectives:

Secretory Phospholipase A2 Iia (sPLA2 Iia) catalyzes the first step of the arachidonic acid pathway by breaking down phospholipids resulting in the formation of fatty acids including arachidonic acid which are then metabolized into additional inflammatory molecules by multiple pathways, including the cyclooxygenase pathway. sPLA2 inhibition inhibits pro inflammatory mediators and has been shown to inhibit lung cancer growth in vivo and in vitro. Prostaglandin E2, is a product of the arachidonic acid/cyclooxygenase pathway which is initially catalyzed by sPLA2 and has been shown to increase tumor growth in multiple tumor types, including lung cancer. We hypothesize that sPLA2 inhibition modulates the production of PGE2, and sPLA2 inhibition exerts its antineoplastic effects through the downregulation of PGE2 production.

Methods:

Human lung adenocarcinoma cancer cells (A549) were treated with PGE2 in the presence of a sPLA2 inhibitor and assayed for invasion. Human lung adenocarcinoma cells (A549) were stimulated with tumor necrosis alpha (TNF- α) as a pro-inflammatory stimuli and assayed for PGE2 production. A549 cells were then treated with sPLA2 inhibitor and stimulated with TNF- α to determine the effects of sPLA2 inhibition on PGE2 production. Finally, A549 cells were treated with PGE2 in the presence or absence of pharmacologic sPLA2 inhibition and ICAM-1 expression was measured via immune blotting.

Results:

PGE2 stimulation increased the invasiveness of A549 lung cancer cells and pharmacologic sPLA2 inhibition attenuated the pro-invasive effects of PGE2 (Figure 1). TNF- α stimulation increased PGE2 production in lung cancer cells (Figure 2). This was significantly reduced by pharmacologic sPLA2 inhibition. PGE2 stimulation upregulated ICAM-1 expression and this was suppressed by sPLA2 inhibition (Figure 3).

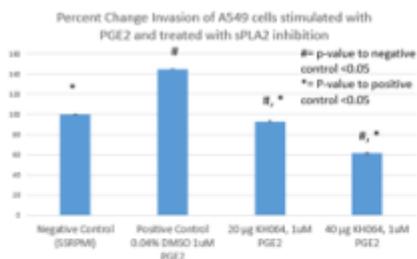


Figure 1. PGE2 increases the invasiveness of A549 lung cancer cells ($p=0.003$) sPLA2 inhibition with KH064 at 20 μM and 40 μM attenuated the PGE2 induced invasiveness ($p=0.003$ and 0.001 compared to positive control for 20 μM and 40 μM doses).

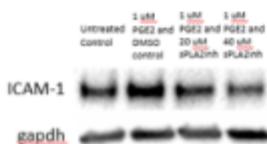


Figure 2. The expression of ICAM-1 is increased by the presence of 1 μM PGE2, this is subsequently decreased by sPLA2 inhibition. N=3 for with similar results.

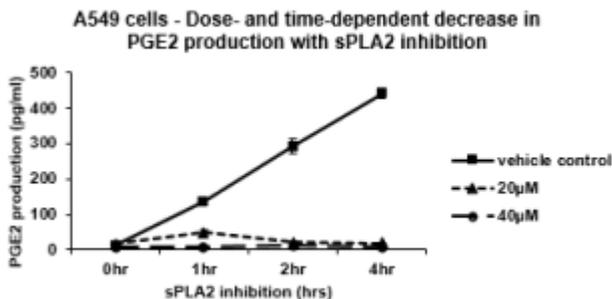


Figure 3. TNF α increases PGE2 production in A549 lung cancer cell lines over time (shown as vehicle control). Treatment with sPLA2 inhibitor at 20 μM and 40 μM attenuated the TNF α -induced PGE2 production.

Conclusion:

sPLA2 inhibition decreases the production of PGE2 and subsequently decreases pro-inflammatory and invasion promoting ICAM-1. The inhibition of this pathway leads to decreased invasiveness of lung cancer cells. These findings further describe how sPLA2 inhibition mechanistically exerts its anticancer effects.



Disclosure: No significant relationships.

Keywords: lung cancer, secretory phospholipase a2, proliferation, invasion

P-23

INTRAOPERATIVE NAVIGATION SYSTEM FOR VIDEO-ASSISTED THORACOSCOPIC SURGERY (VATS) SEGMENTECTOMY; IDENTIFICATION AND CONFIRMATION

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Objectives:

The intraoperative navigation system for VATS segmentectomy can be divided into following some components: identification of the intersegmental line, confirmation of the intersegmental line and securement of resection margin. Although the classic ventilation and collapse method has been used to identify lung intersegmental lines, this method is difficult in patients with underlying lung diseases such as emphysema. We have developed a novel method for identifying the intersegmental line using infrared thoracoscopy (IRT) with intravenous injection of indocyanine green (ICG) (Eur J Cardiothorac Surg. 2014). Intraoperative CT scan during VATS segmentectomy is useful for patients with non-palpable or hardly palpable lesions.

Methods:

i) Identification of the intersegmental line: IRT is based on blood flow rather than ventilation, thus allowing anatomical segmentectomy without lung reinflation. The dominant arteries were interrupted, and the intersegmental line was identified using IRT with ICG. ii) Confirmation of the intersegmental line and resection margin: After dividing the corresponding vessels and bronchi, the intersegmental line was marked by clipping, and intraoperative CT scan was performed under bilateral lung ventilation.

Results:

i) IRT segmentectomy using a KARL STORZ Endoskope has been performed in 15 patients. Identification of the intersegmental line was possible in 12 of the 15 patients. ii) We performed intraoperative CT navigation segmentectomy in 18 cases. In all patients, the location of the lesions to be resected, the intersegmental line, and the surgical margin could be confirmed while performing VATS segmentectomy. The intraoperative CT or 3-dimensional CT reconstruction images are used by the surgeon to confirm the correct anatomical segmental line and secure a sufficient resection margin.

Conclusion:

IRT with ICG and intraoperative CT navigation facilitates more definitive VATS segmentectomy especially for non-palpable or hardly palpable lesions.

Disclosure: No significant relationships.

Keywords: navigation, infrared thoracoscopy, indocyanine green, intraoperative CT, Segmentectomy.



P-24

PREDICTION OF PATHOLOGICAL INVASIVE SIZE IN PATIENTS WITH CLINICAL IA LUNG ADENOCARCINOMA

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Objectives:

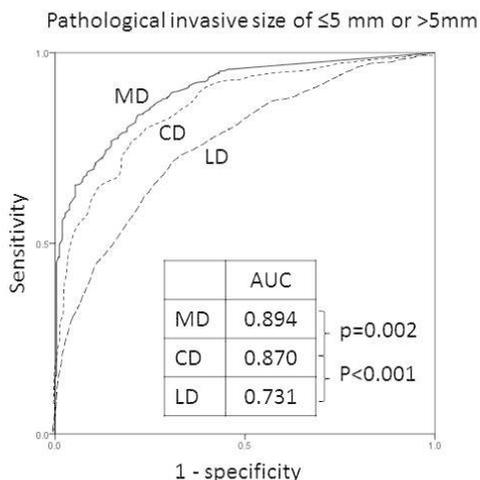
Invasive size is used as a T descriptor in the 8th Edition of the TNM Classification System for Lung Cancer. The aim of this study was to clarify whether high-resolution computed tomography (HRCT) can be used to preoperatively evaluate the pathological invasive size of pulmonary adenocarcinoma.

Methods:

We reviewed 1092 patients with completely resected clinical IA (T1a-1bN0 based on UICC-TNM Classification of Malignant Tumours, 7th Edition) lung adenocarcinoma between 2009 and 2017. The pathological invasive size was measured on the maximal cut surface of the tumor, stained with hematoxylin-eosin and elastica van Gieson in all cases. We analyze correlations of the pathological invasive size with three HRCT variables: maximum tumor diameter in the lung window (LD), consolidation diameter in the lung window (CD), and tumor diameter in the mediastinal window (MD). We performed receiver operating characteristic (ROC) curve analysis to predict a pathological invasive size of ≤ 5 mm.

Results:

Pathological invasive size strongly correlated with both MD ($r=0.772$) and CD ($r=0.743$) and moderately correlated with LD ($r=0.550$). ROC analysis revealed that a pathological invasive size of ≤ 5 mm or >5 mm was best predicted by MD (area under the ROC curve [AUC]=0.894), followed by CD (AUC=0.870), and LD (AUC=0.731) (Figure). Estimation by MD was statistically significant than that by CD ($p=0.002$), and estimation by CD was statistically significant than that by LD ($p<0.001$). Comparison of the AUCs revealed parameters of invasiveness (lymphatic, vascular, and pleural invasions and lymph node metastasis) were best predicted by MD (Table).



AUC: area under the receiver operating characteristic curve,
 MD: tumor diameter in the mediastinal window,
 CD: consolidation diameter in the lung window,
 LD: maximum tumor diameter in the lung window

AUCs for the prediction of pathological invasive size of ≤ 5 mm or >5 mm and parameters of invasiveness (LY, V, PL, and N) according to tumor diameter on high-resolution computed tomography (HRCT) .			
	LD	CD	MD
Invasive size of ≤ 5 mm or >5 mm	0.731	0.870	0.894
LY negative or positive	0.641	0.772	0.801
V negative or positive	0.653	0.820	0.847
PL negative or positive	0.613	0.782	0.805
pN0 or pN1-2	0.692	0.831	0.845

Conclusion:

We can estimate pathological invasive size and other parameters of invasiveness most precisely by measuring MD. MD is an important variable that we should measure preoperatively and is helpful when considering the feasibility of limited surgery.

Disclosure: No significant relationships.

Keywords: pulmonary adenocarcinoma, pathological invasive size, maximum tumor diameter in the lung window, consolidation diameter in the lung window, tumor diameter in the mediastinal window, high-resolution computed tomography

P-25

ANALYSIS OF PATHOLOGICAL NON-INVASIVE LUNG ADENOCARCINOMA WITH A TUMOR DIAMETER LARGER THAN THREE CENTIMETRE (CM) - SHOULD THESE CASES BE CLASSIFIED AS T1A?

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Objectives:

In the WHO classification (ver. 4), cases of pathological non-invasive lung adenocarcinoma with tumor diameters ≤ 3 cm and > 3 cm are defined adenocarcinoma in situ (AIS) and T1a, respectively. We analyzed the prognosis of patients diagnosed with pathological non-invasive lung adenocarcinoma with a tumor diameter > 3 cm to evaluate the validity of the current definition.

Methods:

A total of 2,478 cases of non-small-cell lung cancer underwent complete resection at our hospital from 2000 to 2013. The subjects were 29 (1.2%) of these patients who underwent lobectomy or segmentectomy with lymph node dissection, and were diagnosed pathologically with non-invasive adenocarcinoma with a tumor diameter > 3 cm. A retrospective examination of clinicopathological findings and prognosis was performed.

Results:

The median follow up period and age were 65.3 months and 72 years old, respectively. There were 11 males and 18 females, and six smokers and 23 non-smokers. The median pathological tumor diameter was 40 mm (32-70 mm). The cases included 23 non-mucinous type and 6 mucinous, and none had vascular/lymphatic invasion or lymph node metastasis. Recurrence occurred in five patients. All of them developed lung metastasis in mucinous type (5/6, 83.3%). Five patients died, including four due to primary disease in mucinous type and one due to another disease in non-mucinous. The 5-year survival rate in all patients was 86.1%, and the 5-year disease-specific survival rate in non-mucinous type was 100%.

Conclusion:

Non-mucinous non-invasive adenocarcinoma with a tumor diameter > 3 cm had a histological malignancy grade and prognosis equivalent to those of AIS and corresponded to Tis (stage 0). To define AIS, the non-mucinous type should be evaluated with no limitation on the tumor diameter. In contrast, since the mucinous type redevelops in many cases, even if pathologically diagnosed as non-invasive cancer, staging based on T factor is required for this type, independently from the non-mucinous type.

Disclosure: No significant relationships.

Keywords: adenocarcinoma in situ, larger than 3cm, lung cancer, tumor size

P-26

INTEGRATION OF TISSUE PD-1/PD-L1 IMMUNE CHECKPOINT WITH COMPUTED TOMOGRAPHY (CT) BASED TEXTURE ANALYSIS EXHIBITS HIGH PROGNOSTIC IMPACT ON SURGICALLY RESECTED NON SMALL CELL LUNG CANCER (NSCLC)

Giulia Mazzaschi, P. Pagano, D. Madeddu, S. Cavalli, F. Sogni, C. Frati, A. Falco, G. Armani, G. Bocchialini, C. Mangiaracina, B. Lorusso, L. Ampollini, P. Carbognani, L. Gnetti, C. Lagrasta, M. Silva, M. Tiseo, N. Sverzellati, F. Quaini

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Objectives:

It is increasingly clear that the identification of prognostic and predictive factors in the bursting era of immunotherapy requires a comprehensive analysis of genetic, biologic and clinicopathologic features. Based on PD-1/PD-L1 immune checkpoint, we have recently identified specific tissue immune backgrounds in NSCLC with major impact on clinical outcome and response to immunotherapy. Computed tomography (CT) imaging represents a noninvasive diagnostic tool that might be helpful to assess risk stratification in subjects with lung cancer. We sought to explore the correlation between tissue microenvironmental clues and a number of CT features in order to improve the definition of prognostic parameters in patients affected by NSCLC.

Methods:

Sixty-nine (30 Adenocarcinoma, 39 Squamous Cell Carcinoma) surgically resected patients were included. The quantitative immunohistochemical measurements of PD-L1 expression and TILs subpopulations were correlated with the visually assessed CT features (type, size, effect on surrounding lung parenchyma, margins and texture) provided by potential prognostic impact on lung cancer.

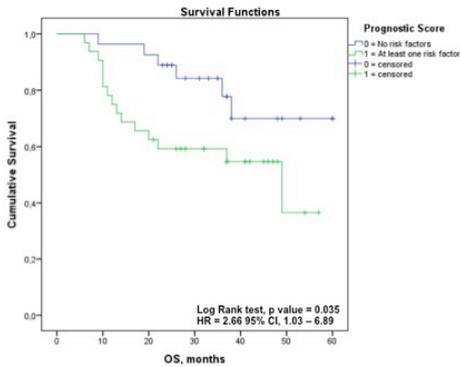
Results:

Higher tissue PD-L1 expression was more frequently detected in lesions either displaying a solid texture ($p < 0.05$) or stretching the surrounding parenchyma ($p < 0.05$). Conversely, no direct statistical correlations were observed between the remaining CT findings and both TILs density and immunophenotypes. However, the combination of predetermined risk factors from tissue (high PD-1-to-CD8 and low CD8-to-CD3 ratio) and CT based (effect and spiculated margins) analyses had a striking impact on clinical outcome. Specifically, patients with higher intratumor CD8-to-CD3 cells and well-defined margins on CT survived 14 months longer ($p = 0.03$) than remainders. Intriguingly, prolonged survival (23 mo. gain; $p < 0.001$) was recorded in cases with CT signs of tumor affecting the surrounding lung parenchyma in combination with low PD-1 expression on CD8 TILs.

Conclusion:

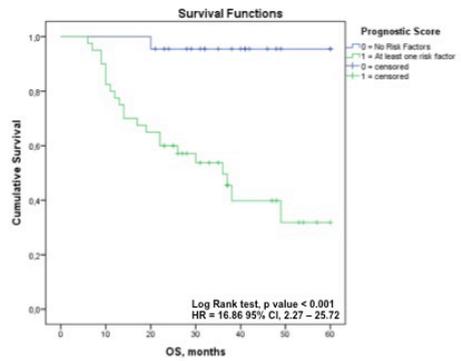
A highly significant prognostic score in NSCLC can be obtained by integrating the tissue immune contexture with CT features.

Tissue CD8-to-CD3 and Margins

**Prognostic Score 1.**

Risk Factors: low tissue CD8-to-CD3 (> Median); spiculated margin.

Tissue PD-1-to-CD8 and Effect on Parenchyma

**Prognostic Score 1.**

Risk Factors: high tissue PD-1-to-CD8 (> Median); no effect on parenchyma.

Disclosure: No significant relationships.

Keywords: NSCLC, immune contexture, CT imaging, prognostic factors

P-27

OUTCOMES AND PROGNOSTIC FACTORS FOR SURVIVAL IN NON-SMALL-CELL LUNG CANCER PATIENTS WITH IIIA-N2 DISEASE TREATED WITH INDUCTION THERAPY FOLLOWED BY SURGERY: A MULTI-INSTITUTIONAL STUDY BY THE ONCOLOGIC GROUP FOR THE STUDY OF LUNG CANCER (SEOR)

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Objectives:

To evaluate long-term survival and associated prognostic factors in a multicentric series of patients with non-small cell lung cancer (NSCLC) stage IIIA-N2 treated with chemo- or chemoradiotherapy induction therapy followed by surgery (CRTS).

Methods:

We retrospectively analyzed 118 potentially resectable patients with T1-3N2M0-NSCLC treated with CRTS at 14 centers between 1/2005 and 12/2014. Overall survival (OS-5y) and progression-free survival (PFS-5y) rates at five years were estimated using the Kaplan-Meier method and compared using the log-rank test. Factors associated with survival were explored using a multivariate Cox model. The regression analysis considered the differences in the induction and mediastinal histological confirmation strategies.

Results:

A lobectomy or bilobectomy was performed in 97 patients (82.2%) while a pneumonectomy was required in 17.8% of cases. Induction treatment consisted on chemoradiotherapy in 62 patients (52.5%) and exclusively chemotherapy in 56 (47.5%). Cytohistological mediastinal reevaluation before surgery was performed in 48 patients (40.7%) OS-5y rate was 51.1% and PFS-5y was 49.4%, with a median follow-up period of 42.5 months. A pathologic complete response was found to be associated with better OS-5y rates (65.4% vs 46.3% for persistent disease). Multivariate analysis identified three favorable independent factors for OS: Mediastinal downstaging (ypN0-1 OS-5y 59.2% vs 28.5% for ypN2; $p<0.001$), lower pathologic T stage (ypT0-1 OS-5y 60% vs ypT3 23.1%; $p<0.001$) and non-pneumonectomy surgeries (OS-5y 54.3% vs 36.6% in pneumonectomies). These factors were also independently significant for PFS.

Conclusion:

This multicentric study shows that patients with NSCLC-IIIa-N2 undergoing surgical resection after induction treatment reached OS and PFS rates of up to 50% at 5 years, which compare favorably with previously published results. We found that mediastinal downstaging, a lower pathologic T stage and non-pneumonectomy surgeries were independently associated with better outcomes. These prognostic factors could help physicians in guiding treatment options for IIIa-N2 patients.

Disclosure: No significant relationships.

Keywords: NSCLC, N2, surgery, chemotherapy, radiotherapy, survival



P-28

EXTERNAL VALIDATION OF THE EUROLUNG1 SCORE FOR RISK STRATIFICATION PRIOR TO THORACOSCOPIC LOBECTOMY

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*Department of Thoracic Surgery, Chest Hospital Schillerhoehe, Gerlingen, Germany***Objectives:**

The ESTS database committee has recently presented the EuroLung1 score to predict major complication following anatomic lung resection. To examine the applicability of this new scoring system, an external validation was undertaken using our institutional database on thoracoscopic lobectomy.

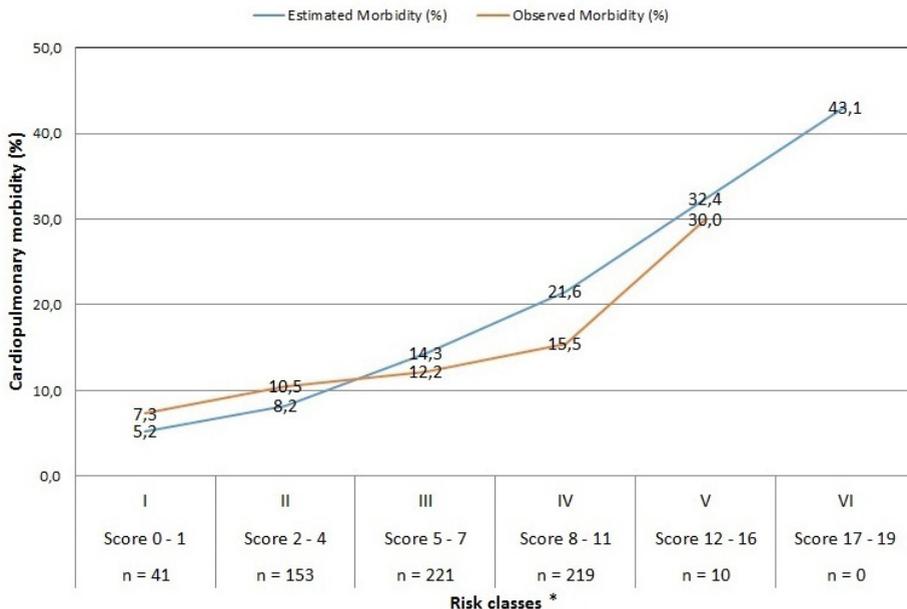
Methods:

From 2009 to May 2017, 644 patients (293 women, 351 men; median age 67 years) underwent thoracoscopic lobectomy or segmentectomy in our institution. According to the princeps publication of Brunelli et al, EuroLung1 score was calculated as a sum of eight predictors with a weight assigned from 1 to 3: age >65, male gender, ppoFEV1 <70%, coronary artery disease, cerebrovascular disease, chronic kidney disease, thoracotomy and extended resection. Also, in compliance with the princeps publication, the morbidity risk was broken down into six classes based on EuroLung1 score (Figure 1).

Results:

The surgical procedures included 574 (89.1%) lobectomies and 70 (10.9%) segmentectomies. There were 548 (85.1%) patients with confirmed NSCLC, 66 (10.3%) with benign disease and 30 (5.0%) with pulmonary metastasis. The postoperative mortality and major complication rate were 0.9% and 12.9%, respectively. On logistic regression analyses, each 1-point increase in EuroLung1 score was associated with a 9% increase in the odds of morbidity (OR=1.092, 95%CI: 1.010–1.180, $p=0.027$). Additionally, a 1-degree increase in risk classes was associated with a 28% increase in the odds (OR=1.327, 95%CI: 1.027–1.715, $p=0.031$). According to the postoperative outcomes in our patient cohort, the morbidity risk was underestimated by EuroLung1 score in lower risk classes and overestimated in higher risk classes (Figure 1). The ROC analysis demonstrated a poor discrimination performance of EuroLung1 score (area under the curve = 0.573).

Figure1: The predicted and observed cardiopulmonary morbidity rates stratified by the risk classes according to EuroLung1 score.



* According to Brunelli A, Salati M, Rocco G, Varela G, Van Raemdonck D, Decaluwe H, et al. European risk models for morbidity (EuroLung1) and mortality (EuroLung2) to predict outcome following anatomic lung resections: an analysis from the European Society of Thoracic Surgeons database. *Eur J Cardiothorac Surg.* 2017;51(3):490-497.

Conclusion:

Our institutional data validated the significant association of EuroLung1 score with major complications following thoroscopic lobectomy. EuroLung1 score might overestimate the morbidity risk in this patient population with higher risk classes.

Disclosure: No significant relationships.

Keywords: major lung resection, minimally invasive thoracic surgery, outcomes, risk assessment, EuroLung1 score



P-29

POSTOPERATIVE PAIN MANAGEMENT IN VIDEO-ASSISTED THORACIC SURGERY (VATS) USING TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION (TENS) AND PARAVERTEBRAL BLOCK: A PROSPECTIVE STUDY

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Objectives:

Transcutaneous electrical nerve stimulation (TENS) has been used to control post-thoracotomy pain with excellent results. We aimed to assess the efficacy of TENS added to paravertebral block and a nonsteroidal anti-inflammatory drug (NSAID) on pain after video-assisted thoracic surgery (VATS) in relation to visual analogue scale (VAS) and rescue medication.

Methods:

50 patients scheduled to undergo 3-ports VATS were enrolled and randomized in two groups: TENS group (25 patients) who received daily postoperative TENS sessions and control group (25 patients) without TENS. Patient characteristics and procedures performed were comparable in both groups. In all the patient's postoperative analgesia consisted of paravertebral block with levobupivacaine bolus every six hours combined with intravenous metamizole. Subcutaneous meperidine (a synthetic opioid) was employed as rescue drug. Pain scores were measured using VAS on 12, 24, 48 and 72 postoperative hours.

Results:

VAS scores in TENS group were significantly lower than in control group mean and on 24, 48 and 72 hours. During postoperative period 2 patients in TENS group (8%) needed rescue analgesia in comparison to 4 (16%) in control group ($p < 0.05$). No side effects were recorded in relation to TENS, paravertebral block or metamizole.

Conclusion:

TENS added to paravertebral block and a NSAID is a safe and effective practice for pain management after VATS.

Disclosure: No significant relationships.

Keywords: vats, TENS, postoperative pain, paravertebral block

Poster
Abstracts P-01 - P-147

P-30

IS SMOKING STATUS ASSOCIATED WITH RISK FACTORS FOR POSTOPERATIVE DELIRIUM IN LUNG CANCER PATIENTS?

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Objectives:

Postoperative delirium complicates the postoperative course and is associated with increased morbidity and mortality as well as increased expenses. The aim of this study was to identify risk factors for postoperative delirium following lung cancer surgery.

Methods:

A retrospective study of 1015 patients who underwent lung cancer surgery at our institute between April 2010 and October 2017 was performed. The following variables were considered in the analysis: age, sex, body mass index, comorbidities, administration of steroid, respiratory functions, smoking index, smoking status, performance status, operative factors. We divided our patients into the delirium group and non-delirium group. Univariate and multivariate analyses were performed to identify whether any of the recorded parameters served as prognostic variables of postoperative delirium.

Results:

Delirium developed in 34 (3.4%) patients. Age (74.8 ± 0.9 vs. 69.2 ± 0.3 ; $p < 0.01$), number of male patients (84.8% vs. 66.0%; $p = 0.024$), cardiovascular disease (20.6% vs. 5.3%; $p < 0.01$), emphysema (76.5% vs. 45.7%; $p < 0.01$), mental disorder (17.6% vs. 3.6%; $p < 0.01$), previous cardiac surgery (8.8% vs. 1.8%; $p < 0.01$), high smoking index (1115.9 ± 107.5 vs. 727.0 ± 22.1 ; $p < 0.01$), and smoking status (Current [< 1 month], 41.2% vs. 19.0%; Current [1-12 months], 14.7% vs. 3.3%; Past, 38.2% vs. 52.6%; Never, 5.9% vs. 25.2%; $p < 0.01$) were significantly higher in the delirium group. (65.7 ± 2.1 vs. 72.2 ± 0.3 ; $p < 0.01$) were significantly lower in the delirium group. Multivariate analysis revealed that mental disorder (odds ratio [OR] = 6.50; 95% CI, 2.04–20.6; $p = 0.002$), and current smoking status (OR=3.1; 95% CI, 1.30–7.11; $p = 0.024$) were the independent risk factors for postoperative delirium

Conclusion:

Mental disorders and current smoking status within the past 12 months are independent risk factors for postoperative delirium and perioperative prohibition of smoking is important.

Disclosure: No significant relationships.

Keywords: postoperative delirium, lung cancer, smoking status

P-31

ANTI-TUBERCULOSIS TREATMENT AFTER PULMONARY TUBERCULOUS NODULES RESECTION IS UNNECESSARY: A SINGLE CENTER RETROSPECTIVE STUDY

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Objectives:

To discuss the necessity of anti-TB therapy after resection of pulmonary tuberculous nodules: whether postoperative anti-TB treatment could reduce TB recurrence?

Methods:

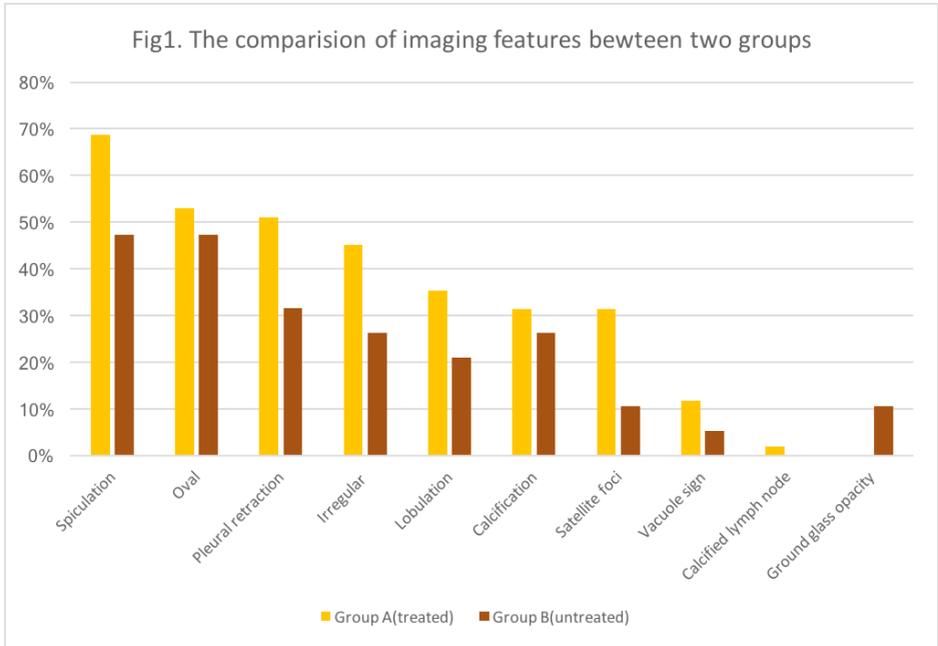
This is a single center retrospective study. Inclusion criteria: 1) asymptomatic solitary pulmonary nodule detected by CT; 2) nodules are resected by operation; 3) TB is confirmed by pathology. Patients' clinical features, follow-up data are collected. The primary end point is TB relapse and the secondary is adverse drug reactions. Patients are divided into two groups according to the acceptance of anti-TB treatment after operation (A: treated; B: untreated). Recurrence is diagnosed by multi-disciplinary discussion. The difference of recurrence rate will be compared and the incidence of adverse drug reactions in Group A will be calculated.

Results:

A total of 70 patients were enrolled, 51 in Group A and 19 in Group B. The median follow-up time was 487 days and there was no significant difference in the follow-up time between two groups. No relapse of TB was found in both groups. The incidence of adverse drug reactions in Group A was 51%(26/51), and the rate of severe adverse reaction was 8%(4/51). No significant difference between two groups was found in the past history of TB, erythrocyte sedimentation rate, T-spot positive rate and the uptake value of PET-CT(Table1). The nodules of two groups had similar manifestations and sizes on CT(Fig1). The positive rates of TB-DNA and anti-acid staining in the two groups were significantly different [$\chi^2=7.487$, $p=0.006$, 59%(22/37) for Group A, 15%(2/13) for Group B, in Table1]. The most commonly (31/51) used combination of anti-TB drugs were isoniazid/rifampicin/ethambutol/pyrazinamide.

Table1. The comparison in clinical features between two groups

	Group A(treated by anti-tuberculosis) n=51	GroupB(untreated) n=19	X²/t	P
History of previous tuberculosis			2.298	0.177
Yes	7	0		
No	44	19		
Erythrocyte sedimentation rate			1.509	0.526
Positive	3	0		
Negative	13	7		
Unknown	35	12		
T-SPOT			1.627	0.356
Positive	12	3		
Negative	5	4		
Unknown	34	12		
TB-DNA/Acid-fast stain			7.487	0.006
Positive	22	2		
Negative	15	11		
Unknown	14	6		
Up-take for PET			0.008	1
Low up-take	11	4		
High up-take	6	2		
Unknown	34	13		
Size in CT(cm)	2.3	1.9	1.536	0.131
BMI(kg/m ²)	23.7	23.0	0.781	0.439



Conclusion:

Postoperative anti-TB treatment seems unnecessary for asymptomatic pulmonary TB nodules. Adverse drug reactions of anti-TB therapy should not be ignored. However, multiple-center prospective studies are needed for further research.

Disclosure: No significant relationships.

Keywords: tuberculosis, surgery, anti-tuberculosis therapy, relapse

P-32

THORACIC BLEEDING COMPLICATIONS IN PATIENTS WITH VENO-VENOUS EXTRACORPOREAL MEMBRANE OXYGENATION

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Objectives:

Patients with severe respiratory failure are treated more frequently with veno-venous extracorporeal membrane oxygenation (vv-ECMO). However, these patients are at risk for bleeding complications due to complex multifactorial coagulation disorders resulting from the extracorporeal circulation.

Methods:

Retrospective analysis of prospectively collected data (institutional ECMO-Registry database) on all patients requiring vv-ECMO between December 2010 and December 2016. Endpoints were the incidence, consequence and in-hospital mortality of patients with thoracic bleeding complications.

Results:

A total of 418 patients (68% male, mean age 50 ± 16.5 years) with severe respiratory insufficiency refractory to conventional therapy required vv-ECMO. Mean lung injury score (LIS) was 3.3 ± 0.5 and sequential organ failure assessment (SOFA) score was 11.9 ± 3.9 . In 23.2% (n=97) of patients relevant hemorrhage was documented. Most patients developed thoracic bleeding complications (n=40; 41.2%), followed by diffuse (21.6%), cerebral (14.4%), gastrointestinal (6.2%), cannulation site (6.2%) and other bleeding locations. Thoracic bleeding complications occurred spontaneous (40%), postoperative (37.5%), after interventions (20%) and after trauma (2.5%). Thoracic surgery was performed in 60% (n=24) of these patients and in 45.8% of cases repeated surgery due to bleeding was necessary again. Mean ECMO duration (18.6 ± 16.8 days; $p=0.035$) and length of hospital stay (58 ± 50 days; $p=0.002$) were significantly longer compared to patients without bleeding complications (n=321). In-hospital mortality was significantly higher in patients with thoracic bleeding complications (52.5%) than in patients without bleeding complications (32.7%; $p=0.013$).

Conclusion:

Thoracic bleeding complications were observed in 9.6% of patients and represent the most frequent bleeding complication (41.2%) during vv-ECMO. Almost 60% of patients required surgical revision and nearly half of these patients underwent repeated surgery. The mortality is high and therefore vv-ECMO should only be performed in experienced centers with thoracic surgery.



Disclosure: No significant relationships.

Keywords: ECMO, thoracic bleeding, hemorrhage, respiratory insufficiency

P-33

THE PROGNOSTIC SIGNIFICANCE OF GROUND-GLASS OPACITY ON CHEST CT AND LEPIDIC GROWTH COMPONENT IN PATIENTS WITH PATHOLOGICAL STAGE IA NON-SMALL CELL LUNG CANCERTomohiro Miyoshi, K. Tane, K. Aokage, M. Tsuboi*Thoracic Surgery, National Cancer Center Hospital East, Kashiwa, Japan***Objectives:**

Ground-glass opacity (GGO) on chest CT and lepidic growth component of cancer cells in pathological findings are regarded as non-invasive component according to the current TNM classification. The presence of GGO component is reported as a prognostic factor of clinical stage IA non-small cell lung cancer (NSCLC), however, the prognostic significance of lepidic growth component in pathological stage IA NSCLC is unclear. The aim of this study is to evaluate them as prognostic indicators in pathological stage IA NSCLC.

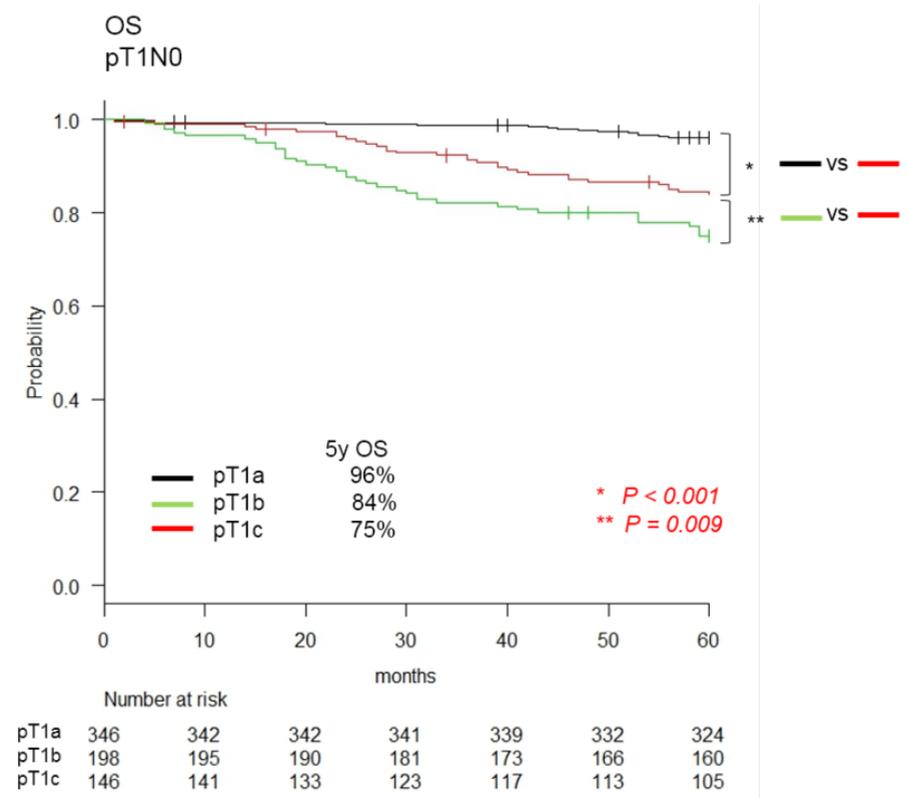
Methods:

We retrospectively reviewed the clinicopathological features of the 690 consecutive patients with pathological stage IA NSCLC who underwent lobectomy and lymph node dissection from January 2003 to December 2011. The pathological stage was reevaluated according to the eighth edition of the TNM classification.

Results:

Among the 690 patients, 299 (43%) lesions were ground-glass nodule (GGN) on chest CT and lepidic growth component existed in 466 (68%) lesions. The 5-year overall survival (OS) of pT1a, pT1b and pT1c were 94%, 90% and 80%, respectively. On multivariate analysis, female (hazard ratio [HR], 0.51; 95% confidence interval [CI], 0.32-0.79; P=0.003), age (HR, 1.05; 95% CI, 1.03-1.07; P<0.001), GGN on chest CT (HR, 0.59; 95% CI, 0.37-0.94; P=0.027) and pathological invasive size (HR, 1.03; 95% CI, 1.00-1.06; P=0.039) were the independently significant prognostic factors. The presence of lepidic growth component was not a significant predictor, and it did not affect the survival in solid nodules on chest CT. The 5-year OS of GGNs was favorable (97%). If GGNs were classified as pT1a regardless of its pathological invasive size, the 5-year OS of pT1a, pT1b and pT1c were 96%, 84% and 75%, respectively (Figure 1).

Figure 1



Conclusion:

In pathological stage IA NSCLC, evaluation using invasive size is reasonable in solid nodules on chest CT, however, the prognosis of GGNs were equivalent to pT1a regardless of its pathological invasive size.

Disclosure: No significant relationships.

Keywords: The TNM classification (the eighth edition), lepidic growth component, ground-glass nodule (GGN), non-small cell lung cancer (NSCLC), prognostic indicators

P-34

MULTIDISCIPLINARY CANCER CONFERENCE REVIEWS FOR THORACIC MALIGNANCIES: ALL CASES REQUIRE REVIEW, NOT JUST DIFFICULT CASES

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Objectives:

The most responsible physician (MRP) usually decides if a cancer case will be presented at a multidisciplinary cancer conference (MCC). We correlated MRP confidence in their original treatment plan with rate of treatment plan change following discussion at a thoracic MCC.

Methods:

The study took place from June-December 2017 at a Canadian tertiary cancer center. The MCC involves surgeons, oncologists, pathologists and radiologists. Cases are brought forward by the MRP. For this study, prior to MCC discussion, MRPs provided their original treatment plan and confidence in this plan (rated on a 1-5 scale). Major and minor changes from original to final treatment plan were documented. **Major changes** included definitive treatment to palliation/observation; upfront surgery to neoadjuvant treatment, or definitive chemotherapy, radiation, or radiofrequency ablation; or, upfront chemotherapy, radiation, or radiofrequency ablation to surgery. **Minor changes** included additional imaging, further staging investigations, repeat consultations, or minor changes in planned chemotherapy/radiation or surgical approach. Data were reported as frequencies and analyzed using chi-square tests ($p < 0.05$).

Results:

Approximately 600 cases were evaluated at the cancer center. Of these, $n=116$ received MCC review. Sixty percent (70/116) of cases resulted in a treatment change, with 41% (29/70) and 59% (41/70) of changes considered major and minor, respectively. When MRP confidence was high and low, there was a 47% (20/43) and 69% (41/59) rate of change, respectively ($p=0.015$). Of cases with high MRP confidence, 14% (6/43) resulted in a major change and 33% (14/43) resulted in a minor change. Major changes most commonly included use of neoadjuvant or definitive chemotherapy/radiation instead of upfront surgery.

Conclusion:

Cases with high MRP confidence in pre-MCC discussion treatment plan had a 47% rate of change, with 14% of changes considered major. These data suggest that most, if not all cases, require MCC review, not just difficult cases.

Disclosure: No significant relationships.



Keywords: decision making, quality, multidisciplinary discussion, multidisciplinary cancer conferences.

P-35

PRIMARY GRAFT DYSFUNCTION AFTER LUNG TRANSPLANTATION INFLUENCES PARENCHYMAL REMODELING DETECTED BY MEAN QUANTITATIVE COMPUTED TOMOGRAPHY (CT)

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Objectives:

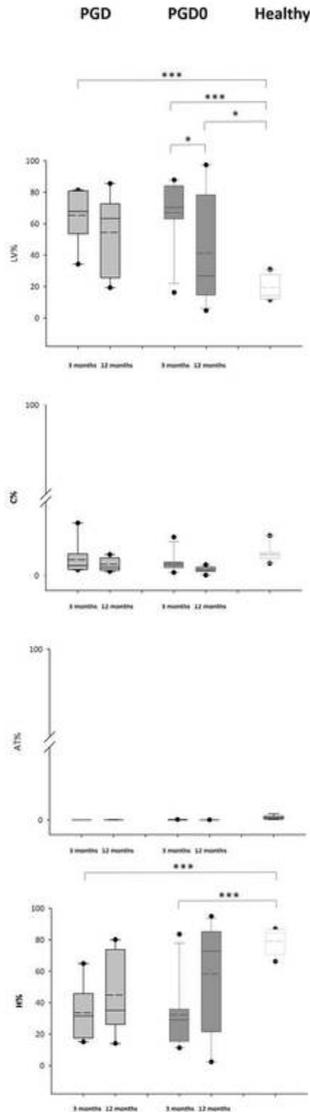
Despite technical progress has diminished the early postoperative mortality after lung transplantation, the incidence of primary graft dysfunction (PGD) remains significant; such syndrome is associated to poor early outcome as well as to impaired long-term survival. Its role in association with functional outcomes is less clear and the evolution of tissue damaged from the ischemia-reperfusion injury has only sporadically been studied. Regional analysis by computed tomography (CT) could be an attractive technique to interpret lung patterns after transplantation. In this study, we evaluate the application of CT functional mask derived parameters to determine whether development of severe (PGD) is associated with short and/or long term postoperative evidences of pulmonary function alterations.

Methods:

We prospectively enrolled all patients who underwent bilateral lung transplantation at our Institution between June 2013 and February 2016. Patients were evaluated at 24, 48 and 72 hours after the end of surgery to establish PGD occurrence and grading. Patients without evidence of PGD constituted the PGD0 Group; patients with grade 2 and/or 3 composed the PGD Group. CT scans at 3 and 12 months after transplantation were analyzed to measure specific gas volume (SVg) changes normalized on expiratory SVgEXP of the whole lung (DSVg/SVgEXP) and to obtain functional masks of density variation (Δ HU), namely maps of low ventilation, consolidation, air trapping and healthy parenchyma.

Results:

Our main result was the evidence of a marked decrease in Δ SVg/SVgEXP in all subjects, both at 3 and 12 months after lung transplantation, indicating a high degree of ventilation defects versus healthy subjects. Higher grades of PGD were associated to higher percentages of low ventilation while air trapping and consolidation were negligible (Figure).



Conclusion:

We demonstrate that quantification of ventilation defects by CT functional mask can offer insight into the correlation between PGD and pulmonary function after lung transplantation at short and mid-term.

Disclosure: No significant relationships.

Keywords: lung transplantation, PGD, functional CT.



P-36

A PROPOSAL OF SCORE TO PREDICT THE COMPLEXITY OF VIDEO-ASSISTED THORACOSCOPIC LOBECTOMY

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Objectives:

To develop a score to preoperatively predict the complexity of video-assisted thoracoscopic (VATS) lobectomy.

Methods:

We assessed 139 consecutive VATS lobectomy patients operated by a single consultant (April 2014-September 2017). Median operative time was 150 minutes (IQR 120-180). Complex operations were defined as: operation time > 180 minutes (>75% percentile) or converted to thoracotomy. Univariable and stepwise logistic regression analyses were used to test the association between baseline and radiological variables (graded by 2 independent investigators) and complex operation. Independent predictors were weighed according to their regression estimates. Each patient was assigned a score derived from the sum of the points.

Results:

Ten procedures (7.2%) were converted to thoracotomy and 24 operations (17%) lasted longer than 180 minutes. Overall, 29 VATS lobectomies (21%) were classified as complex. Median postoperative stay was 2.5 days longer in the complex group (7 vs. 4.5, $p=0.002$). Cardiopulmonary complications and 30-day mortality were not different between the two groups, respectively 24% vs. 18% ($p=0.47$) and 0.7% vs. 0% ($p=0.47$). The following variables resulted significantly associated with a complex operation: male gender ($p=0.006$); pleural thickness ($p=0.003$); emphysema ($p=0.001$); enlarged hilar nodes ($p=0.003$). Patient age, BMI, FEV1, DLCO, size of pleural space, chest wall thickness, radiological presence of adhesions, tumour size or location, fissure completeness was not significantly associated with complex operation. The complexity risk score was generated by weighting 1 all the 4 variables, according to their similar regression coefficients. Patients were grouped in five classes showing incremental incidence of complex operations ($p<0.001$): class A, score 0 (4/54: 7.4%); class B, score 1 (7/40: 17.5%); class C, score 2 (8/30: 26.7%); class D, score 3 (7/11: 64%); class E, score 4 (3/4: 75%).

Conclusion:

A simple aggregate score was developed to stratify preoperatively the complexity of VATS lobectomy. The proposed score can be used to identify appropriate candidates for learning curve and training purposes.

Disclosure: No significant relationships.

Keywords: VATS lobectomy, complexity, aggregate score, predictors

P-37

SUCCESSFUL LUNG TRANSPLANTATION AFTER PROCUREMENT FROM CONTROLLED DCD DURING NORMOTHERMIC ABDOMINAL PERFUSION. EARLY EXPERIENCE

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Objectives:

Donation after cardiac death (DCD) provides a novel source of lungs for transplantation, but death determination, requiring 20 minutes of no-touch, are challenging in Italy. A peculiar DCD program for isolated lungs procurement and a well-tested program for abdominal organs have been merged in a multiorgan procedure. We report early clinical experience of non-rapid normothermic lung retrieval from controlled DCD (cDCD) during normothermic regional perfusion (NRP).

Methods:

After treatment withdrawal and asystole, death is confirmed according to circulatory criteria (20-minute flat electrocardiogram). The NRP is instituted percutaneously; recruitment maneuvers are performed and ventilation starts with protective setting (FiO₂=100%). Performed the sternotomy, the inferior vena cava is clamped at the atrial junction. Lungs are meticulously inspected and palpated. Superior vena cava is ligated, divided and the ascending aorta clamped. If no detrimental change in venous return, pump flow rate, and good lactate trend occurs (first NRP check), the main pulmonary artery is cannulated for cold flush. Once the cold pulmonary flush is completed, a second NRP check is performed; if positive, cardiectomy and in situ retrograde flushing are made. After retrieval of lung block, complete hemostasis is ensured. NRP is continued after the removal of the lungs, until the established time for abdominal organs. In this preliminary phase, lung function is evaluated by ex-vivo lung perfusion (EVLP).

Results:

From 30 October 2017 to 31 December 2017 we managed five cDCD by the current procedure. In three cases the lungs were transplanted with good results; in two cases the lungs were judged inadequate, one at the in-situ evaluation and the second after EVLP (Table). The abdominal organs were always transplanted with good results.

Procedures data								
Donor	Date	Sex	Age (yrs)	Oto score	Lung Transplantation	Recipient LAS	Grade 3 PGD	30-day mortality
1	30/10/2017	M	45	9	Yes	68.60	No	No
2	10/11/2017	M	59	12	No	-	-	-
3	27/11/2017	M	51	1	Yes	52.65	No	No
4	30/11/2017	M	63	8	Yes	33.25	No	No
5	20/12/2017	F	34	11	No	-	-	-

Conclusion:

Our experience in non-rapid normothermic lung retrieval from cDCD during NRP demonstrated adequate lung preservation resulting in successful transplantation, without detrimental effects on abdominal organs procurement.

Disclosure: No significant relationships.

Keywords: lung transplantation, DCD, lung procurement.

P-38

THE EFFECT OF PRIOR EXPERIENCE IN OPEN AND MINIMAL INVASIVE PROCEDURES ON LEARNING CURVE OF VIDEO-ASSISTED THORACOSCOPIC LOBECTOMY

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Objectives:

To analyze whether the experience of open lobectomies and minor video-assisted thoracic surgery (VATS) procedure have any impact on perioperative outcomes and oncologic efficacy during the learning curve of VATS lobectomy.

Methods:

The percentage of VATS/open surgeries in our institution increased year by year and our technique of VATS lobectomy has been published. According to previous studies, the experience of open lobectomy and minor VATS procedure was separated into three levels. High (>200), medium (>50) and low (<5). Surgeons in our institution were separated to five groups on the basis of different previous surgical experience (Figure 1).

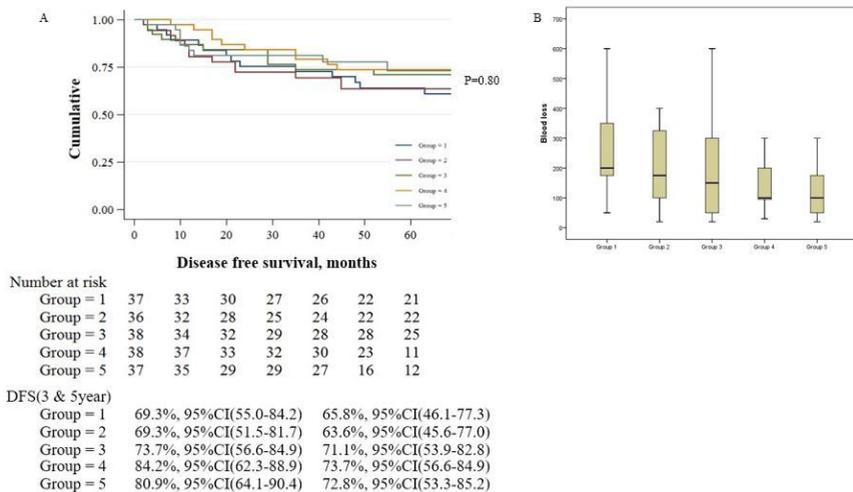


Figure 1. (A) Disease free survival of VATS lobectomy between the 5 groups. Group 1 (high open lobectomies with low minor VATS procedures), Group 2 (high open lobectomies with medium minor VATS procedures), Group 3 (medium open lobectomies with medium minor VATS procedures), Group 4 (medium open lobectomies with high minor VATS procedures) and Group 5 (low open lobectomies with high minor VATS procedures). (B) Blood loss (ml) of VATS lobectomy between the five groups.

Results:

Data of the first 40 consecutive cases of VATS lobectomies by each surgeon were analyzed. The patients' baseline characteristics of the five groups were matched. The rate of upper lobes increase from 50% in the first 20 cases ($P=0.31$) to 69% in the last 20 cases ($P=0.81$). Group 2 resected more lymph nodes (19.9 ± 8.0 vs 16.0 ± 7.7 , $P=0.03$), removed chest tube earlier [7 (4-12) vs 7 (3-21) d, $P=0.02$], and had shorter length of hospital stay [9 (6-15) vs 10 (7-27) d, $P=0.03$] than group 1. Group 4 had significantly less operative blood loss [100 (30-400) vs 150 (20-600) mL, $P=0.04$] than group 3. No differences were found between group 2 and group 3, and between group 4 and 5. Disease free survival ($P=0.80$) and overall survival ($P=0.19$) were similar between the five groups.

Conclusion:

This is the first study comparing both perioperative outcomes and long-term survival on learning curve of VATS lobectomy, and also the first time to evaluate VATS lobectomy by a more accurate VATS/open surgery experience. Surgeons with limited open lobectomy experience can perform VATS lobectomy without compromising the perioperative outcomes and oncologic efficacy as long as they have accumulated enough minor VATS experience.

Disclosure: No significant relationships.

Keywords: lung cancer, video-assisted thoracic surgery, learning curve

P-39

CONSIDERING CASES OF LUNG RESECTION USING LIPIODOL MARKINGS ON PRIMARY LUNG MALIGNANCIES

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Objectives:

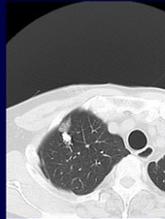
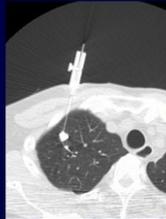
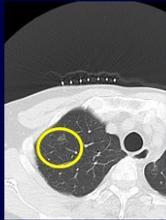
Recently, technology development and cancer patient observations have helped increase lung resection on lesions that are difficult to identify by inspections. In order to avoid anatomical excision and too much loss of lung capacity, any markings are needed. We have considered the preservation of lung function by operating active lung resection with lipiodol markings. Our group has conducted lipiodol marking by injecting lipiodol under a computed tomography (CT)-fluoroscopy guide near the lesion. Then we can regard the removal of the marking as the removal of the lesion. This time we have studied cases in which the pathological diagnosis was primary lung malignancy.

Methods:

From May 2006 to October 2017, 375 cases underwent CT-guided lipiodol marking operations. Out of 375, 113 cases of pathological diagnosis were cancer, carcinoid, or AAH.

Preoperative lipidol marking

with a real-time CT fluoroscopy



Surgical resection with VATS

(C-arm fluoroscopy-guided)



Results:

Within 118 operations using lipidol markings, 140 malignancies were resected. The average of lesions was 12.0 ± 11.8 (mm), and the distance from pleura was 9.8 ± 9.2 (mm) in diameter. 58% were lung cancer/AAH with GGN. 90% of solid lesions were adenocarcinoma. 12 cases were used for partial excision for pathological diagnosis. 8 cases showed lesions that were resected during operations for metastatic lung cancer. 15 cases were from aggressive limited surgery which had multiple lesions, and no recurrence occurred in an observation period of 45 months in average. Reasons of another limited resection were as follows. 15 cases had multiple lesions, 17 cases indicated insufficient lung function, 16 cases had other cancer, and 13 cases were generally in poor condition. Markings and lung resection were conducted as expected in all cases, and decisive disease complication such as air aberrant and deaths in hospital were not recognized at all.

Conclusion:

Lung resections using lipidol marking were safely and effectively conducted.

Disclosure: No significant relationships.

Keywords: lung resection, limited surgery, lipidol, marking

P-40

PORTAL ROBOTIC LOBECTOMY VERSUS UNIPORTAL VIDEO-ASSISTED THORACOSCOPIC LOBECTOMY: A RETROSPECTIVE STUDYHecheng Li¹, R. Jin¹, Y. Yuan¹, J. Xiang¹, Y. Han¹, D. Han¹, R.J. Cerfolio²¹*Thoracic Surgery, Ruijin Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China,*²*Cardiothoracic Surgery, New York University (NYU) Langone Medical Center, New York, NY, United States of America***Objectives:**

Portal robotic lobectomy and uniportal video-assisted thoracoscopic lobectomy are minimally invasive surgical approaches for lung tumors. To compare the early outcomes of portal robotic lobectomy and uniportal video-assisted thoracoscopic lobectomy, we performed a retrospective study.

Methods:

A total of 185 patients who underwent anatomic lobectomy via either Portal robotic surgery or uniportal video-assisted thoracoscopic surgery from January 2015 to January 2017 were included in the retrospective study.

Results:

Early outcome	Early outcomes		
	185 patients		
	Portal robotic(n=110)	Uniportal(n=75)	p
Surgery time(min)	156.50±53.89	141.63±42.80	0.047
Conversion	7(6.4%)	9(12%)	0.181
Estimated blood loss(ml)	133.68±293.38	144.33±183.94	0.780
Blood transfusion in surgery	3(2.7%)	2(2.7%)	1.000
Postoperative hospital stays(d)	5.06±5.58	4.55±2.46	0.452
Chest tube durations(d)	2.51±1.98	2.25±2.33	0.423
total volume of drainages(ml)	1050.06±821.42	966.33±762.50	0.484
total hospital costs(RMB)	74172.43±13577.14	43988.25±9802.94	<0.001
morbidity	6(5.5%)	7(9.3%)	0.311
mortality	1(0.9%)	0	1.000
Total lymph nodes resected	11.65±5.32	11.07±5.53	0.476
Lymph node stations resected	5.20±1.72	4.88±1.30	0.173
Lobar(No.12) LN resected	0.62±1.05	0.11±0.35	<0.001



Of all 185 lobectomies in the study, 75 were uniportal video-assisted thoracoscopic surgery while the other 110 were portal robotic surgery. Analyses of the early outcomes revealed no significant difference between the two groups in blood loss, number of resected lymph nodes, postoperative hospital stays, chest tube durations, total volume of drainages and overall morbidity and mortality. However, the portal robotic lobectomy group was associated with significantly longer surgery times (156.50 ± 53.89 vs. 141.63 ± 42.80 minutes, $p=0.047$) and greater hospital costs ($74,172.43 \pm 13577.14$ vs. $43,988.25 \pm 9802.94$ RMB, $p<0.001$). Further investigation of lymph nodes showed more lobar (no.12) lymph nodes (0.62 ± 1.05 vs. 0.11 ± 0.35 , $p<0.001$) were dissected in the robotic group.

Conclusion:

The morbidity and mortality of minimally invasive lobectomy were low, and the early outcomes were comparable between the two groups. Portal robotic lobectomy may achieve better lymph node dissection than uniportal video-assisted thoracoscopic lobectomy, but it is associated with higher costs. More data are required to evaluate their long-term efficacies.

Disclosure: No significant relationships.

Keywords: portal robotic lobectomy, uniportal video-assisted thoracoscopic surgery, early outcomes

P-41

DIFFERENT METHODS OF REGIONAL ANESTHESIA AND ITS INFLUENCE ON THE RATE OF CHRONIC POST-THORACOTOMY PAIN SYNDROME IN LUNG CANCER PATIENTS

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Objectives:

The aim of the study – to assess the influence of the type of regional anesthesia paravertebral nerve block (PNB), thoracic epidural anesthesia (TEA) and intercostal nerve block (INB) on the incidence of chronic post-thoracotomy pain syndrome (CPPS).

Methods:

Three hundred patients, undergone lobectomy or pneumonectomy for NSCLC via postolateral thoracotomy, were enrolled in the prospective randomized trial approved by the local ethic committee. All patients were randomized into three groups: 1) 100 patients with TEA; 2) 100 patients with PNB; 3) 100 patients with INB. All patients received lornoxicam (8mg), pregabalin (75mg) and nefopam (20mg) two times daily for prophylactic of CPPS. General anesthesia was standard in all groups. Ten-point visual analogue scale (VAS) was used to assess the intensity of CPPS in postoperative period. Static and dynamic pain component was assessed in one and 6 months after surgery.

Results:

There was no any difference between groups regarding age, sex, body mass index, preoperative laboratory tests, type of surgery, anesthesia time and time of discharge. There was no any statistical difference in the rate of CPPS at rest between groups in 1 and 6 months after surgery (Table 1).

Type of regional block	1 month		6 months	
	rest	movement	rest	movement
TEA	0,076±0,266	0,403±0,790	0,115±0,319	0,365±0,760
PNB	0,192±0,44	0,634±1,056	0,173±0,378	0,596±0,985
INB	0,243±0,487	0,756±1,171	0,189±0,455	0,702±1,182

The incidence of CPPS was higher in 1 and 6 months after surgery in INB group if compare with TEA group. There was no statistical difference in the rate of CPPS in PNB group if compare with other groups. There was no difference in the intensity of CPPS between groups in 1 and 6 months postoperatively.

Conclusion:

The use of thoracic epidural block reliably decreases the rate of chronic post-thoracotomy pain syndrome. The intensity of pain syndrome detected in one month after surgery does not change in 6 months period.

Disclosure: No significant relationships.



Keywords: chronic post-thoracotomy pain syndrome, regional anesthesia, paravertebral nerve block, thoracic epidural anesthesia, intercostal nerve block

P-42

VARIABLES INFLUENCING TRENDING OF 30-DAY MORTALITY AND MORBIDITY AFTER ANATOMICAL LUNG RESECTION ALONG 20 YEARS OF PRACTICE, ACCORDING TO EUROLUNG RISK MODELS

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Objectives:

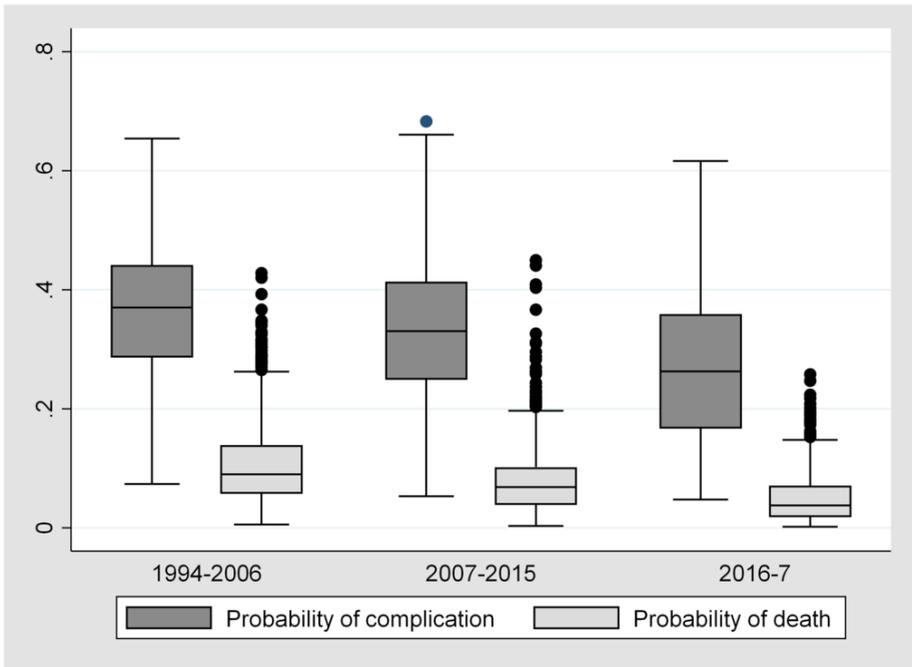
After the publication of the ESTS's EuroLung 1 and 2, we can apply two robust models of morbidity and hospital mortality in anatomical lung resection. We have retrospectively applied the EuroLung models to a series of cases to assess mortality and morbidity time trending aiming to identify variations in patient selection or surgical practices driving changes in the risk of lung resection along time.

Methods:

EuroLung 1 and 2 models were applied to a series of 2342 consecutive cases undergoing anatomical lung resection for lung cancer from 1994 to 2017. Individual probability of major morbidity and death were calculated. The population was divided in 3 periods of time (918 cases from 1994 to 2006; 921 cases included in the ESTS risk model calculation from 2007 to 2015 and 409 cases operated in 2016-17) and the prevalence of risk variables was calculated for dichotomous variables (sex, cardiac and cerebral vascular comorbidities, surgical approach, extended resection and pneumonectomy) and box plots constructed for continuous ones (age, BMI, ppoFEV1% and risk of complication and mortality).

Results:

Plots of probabilities of death and major morbidity in three periods of time are shown in figure 1; both morbidity and mortality risks were lower in period 3 compared to the previous ones ($p=0.001$). Prevalence of binary variables was statistically different comparing period 3 to the previous ones, except for coronary disease, which remained unchanged (Table 1). The rate of pneumonectomy decreased, cases approached by VATS increased dramatically and a lower rate of males and older cases having higher ppoFEV1% have been operated on in the last period.



	1994-2006	2007-2015	2016-17
Male	89,9	81,1	70,6
Brain stroke	0	0,2	2,4
Renal insufficiency	1	2,3	4,6
Coronary disease	14	17,8	16,4
Thoracotomy	99,4	93,5	39,8
Pneumonectomy	24,7	5,7	3,9
Extended resection	20,7	13,5	8,6
Age	64,2(9,9)	65,4(10,2)	66,9(9)
BMI	25,8(4)	26,6(4,1)	26,8(4,2)
FEVpp%	58,1(16,3)	64,5(16,7)	66,6(19)

Conclusion:

Risk of mortality and major complication has decreased with time. EuroLung models allowed to identify less extensive surgery and VATS approach as the variables associated to lower risks in spite than older patients with more comorbidities underwent surgery.

Disclosure: No significant relationships.

Keywords: risk model, morbidity, mortality, lung cancer, surgery

P-43

FLEXIBLE SILICONE MESH APPLICATOR (FREIBURG FLAP™) FOR INTRAOPERATIVE TUMORICIDAL PHOTODYNAMIC THERAPY OF PLEURAL MALIGNANCIES

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Objectives:

To develop a flexible, scalable optical applicator (OSA) to deliver laser light for intraoperative tumoricidal photodynamic therapy (PDT) of pleural malignancies.

Methods:

The OSA was constructed from a Freiburg Flap™ high dose-rate brachytherapy applicator, a mesh-style mat made of silicone rubber with preformed channels. Each channel can accommodate a cylindrical diffuser fiber to deliver laser light to the OSA. Experiments were performed using four fibers with light diffusers attached to a multichannel laser diode (Fig. 1). Distribution of 665-nm light emitted by the OSA or through 3-mm to 12-mm thick solid tissue-mimicking optical phantoms was evaluated using high-resolution digital photography. Dosimetric irradiance (mW/cm²) measurements were made by scanning the surface of an operating OSA or the surfaces of optical phantoms with calibrated isotropic light detectors. An OSA containing 4 light diffusers and 4 light detectors was positioned *via* thoracotomy in 3 large, adult swine (Fig. 1). Immediately after placement, the OSA was activated with 2 W, 4 W or 8 W of 665-nm light and the target area was exposed to a surface fluence of 60 J/cm².

Results:

There was reasonable spatial uniformity for irradiance at the surface of the OSA and through optical phantoms. Average irradiance decreased exponentially with increasing phantom thickness. Irradiances at a depth of 5 mm in phantoms were comparable to those typically used for clinical cancer PDT.

Conclusion:

The Freiburg Flap™, an FDA-approved surface applicator was successfully adapted to deliver laser light for intraoperative PDT. The OSA can easily conform to anatomical contours in the chest cavity. Photographic and optical dosimetric measurements on the benchtop and real-time dosimetry in swine demonstrate that the OSA can provide a high light dose at common prescription depths. Due to its flexible surface it is predestinated for PDT of large and curved tumor surfaces enabling intensified homogeneous and uniform illumination.

Disclosure: D. Bellnier: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

J. Lindenmann: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

S. Yendamuri: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

T. Demmy: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

E. Oakley: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

C. Nwogu: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

M. Ramer: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

L. Tworrek: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

M. Habitzruther: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

G. Shafirstein: Freiburg Flap™ high dose-rate brachytherapy applicator (Nucletron, Elekta AB, Stockholm, Sweden)

Keywords: intraoperative photodynamic therapy, anti-cancer treatment, light delivery, illumination, pleural malignancy

P-44

INCIDENCE AND RISK FACTORS FOR 90-DAY HOSPITAL READMISSION FOLLOWING VATS ANATOMIC LUNG RESECTION

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Objectives:

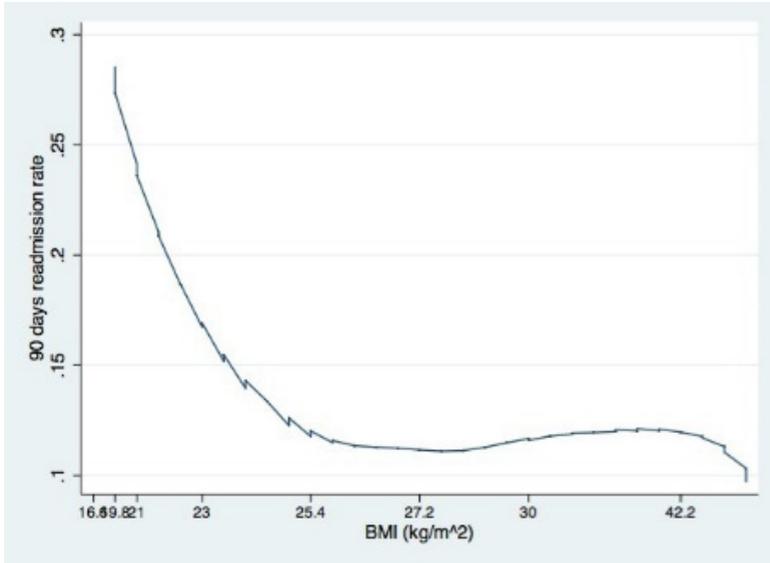
To identify specific risk factors for 90 days hospital readmission (HRA) after video-assisted thoracoscopic (VATS) anatomic lung resections.

Methods:

Retrospective analysis on 503 patients undergoing VATS lobectomy or segmentectomy (January 2012-February 2016). A readmission was defined as at least an overnight stay within 90 days from surgery and after discharge from the index hospitalization. Univariable and stepwise logistic regression analyses were used to identify risk factors for HRA.

Results:

Eleven patients died during their initial hospitalization. The median postoperative stay of the 492 patients discharged from hospital was 4 days (IQR 3-7 days). HRA occurred in 67 patients (13.6%), of whom 43 (64%) were readmitted in the first 30 days. A short hospital stay (<3 days) was associated with only 3.6% HRA, whilst 21% of patients with hospital stay >7 days were readmitted. The most frequent cause of readmission was pneumonia in 17 patients accounting for 26% of all readmissions. Eighteen patients were readmitted for problems related to prolonged chest drain management. Readmission for chest pain occurred only in two patients in this VATS population. 101 patients experienced prolonged air leak (PAL) (> 5 days). Most of them were discharged home with a chest drain in place. Their incidence of HRA was 21% versus 11% in patients without PAL ($p < 0.0001$). The 90-day mortality rate after initial discharge was similar in readmitted and non-readmitted patients (0 vs. 1.2%, Fisher's exact test, $p = 1$). Stepwise logistic regression analysis showed that the only patient related factor independently associated with readmission was a low body mass index (BMI) ($< 20 \text{ Kg/m}^2$) ($p < 0.0001$). The figure shows the relationship between BMI and HRA

**Conclusion:**

Readmission rate after VATS anatomic lung resections is not uncommon. One third of readmissions occur between 30 and 90 days from the index operation. Patients should be counselled about the risk of readmission to set realistic expectations of the procedure.

Disclosure: No significant relationships.

Keywords: vats, readmission, lung resection

P-45

PHOTOACOUSTIC IMAGING FOR LOCALIZATION OF INDETERMINATE PULMONARY NODULE - PRECLINICAL STUDY

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Objectives:

Diagnosis and resection of indeterminate pulmonary nodules (IPNs), which has been an epidemic with increased utilization of chest CT, remains still challenging. In this preclinical study, we explored the possibility of photoacoustic (PA) guided surgical resection with injection of indocyanine green (ICG) for non-palpable or non-visible pulmonary nodule suspicious of lung cancer.

Methods:

In vitro cellular uptake of IC Green® (Akorn™) in H460 lung cancer cell line was evaluated using spinning confocal microscopy. Absorption spectrum of ICG mixed with distilled water or bovine serum albumin were measured using Cary 300 Spectrophotometer (BioProcess™). In phantom study, PA signal intensity was analyzed according to ICG concentration and tissue thickness using VevoLazr® (Visualsonics™) system. PA signal of ICG (mixed with 5% agar solution) in subcutaneous tissue or subcutaneous H460 tumors in nude mice was observed at multiple time points up to 48 hours after injection.

Results:

Intracellular ICG fluorescence was detected in cultured H460 cell incubated with ICG at infrared wavelength (Fig. 1A). Absorption spectrum of ICG was concentration dependent (Fig.1B), expressed by equation $y=0.402x+0.045$ ($R^2=0.985$) at 780nm wavelength. The concentration dependence of the PA signal was logarithmic (Fig.1C) and an exponential decline in the PA signal intensity with the increase of tissue depth (Fig.1D) was observed. PA signal of 2mg/ml ICG in 50ul tubing was still detectable at the depth of 22mm with chicken breast muscle medium (Fig.1E). PA signal from ICG mixed with agar was kept 48hours after injection into subcutaneous tissue (Fig.1F) or tumor (Fig. 1G) in nude mice.

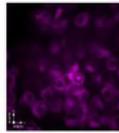


Fig. 1A

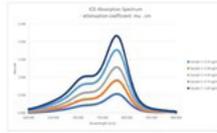


Fig. 1B

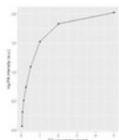


Fig. 1C

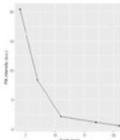


Fig. 1D

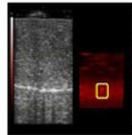


Fig. 1E

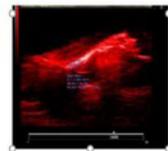


Fig. 1F

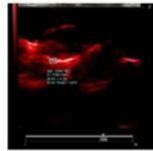


Fig. 1G

Fig. 1A. Fluorescence signal at infrared wavelength in cultured H460 cells incubated with ICG

Fig. 1B. Absorption spectrum of 5 different concentrations of ICG

Fig. 1C. The graph of photoacoustic signal intensity from 8 different concentrations of ICG

Fig. 1D. The graph of photoacoustic signal intensity measured with 2.0mg/ml ICG

Fig. 1E. Ultrasound (left) and photoacoustic image (right) obtained from 2.0mg/ml ICG at 22mm deep of chicken breast muscle.

Fig. 1F. PA image obtained 48hours after injection of ICG mixed with agar into subcutaneous tissue

Fig. 1G. PA image obtained 48hours after injection of ICG mixed with agar into subcutaneous H460 tumor

Conclusion:

This preclinical study has shown that photoacoustic imaging would be usable for detecting IPNs more than 20mm deep after injection of high concentration and even small volume ICG.

Disclosure: No significant relationships.

Keywords: indocyanine green, Indeterminate pulmonary nodule, photoacoustic imaging, localization.

P-46

SURGICAL OUTCOMES OF SMALL CELL LUNG CANCER PATIENTS - COMPARISON WITH PURE SMALL CELL LUNG CANCER VERSUS MIXED OR SYNCHRONOUS SMALL CELL LUNG CANCER

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Objectives:

Management of limited stage small cell lung cancer (SCLC) has been controversial. Surgical outcomes and prognostic factors for resection of limited stage SCLC were evaluated. Histologic subgroup analysis was performed for comparison of pure SCLC and mixed or synchronous (combined) SCLC.

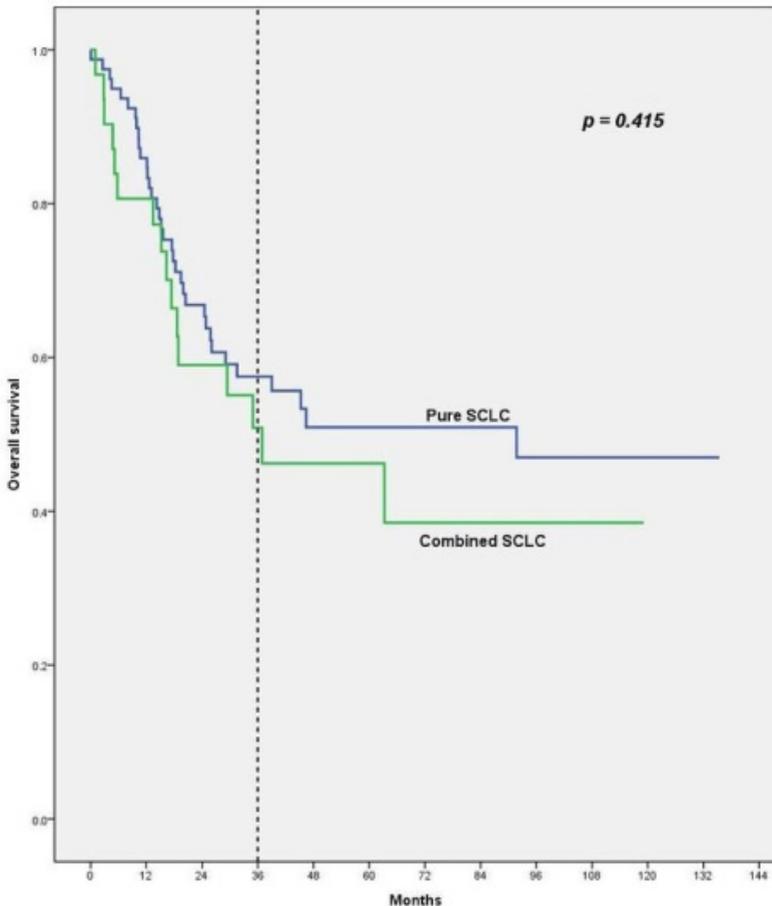
Methods:

Between January 2006 and December 2016, a total of 110 patients who underwent pulmonary resection for treatment of limited stage SCLC were analyzed retrospectively. 79 patients had pure SCLC and 31 patients had combined SCLC.

Results:

There were significant differences were observed with regard to their baseline and clinical characteristics except postoperative hospital stay (6.8 vs 9.2 days, $p = 0.043$). The median follow-up duration was 20.4 months (range, 1 to 132 months). 34 patients (30.9%) experienced recurrence. There were 2 (1.8%) surgical mortalities. 49 (44.5%) patients died during follow-up; 18 died of disease progression and the other 31 died of non-cancerous cause. There was no significant difference in 3-year overall (57.5% vs 50.8%, $p = 0.415$) and disease-free survival rate (55.4% vs 50.8%, $p = 0.348$) between the pure SCLC group and the combined SCLC group. Multivariate analysis revealed that N2 stage ($p < 0.001$), absence of adjuvant therapy ($p < 0.001$) were risk factors for the overall survival. 3-year overall (61.4% vs 25.9%, $p = 0.001$) and disease-free survival rate (69.9% vs 18.8%, $p < 0.001$) were significantly greater in the patients with stage I/II than those with stage III.

Characteristics	Univariate	Multivariate	
	p Value	HR (95% CI)	p Value
Hypertension	0.171		
Respiratory disease	0.017		
Smoking history	0.154		
Postoperative complications	0.086		
N stage 0 1 2	0.007	1.137 (0.573 – 2.254) 3.351 (1.703 – 6.595)	0.714 < 0.001
Recurrence	0.109		
Adjuvant therapy	0.001	0.214 (0.101 – 0.452)	< 0.001
TNM stage	0.024		



Conclusion:

Major pulmonary resection of small cell lung cancer is applicable in the limited stage patients. In the limited stage patients, histological variation seems no effects on overall and disease-free survival. Postoperative adjuvant therapy may be needed for a better prognosis. Large multi-center studies will be needed to define the role of surgery in limited stage SCLC.

Disclosure: No significant relationships.

Keywords: lung cancer, small cell, lung cancer, pathology

P-47

C-REACTIVE PROTEIN-ALBUMIN RATIO IS A VALUABLE PROGNOSTIC MARKER TO PREDICT THE TUMOR-RECURRENCE IN ELDER PATIENTS WITH COMPLETELY-RESECTED LUNG CANCER

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Objectives:

Lung cancer is still the main cause of cancer-associated mortality all over the world. Especially, the treatment strategy of lung cancer in elder patients can be controversial from the point of view of medical economics. Therefore, a valuable prognostic marker is strongly required for elder patients. It has increasingly been recognized that inflammation plays a critical role in lung cancer. In this study, we would like to evaluate the prognostic value of nutrition/inflammation-based markers for recurrent free survival in elder patients with completely-resected lung cancer.

Methods:

Data were collected retrospectively from 167 patients, who were older than 74 years old at the moment of surgical resection and had pathologically confirmed primary lung cancer and received complete surgical resection from 2008 to 2016 in our hospital. Data that included Glasgow prognostic score (GPS), modified GPS (mGPS), high-sensitivity mGPS, C-Reactive Protein/Albumin ratio (CAR), neutrophil/lymphocyte ratio, platelet/lymphocyte ratio, and prognostic nutritional index were analyzed. The optimal cutoff values for continuous prognostic indexes were determined as previously described (Budczies et al. PLoS ONE 7(12):e51862). Univariate and multivariate Cox proportional hazards regression analyses were used to identify the prognostic factors associated with relapse-free survival (RFS).

Results:

The optimal cut-off value was identified to be 0.35 for the CAR. A significant correlation was found between CAR and RFS ($p=0.007$) in univariate analysis. The multivariate analysis for RFS in the factors selected from univariate analysis showed that CAR was only the significantly important factor for RFS ($p=0.026$). In subgroup analysis, there was a significant difference between low-CAR and high-CAR cases in high-CEA patients ($p=0.009$), but not in low-CEA patients.

Conclusion:

Among 7 nutrition/inflammation-based markers, CAR is the best prognostic marker for the detection of recurrence in elder lung cancer patients. CAR will be useful to detect the poor prognosis preoperatively in this population, especially for high-CEA patients.

Disclosure: No significant relationships.

Keywords: C-reactive protein-albumin ratio, elder patients, inflammation, nutrition, prognostic marker, lung cancer

P-48

THE IMPACT PREDICTOR OF ATELECTASIS AFTER LOBECTOMY

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Objectives:

The wide variation in the incidence of postoperative atelectasis is attributed to the lack of consensus about a definition of clinical atelectasis. The aim of this study was to define the incidence of and factors predisposing to postlobectomy atelectasis (PLA).

Methods:

A retrospective study of 943 patients who underwent lobectomy at our institute between April 2010 and November 2016 was performed. Pulmonary atelectasis (PA) was defined as a chest computed tomography (CT) finding of a complete ipsilateral lobar collapse. We divided our patients into those with a PA and those without PA. The following variables were considered in the analysis: comorbidities, respiratory functions, smoking status, performance status, type of resection, surgical procedure, operating time, and blood loss. Univariate and multivariate analyses were performed to identify whether any of the recorded parameters served as prognostic variables in the development of PA.

Results:

Of 943 anatomical pulmonary resections performed, 72 (7.6 %) developed PA. Current smoker (12.0 % vs. 6.7 %; $p = 0.020$), mental disorder (20.7% vs. 7.2%; $p = 0.007$), blood loss (416.5 ± 66.0 vs. 258.1 ± 15.1 %; $p = 0.005$), operation time (228.2 ± 12.8 vs. 189.8 ± 2.3 ; $p < 0.01$), and right upper lobectomy (RUL) (12.6 % vs. 5.8 %; $p = 0.0040$) were significantly higher in PA group. FEV1.0 % (69.7 ± 1.5 vs. 72.7 ± 0.3 %; $p = 0.0158$) was significantly lower in PA group. Multivariate analysis revealed that current smoker (odds ratio (OR) = 1.72, 95% CI 0.29-0.94, $p = 0.031$), mental disorder (4.09 (1.48-11.33), $p = 0.007$), blood loss (2.48 (1.05-5.86), $p = 0.038$), operating time (1.00 (1.00-1.01), $p = 0.048$) are RUL (3.01 (1.59-5.69), $p < 0.001$) were independent risk factors.

Conclusion:

Patients with current smoker, mental disorder, massive blood loss, long operating time, and RUL are at high risk of PA.

Disclosure: No significant relationships.

Keywords: postlobectomy atelectasis, mental disorder, smoking status

P-49

EARLY POST-OPERATIVE OUTCOME COMPARISON BETWEEN MINIMALLY INVASIVE AND OPEN THYMECTOMY FOR THYMIC MALIGNANCIES: A MULTI-CENTER PROSPECTIVE OBSERVATIONAL STUDY

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Objectives:

This study was designed to evaluate the feasibility and safety of Minimally invasive thymectomy (MIT) for thymic tumors, and to compare the early post-operative results of MIT with the open thymectomies (OT) using a multi-center prospective observational study data from the Chinese Alliance for Research in Thymomas (ChART).

Methods:

Between August 2014 and June 2015, patients without preoperative therapy, who underwent surgery for thymic tumors, were prospectively collected for a prospective lymph node dissection study of ChART. They were divided into MIT and OT groups according to surgery approach. As the two groups were not randomized by surgical approach, a propensity-matched analysis was used to compare the perioperative outcomes.

Results:

There were 132 (55%) patients in the MIT group and 108 patients (45%) in the OT group. Before propensity-score matching, the MIT group had smaller tumor size ($P < 0.001$), lower grade histology ($P = 0.023$), and lower Masaoka-Koga staging ($P < 0.001$). Overall morbidity was significantly lower after MIT than after OT (1.5% vs. 10.2%, $P = 0.004$). Propensity-score matching by tumor size, myasthenia gravis, histologic classification, and pathological stage produced 82 patients in each group. After matching, there was no significant difference in patient demographics or tumoral characteristics. Rate of R0 resection was comparable between the MIT group (98.8%) and the OT group (97.6%, $P = 0.49$). Operative time, blood loss during operation, duration or amount of postoperative chest tube drainage and length of hospital stay (LHS) were significantly less in the MIT group than the OA group ($P < 0.05$). There was no peri-operative mortality in either group. Neither was there any significant difference in major complications between the two groups (2.4% vs. 6.1%, $P = 0.277$).

	Unmatched			Matched		
	MIT group (N=132)	Open group (N=108)	<i>p</i>	MIT group (N=82)	Open group (N=82)	<i>p</i>
Patient demographics						
Gender			0.917			0.528
Male	62 (47.0)	50 (46.3)		37 (45.1)	33 (40.2)	
Female	70 (53.0)	58 (53.7)		45 (54.9)	49 (59.8)	
Age (y)	53.2±12.9	53.8±10.9	0.712	53.9±11.4	55.1±12.7	0.548
Autoimmune disease			0.362			0.488
None	104 (78.8)	82 (75.9)		68 (82.9)	63 (76.8)	
Myasthenia gravis	28 (21.2)	22 (20.4)		14 (17.1)	17 (20.7)	
Pure red cell aplasia	0	1 (0.9)		0	1 (1.2)	
Cushing's syndrome	0	1 (0.9)		0	0	
Rheumatoid arthritis	0	1 (0.9)		0	1 (1.2)	
Comorbidities			0.572			0.572
None	110 (84.0)	89 (89.9)		64 (79.0)	69 (92.0)	
Hypertension	16 (12.2)	8 (8.1)		12(14.8)	5 (6.7)	
CAD	1 (0.8)	1 (1.0)		1 (1.2)	0	
Diabetes mellitus	4 (3.1)	1(1.0)		4 (4.9)	1(1.3)	
History of cancer			0.510			0.755
None	126 (95.5)	101 (93.5)		77 (93.9)	76 (92.7)	
Yes	6 (4.5)	7 (6.5)		5 (6.1)	6 (7.3)	
Tumor size (cm)	4.48±2.04	6.86±2.92	0.000	4.82±2.27	5.23±2.82	0.231
WHO classification			0.023			0.856
A	8 (6.1)	8 (7.4)		6 (7.3)	8 (9.8)	
AB	50 (37.9)	23 (21.3)		25 (30.5)	21 (25.6)	
B1	20 (15.2)	12 (11.1)		16 (19.5)	10 (12.2)	
B2	28 (21.2)	25 (23.1)		17 (20.7)	18 (22.0)	
B3	14 (10.6)	20 (18.5)		10 (12.2)	14 (17.1)	
Other type thymoma	4 (3.1)	2 (1.8)		1 (1.2)	2 (2.4)	
Ca	6 (4.5)	12 (11.1)		5 (6.1)	5 (6.1)	
NETT	2 (1.5)	6 (5.6)		2 (2.4)	4 (4.9)	
Pathological M-K stage			0.000			0.831
I	60 (45.5)	35 (32.4)		33 (40.2)	35 (42.7)	
Ila	23 (17.4)	10 (9.3)		13 (15.9)	10 (12.2)	
Ilb	29 (22.0)	14 (13.0)		17 (20.7)	13 (15.9)	
III	16 (12.1)	39 (36.1)		15 (18.3)	19 (23.2)	
IVa	0	2 (1.9)		0	1 (1.2)	
IVb	4 (3.0)	8 (7.4)		4 (4.9)	4 (4.9)	
Number of node stations	3.37±1.75	2.95±1.53	0.053	3.21±1.57	3.04±1.61	0.494
Early post-operative outcome						
Operative time (min)	107±43.7	140±58.2	0.000	111.5±47.1	137.6±57.8	0.002
Blood loss during operation (mL.)	84.4±102.8	179.8±186.2	0.000	89.2±113.8	174.1±195.5	0.001
Chest tube duration (d)	2.94±1.3	4.09±2.8	0.000	2.85±1.3	3.80±1.6	0.000
Amount of chest tube duration (ml)	412.5±289.8	867.9±1004.6	0.000	439.1±302.5	767.9±663.5	0.000
Transfusion (mL.)	32.2±142.6	73.8±274.8	0.158	31.7±148.9	74.1±284.1	0.236
Length of stay (d)	5.4±2.4	7.6±4.6	0.000	5.5±2.5	7.0±3.2	0.001
Resection status			0.510			0.49
R0	131 (99.2)	104 (96.3)		81 (98.8)	80 (97.6)	
R1+2	1 (0.8)	4 (3.7)		1 (1.2)	2 (2.4)	
Overall morbidity	2 (1.5)	11 (10.2)	0.004	2 (2.4)	5 (6.1)	0.277



Conclusion:

MIT is safe and may help improve perioperative results while ensuring completeness of tumor removal. It is thus recommendable in the treatment of thymic tumors when technically feasible.

Disclosure: No significant relationships.

Keywords: propensity-score matched analysis, minimally invasive thymectomy, open surgery

P-50

INTERATRIAL SHUNTING THROUGH AN ASYMPTOMATIC PATENT FORAMEN OVALE: AN INVESTIGATION ON A POSSIBLE PROGNOSTIC IMPACT IN THORACIC SURGERY

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Objectives:

Patent foramen ovale (PFO) is present in up to 25% of the general population and is considered an irrelevant condition in healthy subjects. After pulmonary resection, interatrial shunting (IS) through PFO can provoke platypnea-orthodeoxia, a rare, serious, complication, characterized by posture dependent desaturation and dyspnea, which may have an early or late presentation and its incidence is currently unknown. We investigated for associations between the presence of asymptomatic PFO at baseline and postoperative short-term adverse events in patients undergoing major pulmonary resection for non-small lung cancer, as well as the rate of PFO after pulmonary resections.

Methods:

Prospective, observational, cohort study, including 147 consecutive patients. Patients were assessed by transcranial doppler (TCD) with bubble test at baseline and discharge. To confirm the IS, patients with positive TCD at baseline also underwent contrast transthoracic echocardiography with agitated saline injection.

Results:

Median age was 67.7±9.2 years (range 36-86), 99 (67%) males. Overall, 18 patients underwent pneumonectomy, 11 bilobectomy and 118 lobectomies; 54% underwent right sided procedure and 46% left sided. One perioperative death was recorded, and 35 patients experienced one or more cardiopulmonary complications. At baseline, PFO was positive in 25% and negative in 75%; of the latter 11% (12/110) (95% CI: 6.2%-18.2%) were positive at discharge. On multivariate analysis, detection of PFO at baseline was significantly associated with a risk of postoperative complications (OR:2.5; 95% CI: 1.1-5.8). Specifically, we observed a significant association between atrial fibrillation and the presence of positive PFO at baseline (OR:3.3; 95% CI: 1.3-8.0).

Conclusion:

Preoperative asymptomatic PFO resulted being independently associated with postoperative adverse events. Moreover, 11% of patients who had negative TCD at baseline presented asymptomatic PFO at discharge. Larger prospective studies are needed to further investigate for a prognostic impact of PFO in thoracic surgery.

Disclosure: No significant relationships.



Keywords: patent foramen ovale (PFO), atrial fibrillation (AF), perioperative management, risk factors in surgery

P-51

ESTABLISHING AN ENHANCED RECOVERY AFTER SURGERY PROTOCOL IN A THORACIC SURGERY DEPARTMENT. ARE WE READY TO ACCEPT THE CHANGE?

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Objectives:

In the current surgical era enhanced recovery after surgery (ERAS) protocols are increasingly put into practice across Europe in order to improve patient satisfaction, reduce hospital stay and healthcare costs. Our institution is planning to implement such protocols in the near future. We aimed to test their acceptance by both patients and staff in our academic thoracic surgery department.

Methods:

For this single-center prospective study we utilized four versions of customized questionnaires (20 questions each). Questions were relative to the basic philosophy of the ERAS protocol (optimal pain management, minimal invasive procedures, early mobilization and enteral feeding, fewer drains, etc). Four different responder groups were assessed. Fifty patients scheduled for lung resection (either thoracotomy or VATS) and 50 family members (one from each patient) were queried. In addition, 10 doctors involved in thoracic surgery (consultant surgeons, residents and thoracic anesthetists) and 10 thoracic ward nurses comprised the professional groups. Their answers were tabulated, and an individual cumulative score was calculated to ascertain positivity or negativity towards the ERAS principles.

Results:

Patients had the lowest acceptance rate of the ERAS principles with only 66% having positive scores (average score: 71, range: 50-90). Similarly, family members also had a low acceptance rate with 71.4% recording a positive score (score: 76.1, range: 40-95). In contrast, physician's response was overwhelmingly positive with 90% of them ready to accept ERAS (score: 90, range: 65-100) while surprisingly nursing staff results were mixed with only 72.2% accepting ERAS (score: 73.6, range: 50-100).

Conclusion:

Changes in healthcare practice requires acceptance by staff and patients alike. Our results demonstrate a positive stance towards fast-track surgery however skepticism exists. Different perspectives stem from differences in educational levels, up-to-date professional training and prejudice against new ideas. This study indicates the need for more in-depth preparation (information campaign, staff training) before implementing these into practice.

Disclosure: No significant relationships.

Keywords: enhanced recovery after surgery, thoracic surgery, fast track surgery, outcomes, patient satisfaction

P-52

MESENCHYMAL STROMAL CELLS ISOLATED FROM DEFINED NSCLC CONTEXTURES REPRODUCE THE IMMUNE SIGNATURE OF THE PARENTAL MICROENVIRONMENT

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Objectives:

The immune regulation of cancer is corroborated by the success of PD-1/PDL-1 immune checkpoints inhibitors. The crucial involvement of Mesenchymal Stromal Cells (MSC) in the tumor microenvironment is strongly supported by the discovery that human MSC secrete a PD-L1 soluble form (sPD-L1). We determined whether MSC isolated from defined NSCLC contextures display distinct properties mainly reproducing the respective tissue immune profile.

Methods:

MSC from tumor core (T-MSC) and spared lung (L-MSC) were obtained on 46 resected NSCLC. Immunohistochemical analysis of PDL-1 and tumor infiltrating lymphocytes defined Type II (immune ignorant, n=12) and Type III (intrinsic induction, n=6) categories. RT-PCR and ELISA of chemokines, cytokines, growth factors and sPD-L1 were performed on cells and conditioned media (CM) from Type II and III derived MSC. PD-L1 was assessed by immunocytochemistry and WB at baseline and after MSC exposure to IFN γ , TNF α or CM from ADC line Calu-3. The effect of T-MSC and L-MSC from the same patient on Calu-3 was tested in vitro and in xenotransplanted mice.

Results:

Compared to respective L-MSC, chemokines (CXCL12, CCL2, CXCL1, CXCL2 and CXCL5) and IL1-b involved in recruitment of suppressor phenotypes were upregulated in Type II T-MSC while IL-6 and IL-8 overexpression and TNFSF10 downregulation, activating the immune response, were documented in Type III T-MSC. PD-L1 rise in Type III T-MSC exposed to TNF α , IFN γ or Calu-3 CM was greater than in Type II. Additionally, PD-L1 enhancement in Calu-3 exposed to CM from Type III T-MSC was greater than Type II. Higher levels of sPD-L1 were detected in Type III T-MSC CM compared to immune ignorant NSCLC. Finally, while xenotransplants were unaffected by L-MSC, both Type II and to a more extent Type III T-MSC co-injection fostered Calu-3 generated tumors.

Conclusion:

PD-L1 modulation by MSC from immunologically distinct NSCLC mimics the respective tissue immune-contexture, suggesting innovative immunotherapeutic approaches.

Disclosure: No significant relationships.

Keywords: mesenchymal stromal cells, NSCLC, immune contexture, tumor microenvironment, PD-L1

P-53

ASSESSMENT OF ACUTE PULMONARY EMBOLISM RISK IN PATIENTS WITH LUNG CANCER SURGERY USING THREE VERSIONS OF CAPRINI RISK MODELYuping Li¹, L. Shen¹, J. Yang¹, G. Jiang²¹*Department of General Thoracic Surgery and Thoracic ICU, Shanghai Pulmonary Hospital, Shanghai, China*²*Department of Thoracic, Shanghai Pulmonary Hospital, Shanghai, China***Objectives:**

Acute pulmonary embolism (PE) is one of the serious complications with high mortality after thoracic surgery. There are more than 10,000 cases of thoracic surgery per year in our institution, while clinical practice of PE prophylaxis is empirical. We sought to validate the 2005, 2010 and Boston Medical Center (BMC) versions of Caprini Risk Assessment Model (RAM) for PE risk in patients with lung cancer surgery and find the best one to guide prophylaxis.

Methods:

We performed a retrospective case-control study among patients underwent lung cancer surgery during January 2012 to December 2015 in our institution. A total of 92 patients were found to have PE during hospitalization, and 552 controls were randomly selected adult inpatients frequency matched to cases for medical service. Each patient was retrospectively assessed for PE risk using three versions of RAMs.

Results:

The overall incidence rate of in-hospital PE was 5.3 per 1000 admissions. The median age of the 92 cases with PE was 67 years and 55% were male. The median 2010 and BMC Caprini score were higher than median 2005 Caprini score (9 vs. 8, 10 vs. 8, $P < 0.001$). The areas under the receiver-operator characteristics curve of the 2005, 2010 and BMC Caprini RAM were 0.712, 0.668 and 0.582. After further stratifying the high-risk level, the risk of developing PE was found to be significantly higher among the patients with a score of ≥ 9 as compared to those with a score of < 9 (OR=5.312, 95% confidence interval (CI) 3.339-8.479, $p < 0.001$) using 2005 Caprini RAM.

Conclusion:

When compared to the 2010 and BMC Caprini RAM, the 2005 Caprini RAM provides superior PE risk stratification in patients with lung cancer surgery. Further stratification of the patients with a cumulative risk score over 9 is recommended to provide appropriate chemical prophylaxis, thereby reducing complications due to PE prophylaxis.

Disclosure: No significant relationships.

Keywords: risk, pulmonary embolism, risk stratification, Caprini, risk assessment model

P-55

PREDICTION SCORE FOR PROLONGED AIR LEAKS AFTER VIDEO-ASSISTED THORACIC SURGERY LOBECTOMY: A PROPOSAL FROM A NATIONAL DATA-BASE

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Objectives:

Aim of the study is to develop and validate a logistic regression equation predicting the risk of a Prolonged Air Leak (PAL) after a Video Assisted Thoracic Surgery (VATS) lobectomy using a national VATS Group prospective database.

Methods:

To develop the risk stratification model only PAL positive patients from centres with more than 75 VATS lobectomies in registry have been considered, collecting the following data: gender, age, indication (benign, primary or metastatic tumour), chemotherapy or radiotherapy, Charlson Comorbidity Index, Eastern Cooperative Oncology Group Performance Status (ECOG PS), previous surgery, laterality and type of lobectomy, tumour size, number of incisions, number of resected lymph nodes, conversion (including cause of conversion and or vascular injuries), final pathological stage (TNM 7th edition), postoperative complications (Clavien-Dindo classification), length of stay. An appropriate score cut-off was then assessed. The validation sample was then used to evaluate the diagnostic accuracy of the constructed score. The analyses used the typical two-sided 5% significance level. Spearman's rank correlation coefficient was applied as needed.

Results:

Independent variables at analysis were: age <70 years, male sex, COPD, FEV1<70%, ECOG score > 1, Charlson Comorbidity Index >2, upper lobe tumor location. Napierian logarithms of the odds ratio values of the multivariate analysis allowed to associate each variable with a score as shown in Table 1. The predictive score model was tested on a derivative dataset of randomized patients from the two groups (PAL and no-PAL): the results showed a score specificity of 91,6% and a score sensitivity 67,3%; results of model tested on a validation set confirm the diagnostic accuracy of the score.

Conclusion:

The predictive score allows us to include patient candidate to a VATS lobectomy in a well determined risk class of PAL and can be used in the patient's overall assessment identifying who could be helped by additional intraoperative preventive measures.

Disclosure: No significant relationships.

Keywords: air leak, VATS lobectomy, lung cancer, predictive score

P-56

EFFECTIVENESS OF THORACOSCOPIC SYMPATHECTOMY IN THE TREATMENT OF PATHOLOGY OF UPPER LIMB ARTERIES AND PANCREATIC DISEASES

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Objectives:

To assess immediate and long-term outcomes of thoracoscopic sympathectomy.

Methods:

We performed thoracoscopic sympathectomies during 2010-2016 as a part of complex therapy for Raynaud phenomenon (n=21), and Takayasu syndrome (n=2), as well as in 5 cases of locally advanced pancreatic carcinoma (1 group). These outcomes were compared with the results of conservative therapy for 30 patients (2 group). This group consisted of 24 patients with Raynaud phenomenon and 6 persons with pancreatic carcinoma. Criteria of assessment included particularities of clinical course, pain evaluation by means of visual analogue scale (VAS); rheography index, quality of life according to the scale SF-36 on 3rd day and after 6 or 12 months from the treatment onset

Results:

Dynamics of rheography index, pain syndrome severity, quality of life are shown in the table, depending on the time when therapy has started.

	3 day			After 6 months			After 12 months		
	1 group (n=28)	2 group (n=30)	P value	1 group (n=28)	2 group (n=30)	P value	1 group (n=24)	2 group (n=25)	P value
Rheography index	2.82±0.23	2.44±0.25	0.268	2.78 ± 0.11	2.13 ± 0.21	0.021	2.81 ± 0.14	1,91 ± 0.37	0.027
VAS, points	0.3±0.1	0.8±0.2	0.029	0.2±0.1	1.4±0.3	0.001	0.4±0.2	2.1±0.8	0.044
Phalanx amputation, n	1(3.6%)	1(3.3%)	0.960	1(3.6%)	4 (13.3%)	0.186	1(4,2%)	6 (21.4%)	0.047
SF-36, points	0.54±0.19	0.45±0.11	0.673	0.76±0.09	0.49±0.10	0,047	0.88±0.15	0.41±0.11	0.013

Pain was less intensive among the 1 group of patients beginning from the postoperative day 3. The same figure was observed 6 months after sympathectomy. Reographic and quality of life indexes were higher among the patients who underwent surgery than among those who received conservative therapy solely during this period. This tendency remained by the end of this study.

Conclusion:

Application of sympathectomy improved immediate and long-term outcomes as well, particularly, boosting reography index by 32%, reducing pain syndrome by 1.7 points, diminishing phalanx amputation rate by 17.2%, and enhancing quality of life by 53%.

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Disclosure: No significant relationships.

Keywords: Raynaud phenomenon, thoracoscopic sympathectomy, pancreatic carcinoma

P-57

STUDY OF THE CORRELATION OF MATRIX STIFFNESS AND WNT/B-CATENIN PATHWAY IN MALIGNANT PHENOTYPE OF LUNG ADENOCARCINOMAHuang Jian*Thoracic Surgery, Wuxi People's Hospital of Nanjing Medical University, West China Hospital of Sichuan University, Wuxi City, China***Objectives:**

The study was performed to explore the relationship of matrix stiffness and tumor progression, and also the EMT and Wnt/ β -catenin signaling pathway in different matrix stiffness of lung adenocarcinoma.

Methods:

A total of 77 patients with lung adenocarcinoma were included. The tumor parts were quantified the Young's modulus by the elasticity measuring instrument. We analyzed the correlation of tumor stiffness and tumor progression according to the Young's modulus quantified and clinicopathological characteristics. And different matrix stiffness were performed to investigate the differences in biological behavior of A549 cell line cultured, such as proliferation, apoptosis, invasion, cytoskeleton, EMT biomarkers (E-cadherin, Vimentin) and wnt/ β -catenin signaling pathway biomarkers (wnt1, β -catenin, cyclin-D1).

Results:

The mean Young's modulus was 5.618 ± 2.446 kPa, 4.5 times of the normal lung tissue (1.268 ± 0.250 kPa), a significant difference in cell differentiation degree, TNM staging and lymphatic metastasis, and a positive correlation existed. Besides, cell differentiation degree and tumor stiffness were both considered as the independent risk factors for the metastasis of lymph nodes. The stiffer matrix (10kPa vs. 1kPa, 5-day) is more conducive to cell adhesion ($82.33 \pm 2.51\%$ vs. $65.02 \pm 5.01\%$), proliferation ($4.17 \pm 0.28 * 10^5/\text{ml}$ vs. $2.67 \pm 0.28 * 10^5/\text{ml}$), invasion (168.3 ± 53.5 vs. 73.3 ± 10.4), reduction of apoptosis sensitivity (4.25% vs. 13.15%) and promote the pseudopodia perform. Besides, the stiffer matrix is more conducive to downregulate the expression of E-cadherin (0.290 ± 0.026 vs. 0.646 ± 0.032) and upregulate the Vimentin (0.226 ± 0.040 vs. 0.466 ± 0.057) and β -catenin and Cyclin D1 in nucleus ($P_1=0.025$, $P_2=0.007$).

Conclusion:

Increased matrix stiffness may play a positive role in tumor progression via upregulating the wnt/ β -catenin signaling pathway expression and promoting the EMT process. The individualized treatments according to the tumor stiffness may provide a new way for lung adenocarcinoma in future.

Disclosure: No significant relationships.

Keywords: lung adenocarcinoma, matrix stiffness, epithelium-interstitial transformation, wnt/ β -catenin signal

P-58

FEASIBILITY OF IN VIVO AND EX VIVO CHEMOTHERAPY IN A MODEL OF OVINE PULMONARY ADENOMATOSIS

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Objectives:

Ovine Pulmonary Adenomatosis (OPA) is a naturally occurring adenocarcinoma of the sheep, which can be induced by inoculating healthy lambs with Jaagsiekte Sheep Retrovirus (JSRV) and closely resembles human bronchioalveolar cancer. We sought to evaluate high-dose ex-vivo and in vivo chemotherapy approaches in OPA to reduce drug-related systemic side effects and toxicity, develop further treatment options in advanced disease and achieve local tumor control.

Methods:

A total of n=12 lambs were bronchoscopically inoculated with JSRV on day 3 (n=4), 7 (n=4) or 16 (n=4). CT scans were performed prior to inoculation and on days 21, 42, 63 and 84 until lesions >2cm in diameter were observed. Animals were sacrificed either after having confirmed lesions >2cm or after 84 days. Isolated Lung Perfusion (iLuP) was performed in n=4 lambs with a weight between 20-40kg by cannulation of the pulmonary artery, both pulmonary veins and connection to an extracorporeal circuit. Central clamping of vessels and snaring of main bronchus to occlude bronchial arterial flow were mandatory before initiating iLuP. Ex vivo lung ventilation and perfusion were performed in n=6 lambs with adjunct of the Transmedics Organ Care System (OCS) Lung. After left-sided pneumonectomy via lateral thoracotomy 60minutes of OCS-treatment were followed by autotransplantation of the removed organ.

Results:

Out of n=12 lambs inoculated with JSRV n=8 lambs were successfully infected and showed signs of OPA. N=1 lamb was sacrificed on day 20 due to massive dyspnea and all other lambs were sacrificed after 65-89 days. Tumor was found in 5-70% of lung tissue of all infected lambs and n=6 lambs had signs of massive bilateral lung cancer. In iLuP n=1 lamb developed massive pulmonary edema, due to partial occlusion of a draining cannula and n=3 lambs had an uneventful course. Left lung autotransplantation was feasible in n=5 lambs in our OCS group. One animal was lost due to technical problems.

Conclusion:

Induction of OPA in healthy lambs appears to be feasible by bronchoscopic inoculation with JSRV. At present it constitutes the only form of primary lung cancer in a large animal model and thus warrants further investigation. Both iLuP and ex-vivo OCS-based treatment are feasible in this setting and should be further investigated.

Disclosure: No significant relationships.



Keywords: ex vivo lung ventilation and perfusion, isolated lung perfusion, ovine pulmonary adenomatosis

P-59

SPREAD THOROUGH AIR SPACES OF LUNG CANCER IS A RISK FACTOR OF PULMONARY METASTASIS AFTER SURGERYSatoshi Shiono¹, M. Endo¹, K. Suzuki¹, K. Yarimizu¹, K. Hayasaka¹, N. Yanagawa²¹*Department of Thoracic Surgery, Yamagata Prefectural Central Hospital, Yamagata, Japan*²*Department of Pathology, Yamagata Prefectural Central Hospital, Yamagata, Japan***Objectives:**

The spread of lung cancer to the alveolar spaces was recently reported as a novel pattern of cancer progression. Spread through the air spaces (STAS) is regarded as a significant risk factor for recurrence of lung cancers. However, the recurrence patterns of lung cancer have not been clarified in patients with postoperative STAS. The aim of this study was to explore STAS and recurrence patterns in patients with lung cancer surgery.

Methods:

Between January 2000 and December 2017, a total of 1426 patients underwent complete resection of lung cancers. After excluding patients with preoperative therapy, multiple lung cancers, or small cell lung cancer, we studied 848 pathological stage I patients who underwent lobectomy or sublobar resection. Recurrence patterns and recurrence-free rates were determined for the pathological findings, especially the presence of STAS. Locoregional recurrences included surgical margin recurrences, hilar and mediastinal lymph node metastases, ipsilateral lobe metastases and pleural dissemination, whereas distant recurrences included extrathoracic organ and contralateral lobe metastases.

Results:

STAS was found in 139 of 848 (16.4%) cases. Recurrences developed in 108 (13.3%) cases: locoregional recurrences in 76 (9.0%), distant metastases in 27 (3.2%), and both in 5 (0.6%) cases. Among recurrences, pleural dissemination developed in 12 (1.4%) and pulmonary metastases in 46 (5.4%) cases. Five-year recurrence-free rates were 65.4% in patients with STAS and 89.0% in patients without STAS. Univariate and multivariate analyses revealed that STAS was a significant factor for recurrences ($p < 0.01$), especially locoregional recurrences ($p < 0.01$). While STAS was not related to distant metastases ($p = 0.14$) and pleural dissemination ($p = 0.11$), STAS was a significant risk factor for pulmonary metastases ($p < 0.01$).

Conclusion:

In pathological stage I patients who underwent complete resection of lung cancers, patients with STAS tended to develop locoregional recurrences and pulmonary metastases.

Disclosure: No significant relationships.

Keywords: lung cancer, spread through the air spaces, surgery, recurrence, pulmonary metastasis



P-60

INDOCYANINE GREEN VIRTUAL ASSISTED LUNG MAPPING (ICG-VAL-MAP): ANYONE CAN PERFORM A VISIBLE PREOPERATIVE MAPPING SUCCESSFULLY

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Objectives:

As a preoperative marking of pulmonary nodules, we developed Virtual Assisted Lung Mapping (VAL-MAP), which is consisted of preoperative simulation using three-dimensional CT images and transbronchial dye marking using indigocarmine (IC). Between 2012 and 2016, we performed VAL-MAP in more than 200 cases in our institution; however, we sometimes came across a situation, in which an identification of mapped IC was difficult to be determined at post-mapped CT and during surgery. Therefore, we have developed a new VAL-MAP (ICG-VAL-MAP) using indocyanine green (ICG) and contrast agent. The purpose of this study was to prospectively confirm the visibility of a newly-developed ICG-VAL-MAP in an identification of mapped ICG at post-mapped CT and during surgery.

Methods:

Since January in 2017, we have performed ICG-VAL-MAP, using ICG and contrast agent in addition to IC as a marker, in 40 patients. During surgery fluorescence endoscope system was used.

Results:

Targeted lesions were 49 nodules with the diameter ranging from 2 to 38 mm (median 8 mm). The depth from the pleural surface ranged from 0 to 35 mm (median 10 mm). Total mapped numbers were 103 (IC: 35, ICG: 68). At post-mapped CT, IC was easily identified in 27 cases (77%), difficult to be identified in 5 (14%), unable to be identified in 3 (9%). On the other hand, ICG was easily identified in all cases. During surgery, IC was easily identified in 28 cases (80%), slightly identified in 4 (11%), unable to be identified in 3 (9%). On the other hand, ICG was easily identified in all cases. There were no severe complications related to ICG-VAL-MAP. All nodules were diagnosed intraoperatively and an appropriate surgical resection was performed in each patient. Surgeons were very much satisfied with ICG-VAL-MAP.

Conclusion:

ICG-VAL-MAP was a novel and promising technique with better visibility.

Disclosure: No significant relationships.

Keywords: three-dimensional computed tomography, video-assisted thoracoscopic surgery, preoperative marking, fluorescence surgery, surgical simulation, virtual assisted lung mapping.

P-61

PROGNOSTIC ABILITY OF LYMPHOVASCULAR INVASION FOR PATIENTS WITH ESOPHAGEAL SQUAMOUS CELL CARCINOMA AFTER NEOADJUVANT THERAPY FOLLOWED BY SURGERYYuta Ibuki, Y. Hamai, M. Emi, M. Okada*Department of Surgical Oncology, Hiroshima University, Hiroshima, Japan***Objectives:**

The impact of lymphovascular invasion (LVI) on the prognosis of patients with esophageal squamous cell carcinoma (ESCC) after neoadjuvant therapy followed by surgery has not been investigated in detail. The present study aimed to determine the prognostic significance of LVI for the survival of patients with advanced ESCC who underwent neoadjuvant therapy.

Methods:

We reviewed the records of 175 consecutive patients with advanced ESCC who were treated by neoadjuvant therapy followed by surgery (chemotherapy: n = 45, 25.7%; chemoradiotherapy: n = 130, 74.3%). Fifty-two patients with pathological complete response of primary tumor were excluded. Findings of LVI in resected specimens from the remaining 123 patients with residual primary tumor were evaluated. The relationship between LVI and survival were assessed.

Results:

We found LVI in specimens from 63 (51.2%) patients. Five-year recurrence free (RFS) and overall survival (OS) rates were significantly poorer among patients who were positive, than negative for LVI (RFS; 22.9% vs 58.7%; $p < 0.001$, OS; 30.7% vs 61.7%; $p = 0.001$). This trend was similar in patients with poor (less than two-thirds of the primary tumor reduced by neoadjuvant therapy; Japan Esophagus Society (JES) Grades 1 and 0; n = 59, 48%) and good (over two-thirds of the primary tumor reduced; JES Grade 2; n = 64, 52%) responders. The presence of LVI also significantly stratified RFS in patients without pathological node metastasis, but not with pathological node metastasis. Cox regression multivariate analyses including pathological T and JES grades suggested that having LVI (HR, 3.06; 95%CI 1.19 - 7.84; $p = 0.02$) was an independent predictor of RFS for patients without node metastasis.

Conclusion:

The survival of patients after neoadjuvant therapy for advanced ESCC could be stratified by LVI. The impact was particularly significant for patients without node metastasis.

Disclosure: No significant relationships.

Keywords: neoadjuvant therapy, prognostic factor, esophagus



P-62

FLUORESCENT IMAGE-GUIDED LUNG RESECTION UNDER INTRAOPERATIVE ELECTROMAGNETIC NAVIGATIONAL BRONCHOSCOPIC LOCALIZATIONK.N. Han, Hyun Koo Kim, K. Lee, Y.H. Choi*Thoracic and Cardiovascular Surgery, Korea University Guro Hospital, Seoul, Republic of Korea***Objectives:**

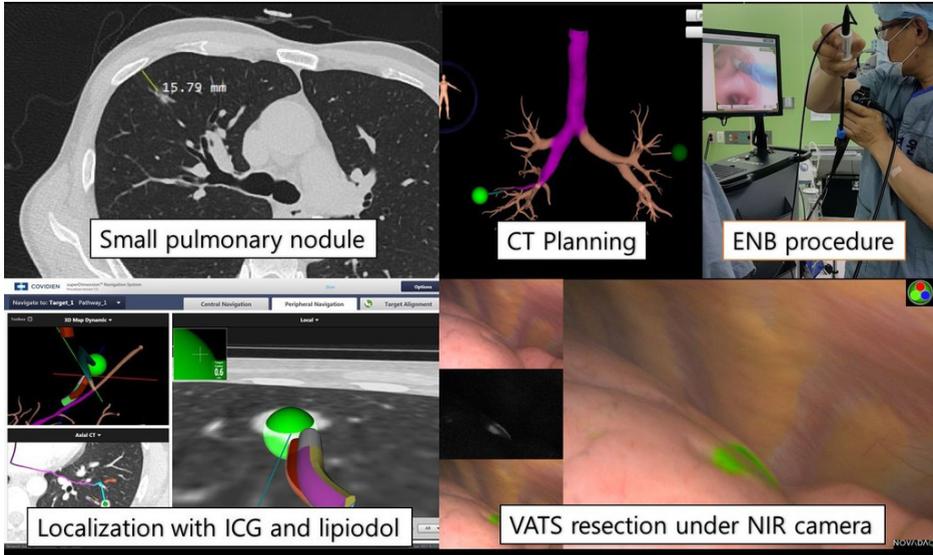
Intraoperative localization and minimal resection of small pulmonary lesion less than 1 cm is still challenging during minimally invasive thoracic surgery. The purpose of this study is to evaluate the efficacy of the fluorescence image-guided VATS resection after intraoperative electromagnetic navigational bronchoscopy (ENB) with fluorescence.

Methods:

We performed intraoperative localization for pulmonary nodule during minimally invasive thoracic surgery in 10 patients (eight malignancies and two benign diseases) without transthoracic percutaneous intervention. After anesthetic induction at operation room, we performed ENB-guided localization with fluorescent marker and VATS lung resection under NIR endoscopic system.

Results:

The procedure time of ENB localization was mean 18.2 (7-25) min. There was 1 minor bleeding event during ENB localization which stopped spontaneously without intervention. There was no systemic problem related with ENB procedure during VATS operation. Under NIR view, we explored the fluorescent signal and performed C-arm fluoroscopy. Success rate of ENB localization was 90% (9/10). Deep pulmonary lesion (34mm from the pleura) was not identified by ENB marking. There were two conversions (segmentectomy and lobectomy) due to positive resection margin on frozen examination. Dual localization with fluorescence only and fluorescence with radiocontrast for two separate targets showed the superiority for the enhanced localization with fluorescence with radiocontrast compared with fluorescence only.

**Conclusion:**

ENB-guided localization for small pulmonary nodule is clear advance for image-guided VATS lung resection reducing the complication of transthoracic percutaneous procedure.

Disclosure: No significant relationships.

Keywords: electromagnetic navigational bronchoscopy, lobectomy, localization.



P-63

STANDARDIZED DIAGNOSIS AND TREATMENT OF RESECTABLE ESOPHAGEAL CANCER IN CHINA: A NATIONAL CROSS-SECTIONAL SURVEY

Di Lu, S. Feng, X. Liu, X. Dong, H. Wu, G. Xiong, H. Wang, M. Li, K. Cai

*Department of Thoracic Surgery, Nanfang Hospital, Southern Medical University, Guangzhou, China***Objectives:**

During our daily practice, we found it incomprehensible that a number of physicians and surgeons from relative departments, such as oncology, gastroenterology, radiotherapy and thoracic surgery, weren't fully aware of the 7th edition of TNM classification of esophageal carcinoma, let alone able to diagnose precisely, though this edition has been released since 2009. Therefore, this investigation of awareness of the 7th edition of TNM classification of esophageal carcinoma was performed to find out whether this phenomenon is common in China and to explore the possible causes.

Methods:

This hospital-based cross-sectional survey was conducted in the department of thoracic surgery, gastroenterology, oncology and/or radiotherapy in 8 tertiary hospitals in central and southern China mainland. A 14-item questionnaire was administered to 366 doctors from these departments treating patients with esophageal cancer, which contains the precise comprehension of the 7th edition of TNM classification and the preference of treatment protocol.

Results:

31.42% of the examinees were from the department of thoracic surgery, 40.44% from gastroenterology, and 28.14% from oncology and/or radiotherapy. 66.12% of the doctors even didn't know the 7th edition has been released in 2009, and only 21.86% and 16.67% doctors regarded cervical nodes and celiac nodes as regional lymph nodes. 67.21% doctors weren't aware of the new classification of adding factors of location, histologic grade and histopathology to the TNM system, and 51.37% doctors couldn't make the right TNM classification of the esophagogastric junction cancers. However, more than 50% of doctors could make the right peri-operative decisions in treating patients with esophageal cancer.

Conclusion:

The 7th edition of TNM classification of esophageal carcinoma was poorly accepted and applied in central and southern China mainland, while the peri-operative therapeutic principles were relatively well practiced by physicians and surgeons in this field.

Disclosure: No significant relationships.

Keywords: esophageal cancer, standardized diagnosis and treatment, TNM staging system, current state investigation

P-64

COPY NUMBER GAINS IN CHROMOSOME 7P ORIGINATING FROM PLASMA CELL FREE DNA OF EARLY STAGE LUNG CANCER PATIENTSYang Yang, G. Jiang*Department of Thoracic Surgery, Shanghai Pulmonary Hospital, Shanghai, China***Objectives:**

Biomarkers are essential for successful early diagnosis of lung cancer. The variations in chromosome 7 play a critical role in tumorigenesis of lung cancer. Here we investigated whether copy number gain of chromosome 7p in plasma cell free DNA can be served as a minimal invasive lung cancer detection biomarker.

Methods:

Eight treatment naïve lung cancer patients and 15 non-cancer controls were recruited. Peripheral blood was collected before treatments. Plasma cell free DNA was profiled with low coverage whole genome sequencing by using a standard noninvasive prenatal testing protocol and an optimized bioinformatics analyses pipeline. Chromosome 7 copy number gains were reported.

Results:

Cell free DNA was successfully extracted from lung cancer plasma samples, with concentration range from 0.184 to 0.494 ng/ul. Chromosome 7p copy gains were found in 100% (4/4) stage IIIB/IV patients and 75% (3/4) stage IA/IB lung cancers. The smoking history and the genotype of *EGFR* gene, which located in Chr 7p, had no correlation with the status of Chromosome 7 copy number gains. Meanwhile none of these 15 controls had copy number gains in Chr 7p. Furthermore, the sensitivity of CEA and CYFRA21-1 analysis was insufficient. Positive CEA was found in 1/8 (12.5%) and 2/8 (25.0%) patients by using cutoff 10ng/ul and 3.3ng/ul respectively. Positive CYFRA21-1 was found in 2/8 (25.0) and 4/8 (50.0%) lung cancers by using cutoff 7.0ng/ul and 3.5ng/ul.

Conclusion:

Our findings suggested that chromosome 7 imbalances might be a useful peripheral blood tumor biomarker for early detection of lung cancer.

Disclosure: No significant relationships.

Keywords: copy number gain, chromosome 7p, lung cancer, plasma cell free DNA, early detection.

P-65

CIRCULATING TUMOUR DEOXYRIBONUCLEIC ACID (CTDNA) ANALYSIS OF THE EGFR GENOTYPE ENHANCED THE ACCURACY OF BIOLOGICAL PROPERTY DIAGNOSIS FOR SMALL-SIZED PULMONARY NODULES

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Objectives:

The implementation of low-dose computed tomography (LDCT) has allowed for the screening of small-sized nodules in lung. The detection of small pulmonary nodules has greatly improved the early detection rate of lung cancer. However, it is challenged by the increase in false positive. To improve this situation, the current study aims to analyze whether the genotype analysis of ctDNA can be used to further judge the nature of the lesion.

Methods:

Consecutive patients with small pulmonary nodules (diameter <2.0 cm) at the Shanghai Pulmonary Hospital from November 2016 to March 2017 were recruited. Patients receiving any pre-operative anticancer therapies, and those with recurrent or metastatic disease were excluded. Peripheral blood samples (5 ml) and matching tissues were collected. Circulating tumor DNA (ctDNA) was enriched from plasma samples using the the QIAamp Circulating Nucleic Acid kit (Qiagen) and the genomic DNA which originated from corresponding tissue samples was extracted from the QIAamp DNA Mini Kit (Qiagen). Mutation analysis of the EGFR gene in all samples was analyzed by the amplification refractory mutation system (ARMS).

Results:

Paired peripheral blood samples and lesion tissues were obtained from 194 patients. Of these, 69 patients were male in which 13 were former or current smoker. Lung cancer was confirmed in 163 patients through histological analysis. ctDNA was successfully enriched from all peripheral blood samples. The *EGFR* mutation was detected in 31 samples in which 28 samples were lung cancer. The positive predictive value was 90.3% (28/31).

Conclusion:

Our findings indicated that the genotype analysis of *EGFR* gene in ctDNA improves the diagnostic accuracy of small pulmonary nodules.

Disclosure: No significant relationships.

Keywords: small-sized pulmonary nodules, lung cancer, ctDNA, EGFR gene, mutation.

P-66

LONG-TERM OUTCOMES AFTER 3-PORT THORACOSCOPIC SEGMENTECTOMY VERSUS LOBECTOMY FOR SMALL LUNG CANCERShinji Yuhara, T. Kohno, S. Fujimori, S. Suzuki, M. Wakatabe*¹Department of Thoracic Surgery, Respiratory Center, Toranomon Hospital, Tokyo, Japan***Objectives:**

The tumors with the size of 15 mm or less and less than 50 percent of solid component have been eligible for our radical surgical indication of 3-port thoracoscopic segmentectomy. The objective is to evaluate the indication.

Methods:

We reviewed 181 segmentectomy (groupS) and 475 lobectomy (groupL) with no lymph nodes metastasis and the size of 30mm or less and compared GroupS with groupL.

Results:

As for imaging findings, there were significant differences in the maximum tumor diameter (15.0±4.8mm VS 19.1±5.4mm; P<0.01) and the maximum diameter of solid component (8.0±6.9mm VS 13.6±7.5mm; P<0.01). There were significant differences in the operation time (166 min VS 184 min; P=0.01) and the blood loss (50 mL VS 100 mL; P=0.01). There were two open conversions in groupS and one in groupL. The mean postoperative stay was 5 days in each group. There was one 30 days death due to the acute aggravation of IP in groupL. At a mean follow up of 48 months, there were significant differences in overall recurrence rates (2.2% VS 7.6%; P<0.01) and 5-year RFS (91.5% VS 85.0%; P=0.03), however no significant difference was noted in 5-year OS (93.6% VS 91.6%; P=0.26).

Conclusion:

Our indication of segmentectomy was acceptable. In the subgroup analysis of solid tumors with the size of 20mm or less, comparing groupS with groupL, there was no significant difference in 5-year RFS (72.6% VS 83.5%; P=0.34) and 5-year OS (81.4% VS 90.6%; P=0.32). Eighty-two percent of overall recurrence happened in the patients with pure solid tumors, therefore it is necessary to consider an indication of segmentectomy for solid tumors carefully. There was no recurrence in part solid tumors with the size of 20mm or less in groupL, which indicates the possibility of expanding an indication of segmentectomy for part solid tumors.

Disclosure: No significant relationships.

Keywords: part solid tumor, segmentectomy, small lung cancer, thoracoscopic surgery.

P-67

COMPARISON OF NON-INTUBATED AND INTUBATED VIDEO-ASSISTED THORACIC SURGERY (VATS) UNIPORTAL LOBECTOMIES

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Objectives:

Non-intubated thoracic surgery (NITS) video-assisted thoracic surgery (VATS) is a new method for lobectomies. In this study the early results of the NITS VATS lobectomies were compared with the intubated thoracic surgery (ITS) VATS lobectomies.

Methods:

Between January 1. 2016 and December 31. 2016, 82 consecutive patients for ITS and January 26. 2017 and December 31. 2017, 74 consecutive patients for NITS VATS lobectomies were planned. Exclusion criteria in both series was body-mass index >30. Uniportal VATS lobectomies were performed on 81 patients in the ITS Group and 66 patients in the NITS Group. Bispectoral Index (BIS) guided Propofol sedation was performed, with laryngeal mask, for NITS. There was no significant difference in the Charlson comorbidity score 5,4 (2-10) and 5,2 (2-11) ($p=0.632$), in FEV1 89% (38-136) and 86,3% (37-136) ($p=0,262$), and tumor stages ($p=0,254$), in ITS and NITS groups, respectively. Conversion rate was 1,2% and 11% in ITS and NITS Groups.

Results:

There was no perioperative mortality. Operative times were 96,6 min (44-188) and 93,6 min (55-175) ($p=0.483$), drainage time was 5,1 days (1-25) and 3,1 days (1-14) ($p=0.004$), prolonged air leak was 26% and 10% ($p=0.019$), reoperation was 3,7% and 1,55% ($p=0.419$), and postoperative complications (mainly pneumothorax) were 12,3% and 7,6% ($p=0.344$) in the ITS and NITS groups, respectively. Among the 8 NITS conversion cases, in 2 patients (hypoxia, adhesion) intubation and VATS lobectomies, in 1 case (bleeding) intubation and axillary thoracotomy, and in 5 cases (oncological reasons) non-intubated!! axillary thoracotomies (3 lobectomies, 1 pneumonectomy and 1 sleeve lobectomy) were performed.

Conclusion:

There were significantly shorter drainage time, less postoperative complications and less prolonged air leak after non-intubated VATS lobectomies compared to intubated VATS lobectomies. The conversion rate was higher in non-intubated cases in conversion from NITS VATS to thoracotomy, it is not necessary to intubate the patient in every case.

Disclosure: No significant relationships.

Keywords: non-intubated, uniportal, vats, lobectomy

P-68

THE SENSITIVITY AND SPECIFICITY OF SCREENING EARLY STAGE LUNG CANCER THROUGH DETERMINING THE METHYLATION STATE OF SHORT STATURE HOMEBOX 2 (SHOX2) AND PROSTAGLANDIN E RECEPTOR 4 (PTGER4) GENE IN CIRCULATING CELL-FREE DNA

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*Department of Thoracic Surgery, Shanghai Pulmonary Hospital, Shanghai, China***Objectives:**

Circulating cell-free DNA (cfDNA) provides a non-invasive method for molecular analysis. This study aims to analyze the sensitivity and specificity of screening early stage lung cancer through determining the methylation state of *SHOX2* and *PTGER4* gene in cfDNA.

Methods:

Patients attending the Department of Thoracic Surgery, Shanghai Pulmonary Hospital were recruited in this study. The cfDNA was enriched from peripheral blood following bisulfite modification. The methylation level of *SHOX2* and *PTGER4* genes were determined by qPCR.

Results:

cfDNA of 220 peripheral blood samples which included 144 lung cancer patients, 22 non-malignant lung disease patients and 54 healthy control participants were enriched. Hyper-methylated *SHOX2* and *PTGER4* genes were detected in 105 lung cancer patients. For patients with lung cancer lesions in stage Tis0 and I, the positive rates of hyper-methylated *SHOX2* and *PTGER4* genes were 57.58% and 75.00% respectively. *SHOX2* and *PTGER4* gene inclined to have hyper-methylation state in lung squamous carcinoma patients (93.75%) than that in lung adenocarcinoma patients (69.23%).

Conclusion:

Our findings suggested that screening early stage lung cancer patients through determining the methylation state of *SHOX2* and *PTGER4* genes in cfDNA seemed to represent a promising tool for clinical applications.

Disclosure: No significant relationships.

Keywords: methylation, SHOX2, PTGER4, circulating cell-free DNA, lung cancer.

P-69

CYSTEINE CONJUGATE-BETA LYASE 2 (CCBL2) MRNA IS OVEREXPRESSED IN METASTATIC LYMPH NODES IN NON-SMALL CELL LUNG CANCERDariusz Sagan¹, J. Kocki², T. Kocki³¹*Thoracic Surgery, Medical University of Lublin, Lublin, Poland*²*Clinical Genetics, Medical University of Lublin, Lublin, Poland*³*Experimental And Clinical Pharmacology, Medical University of Lublin, Lublin, Poland***Objectives:**

Cysteine conjugate-beta lyase 2 (CCBL2) is a gene located at 1p22.2. The protein product of this gene catalyzes transamination of L-kynurenine to form kynurenic acid (KYNA). Previous studies showed that kynurenine metabolic pathway plays an important role in anti-cancer immune response. In this study we assessed mRNA expression of CCBL2 in samples from tumor tissue, lung parenchyma and lymph nodes in patients with NSCLC.

Methods:

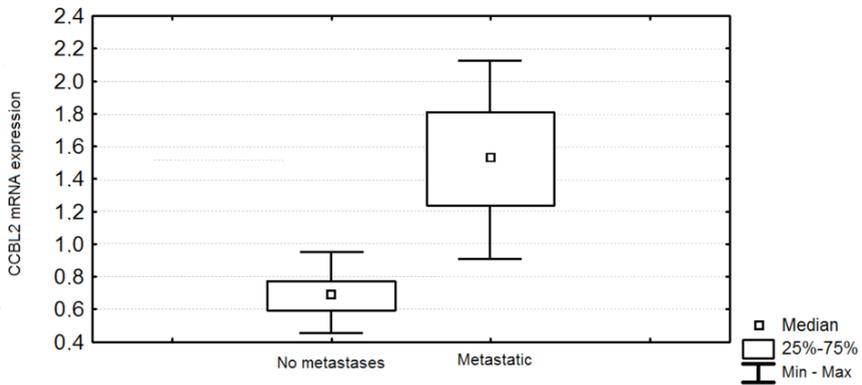
CCBL2 mRNA expression was assessed using real-time Reverse-Transcriptase Polymerase Chain Reaction method (real-time RT-PCR) in tumor tissue, normal pulmonary parenchyma and lymph nodes samples from 63 patients with NSCLC undergoing pulmonary resection. GAPDH gene was used as a reference. Kynurenine pathway activity was assessed in tissues and serum by KYNA level measurement using ion-exchange resin and high performance liquid chromatography (HPLC).

Results:

mRNA CCBL2 expression in normal pulmonary parenchyma was higher than in tumor samples (mean 0.91 ± 0.52 ; median 0.84 vs. 0.42 ± 0.5 ; median 0.25; $p=0.00012$) but comparable to lymph nodes (1.03 ± 0.66 ; median 0.77). CCBL2 expression in tumor samples was the highest in adenocarcinoma (0.72 ± 0.77 ; median 0.6), lower in squamous (0.34 ± 0.35 ; median 0.21) and the lowest in large cell lung cancer (0.23 ± 0.35 ; median 0.05; $p=0.014$). mRNA CCBL2 expression in tumor samples showed positive correlation with KAT1 activity in lymph nodes ($R=0.61$; $p=0.01$). CCBL2 mRNA expression in normal pulmonary tissue was negatively correlated with KAT1 and KAT2 activity in tumor samples ($R=-0.32$; $p=0.03$ and $R=-0.38$; $p=0.01$ respectively). CCBL2 mRNA expression in metastatic lymph nodes was significantly higher than in intact lymph node (median 1.54 vs 0.7; $\chi^2=5$; $p=0.025$)

Conclusion:

CCBL2 mRNA is overexpressed in metastatic lymph nodes in non-small cell lung cancer. It may be a novel method for diagnosing mediastinal lymph nodes involvement from micro-samples obtained by EBUS or EUS in patients with NSCLC.



Disclosure: No significant relationships.

Keywords: CCBL2, lung cancer, kynurenine, immune response, mRNA



P-70

INTRAOPERATIVE VENTILATION MECHANICAL TEST TO PREDICT PERSISTENT AIR-LEAKS (PALS) AFTER VATS LOBECTOMY

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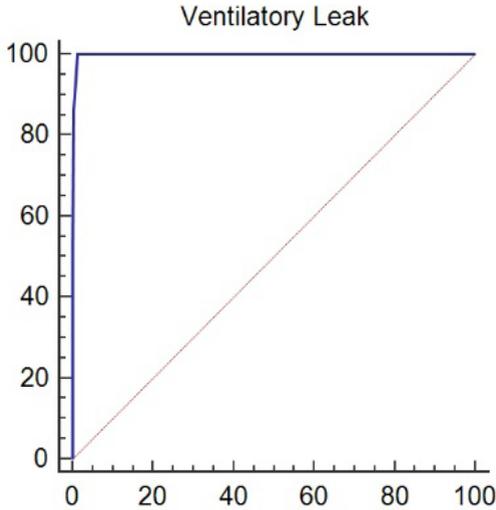
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Objectives:

PALS is a common complications that also exists after VATS lobectomy. All previous risk models for predicting PAL included demographic, comorbidities and preoperative cardio-pulmonary assessment variables but not intraoperative air-leaks. The submersion test to verify intraoperative air leaks after VATS lobectomy is sometimes unreliable since the lung re-expansion could limit the endoscopic view. We evaluated whether intraoperative quantitative measurement of air leaks using ventilation mechanical test could predict PALS after VATS lobectomy and identify patients needing additional surgical procedures for preventing them.

Methods:

It was an observational single-center study included all consecutive patients undergoing VATS lobectomy and did not receive any intraoperative preventive surgical procedure to prevent air leaks. After lobectomy, the lung was re-inflated and ventilatory leaks (VL %) was calculated as follows: $[(\text{inspiratory tidal volume} - \text{expiratory tidal volume}) / \text{inspiratory tidal volume}] \times 100$. The numeric variable of VL was categorized by ROC analysis to select the best cut-off associated with PAL. VL (>8%), age, FEV1%, BMI, DLCO%, location and side of resection, fissure integrity, presence of adhesions were screened by univariate analysis and then used in stepwise logistic regression analysis to define the independent predict factors of PAL.

**Results:**

A total of 389 patients were included. Of these, 33 (8,4%) presented PALs (> 5 days). Patients with PALs compared to control group presented and higher VL value ($p=0.0001$), and a prolonged chest tube drainage ($p=0.003$), length of hospital stay ($p=0.005$) and higher post-operative complications rate ($p=0.01$). Logistic regression analysis found that $VL>8\%$ ($p=0.0003$); $FEV1<80\%$ ($p=0.001$), presence of adhesions ($p=0.01$) were significant predictors of PAL.

Conclusion:

VL is an independent predictor of PALs after VATS lobectomy; it provides a real-time intra-operative guidance to identify those patients who can benefit from intraoperative preventive interventions (i.e. sealants, buttressed staplers, pleural tend) to reduce PALs.

Disclosure: No significant relationships.

Keywords: VATS lobectomy, ventilation mechanical test, persistent air-leaks



P-71

LATE ONSET SUPRAVENTRICULAR TACHYCARDIA AFTER PULMONARY RESECTION

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Objectives:

Atrial fibrillations are common complications after thoracic surgery, but their etiology is unclear. Most arrhythmias occur within first 3 postoperative days. However, we sometimes encounter delayed developed postoperative atrial fibrillations (POAF) after 4 postoperative days. The objective of this study is to identify the characteristics and predictors of delayed developed POAF.

Methods:

We reviewed retrospectively 2344 consecutive patients who underwent anatomical lung resection between 2008 and 2015 at our institute. Retrospective analysis was carried out on 179 patients who newly developed POAF. Antiarrhythmic drugs were not used prophylactically, and electrocardiogram monitoring was performed for 2 days after surgery. Examination for palpitation was performed when the patients were not wearing the monitor. POAF that occurred after 4 postoperative days was defined as delayed POAF. We divided these 179 patients into two groups, early POAF group and delayed POAF group. And we analyzed preoperative and operative clinical factors. The correlation between delayed POAF and clinical factors (sex, age, smoking history, high blood pressure, history of ischemic heart disease, radical node dissection, mode of surgery, operation time and amount of blood loss) were evaluated using chi-square test and multivariate analysis.

Results:

Thirty eight patients (21%) developed POAF after 4 postoperative days. Regarding clinical factors, only operation time was long in delayed POAF group statistically. There was no statistical difference in older age, high blood pressure, radical node dissection and pneumonectomy known as a risk factor for POAF. Moreover, 2cases in the delayed POAF group, developed into embolic stroke and myocardial infarction.

Conclusion:

About 21% of POAF was occurred after 4 postoperative days. And 2 cases led to critical complications. The etiology of POAF remains to be unclear, but it is suggested surgical stress may be involved in delayed POAF. It is necessary to consider the possibility of POAF at all times after lung resection.

Disclosure: No significant relationships.

Keywords: complication, pulmonary resection, postoperative atrial fibrillation

P-72

THE CLINICAL NECESSITY OF TOTAL THYMECTOMY FOR THYMIC EPITHELIAL TUMOR AS REVEALED VIA EXOME SEQUENCINGJ. Jiang, C. Jin, Y. Zhang, Jian-Yong Ding*Department of Thoracic Surgery, Fudan University, Shanghai, China***Objectives:**

Multiple thymic squamous cell carcinoma (TSCC) is a rare thymic epithelial tumor with a dismal prognosis. Mutational profiles of multiple TSCC may expand our understanding of tumorigenesis and treatment options for these tumors.

Methods:

We sequenced the whole exomes of 3 TSCC nodules from a multiple TSCC patient and a paired peripheral blood sample and identified single-nucleotide variants and small insertions and deletions. We also performed gene ontological and pathway analyses of the somatic mutations that we discovered.

Results:

The three TSCC nodules were subjected to hematoxylin-eosin staining, and the results showed that these three nodules were highly similar with respect to histology. We identified 116, 94 and 98 non-synonymous somatic mutations in the 3 TSCC nodules, and 34 mutations, including mutations in TP53 and ARID1A, among others, were present in all 3 TSCC nodules. We then performed immunohistochemistry to assess two selected genes, TP53 and ARID1A, and found that the 3 TSCC nodules expressed similar levels of TP53 and ARID1A. Further gene ontological analysis and pathway analysis revealed that the 3 TSCC nodules also had similar significantly enriched pathways based on the identified genetic alterations. These results demonstrated that the 3 multiple TSCC nodules were spatially independent of each other but were highly similar with respect to histological sources and genetic characteristics, suggesting that 2 TSCC nodules were likely metastases of the third nodule.

P-73

ASSESSMENT OF ENDOBRONCHIAL ULTRASOUND GUIDED TRANSBRONCHIAL NEEDLE ASPIRATE (EBUS-TBNA) SPECIMEN ADEQUACY BY SIMPLE MACROSCOPIC INSPECTION CRITERIA

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Objectives:

Rapid on-site evaluation (ROSE) has been introduced to improve endobronchial ultrasound-transbronchial needle aspiration (EBUS-TBNA) diagnostic yield. However, sample adequacy by ROSE is disproven by final pathology in 10-15%, and ROSE utility is currently debated. This study aims to evaluate an alternative, simple inspection method for assessing adequacy of EBUS-TBNA specimen.

Methods:

We analysed the prospectively collected data of 377 consecutive patients [male, 76%; median age, 68 (IQR: 57-75)] undergoing EBUS-TBNA for mediastinal lymphadenopathy (n=354) or tumour (n=23) in 2014-2017, without ROSE. EBUS-TBNA was performed under conscious sedation by two experienced endoscopists, using 21-Gauge needle, with median 3 (IQR: 3-4) passes for each mediastinal target [target median size, 20 mm (IQR: 15-30)]. EBUS-TBNA samples were fixed in formalin and classified as adequate by the endoscopist when the following macroscopic inspection criteria were present: a well-defined cylindrical fragment 1-2 mm in diameter and ≥ 10 mm in length, or multiple well-defined cylindrical fragments 1-2 mm in diameter and < 10 mm in length. Samples without these characteristics were classified as inadequate. For all EBUS-TBNA procedures, the sample adequacy assessed by these criteria was compared with final pathology report.

Results:

According to the proposed method of specimen inspection for adequacy, 282/377 (75%) EBUS-TBNA samples were classified adequate; 34 of the latter (12%) resulted inadequate at final pathology. Using the specimen pathology report as "gold standard", the inspection method for assessing sample adequacy showed 80% sensitivity and 88% true predictive value. At multivariable analysis (target size; lymphnode/tumor; number of EBUS-TBNA passes; specimen adequacy by inspection), macroscopic inspection criteria of EBUS-TBNA sample adequacy were significantly associated with adequacy at final pathology [HR: 4.01 (95%CI: 2.25-7.14); $p < 0.01$].



Conclusion:

The high positive predictive value (88%) of the proposed inspection criteria to assess EBUS-TBNA sample adequacy suggests that simple inspection of the specimen could be used as an alternative to ROSE.

Disclosure: No significant relationships.

Keywords: EBUS-TBNA, sample adequacy, diagnostic yield, ROSE, specimen inspection

P-74

VATS THORACOPLASTY IN COMPLEX DESTRUCTIVE PULMONARY TUBERCULOSIS TREATMENTDmitry Giller¹, B. Giller¹, G. Scherbakova², I. Enilenis¹, A. Glotov², O. Kesaev¹

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Objectives:

The last five decades the interest to thoracoplasty, as a treatment procedure for patients with tuberculosis (TB), decreased. With the emergence of antituberculars, the success of chemotherapy pushed back collapse and surgical methods to the background, but the drug-resistance growth makes these methods relevant. Techniques proposed in the early 20th century were extremely traumatic surgery resulting in function of upper extremities lesion and chest deformation. We developed a minimally invasive endoscopic technique of VATS thoracoplasty, basing on the experience of the past.

Methods:

We performed 925 VATS thoracoplasties (251 as a treatment procedure) according this technique between 1999 and 2017. Indications for treatment thoracoplasty are single/multiple cavity(ies) in the upper-posterior segments of the upper lobe and/or S6 of the one/both lungs combined with massive seeding that does not allow for a lung resection to be performed. In addition, we often perform it to correct the hemithorax volume and to prevent TB reactivation in the remaining foci after previously performed extensive lung resections and pneumonectomy.

Results:

Intraoperative complications after 251 treatment thoracoplasty were experienced with 6 (2,39%) patients. Postoperative complications emerged in 7 (2,78%) cases. All complications were eliminated. Postoperative mortality was 1 (0,39%). After VATS thoracoplasty application as the treatment procedure and an adequate chemotherapy background we achieved an efficacy of 88 %, according to the WHO criteria. Clinical recovery (abacillation, decay cavity closure and the lack of TB reactivation 6 months after surgery) was achieved in 81% of the cases (77% with MDR, 71% XDR).

Conclusion:

VATS thoracoplasty technique is much less traumatic than common techniques, but it allows to achieve a significant reduction of hemithorax volume. Patients' pain syndrome manifestation is less severe, their functional rehabilitation is full and early, thorax deformation is absent and shoulder girdle function is completely saved.



Disclosure: No significant relationships.

Keywords: tuberculosis, thoracoplasty, vats

P-75

MINIMAL INVASIVE THYMECTOMY IS FEASIBLE FOR THE SURGICAL TREATMENT OF LARGE SIZE THYMIC TUMORSNing Xu, Z. Gu, W. Fang*Thoracic Surgery, Shanghai Chest Hospital, Shanghai, China***Objectives:**

Minimal invasive thymectomy (MIT) is a widely accepted approach for surgical management of small, early stage thymic malignancies. Yet the role of MIT in treating tumors larger than 5 cm remains controversial. We hereby evaluated the safety and efficacy of MIT for thymic tumors larger than 5cm.

Methods:

From January 2008 to July 2017, patients without preoperative therapy who underwent MIT were prospectively collected. Patients underwent VATS exploration, converted to open surgery because of extensive tumor invasion, were excluded from the study. Tumors were divided into size ≤ 5 cm or > 5 cm groups according to their longest dimension in transverse section on CT scan. Peri-operative outcomes and follow-up results of the two groups were compared after Propensity-score matching.

Results:

A total of 197 patients were retrospectively reviewed with 129 patients in the size ≤ 5 cm group and 68 patients in another. PSM produced 63 cases for each group by balancing myasthenia gravis, cT stage and histologic subtype. There was no statistical difference between the two groups in patient demographics or tumor characteristics. Conversion incidence (1.6% vs. 1.6%, $p=1.000$), R0 resection rate (98.4%, 96.8%, $p=1.000$) and Co-resection of invaded structures (27% vs. 22.2%, $p=0.535$), including but not limited to innominate vein and wedge lung resection, were comparable between the two groups. There was no difference in Operation time ($p=0.123$), blood loss ($p=0.433$), duration of chest tube drainage ($p=0.606$), length of postoperative hospital stays ($p=0.515$), or incidence of postoperative complications ($p=0.273$) between the two groups. During follow-up, there were two cases of pleura dissemination and one case of distant metastasis in the size ≤ 5 cm group but no recurrence observed in the size > 5 cm group (Table).

	Before PSM			After PSM		
	≤5cm group	>5cm group	P value	≤5cm group	>5cm group	P value
	N=129	N=68		N=63	N=63	
Patient demographics						
<i>Gender (%)</i>			0.860			0.280
Male	70(54.3)	36(52.9)		39(61.9)	33(52.4)	
Female	59(45.7)	32(47.1)		24(38.1)	30(47.6)	
<i>Age(y)</i>	54.4±11.9	52.2±13.5	0.245	54.5±12.4	51.7±13.5	0.232
<i>Myasthenia gravis (%)</i>			0.060			0.544
No	107(82.9)	63(92.6)		56(88.9)	58(92.1)	
Yes	22(17.1)	5(7.4)		7(11.1)	5(7.9)	
<i>Comorbidities (%)</i>			0.921			1.000
No	94(72.9)	50(73.5)		45(71.4)	45(71.4)	
Yes	35(27.1)	18(26.5)		18(28.6)	18(28.6)	
<i>Tumor size(cm)</i>	3.5±0.9	6.3±1.1	0.000	3.6±0.8	6.2±1.0	0.000
<i>cT stage (%)</i>			0.099			1.000
T1	114(88.4)	52(76.5)		51(81)	52(82.5)	
T2	10(7.8)	11(16.2)		9(14.3)	9(14.3)	
T3	5(3.9)	5(7.4)		3(4.8)	2(3.2)	
<i>pT stage (%)</i>			0.097			0.214
T1a	106(82.2)	58(85.3)		53(84.1)	54(85.7)	
T1b	7(5.4)	6(8.8)		4(6.3)	6(9.5)	
T2	9(7.0)	0		4(6.3)	0	
T3	7(5.4)	4(5.9)		2(3.2)	3(4.8)	
<i>Histologic subtype (%)</i>			0.192			0.917
A	13(10.1)	4(5.9)				
AB	41(31.8)	32(47.1)		30(47.6)	32(50.8)	
Other type thymoma	7(5.4)	1(1.5)				
B	49(38.0)	26(38.2)		27(42.9)	26(41.3)	
Sq+carcinoid	19(14.7.4)	5(7.4)		6(9.5)	5(7.9)	
Peri-operative outcomes						
Conversion (%)	2(1.6)	1(1.5)	1.000	1(1.6)	1(1.6)	1.000
R resection status (%)			1.000			1.000
R0	125(96.9)	68(97.1)		62(98.4)	61(96.8)	
R1	4(3.1)	2(2.9)		1(1.6)	2(3.2)	
Co-resection (%)			0.751			0.535
No	96(74.4)	52(76.5)		46(73)	49(77.8)	
Yes	33(25.6)	16(23.5)		17(27)	14(22.2)	
Operative time (min)	92.7±41.5	99.6±44.6	0.283	88.9±35.9	100.4±45.8	0.123
Blood loss (ml)	91.8±57.8	100±84.4	0.425	90.3±58.6	100.8±87.3	0.433
Chest tube drainage (day)	2.5±1.4	2.8±1.5	0.176	2.6±1.4	2.7±1.4	0.606
Postoperative stay (day)	4.8±2.3	4.9±2.1	0.655	4.6±2.0	4.8±2.2	0.515
Overall complication (%)			0.226			0.273
No	118(91.5)	66(97.1)		57(90.5)	61(96.8)	
Yes	11(8.5)	2(2.9)		6(9.5)	2(3.2)	
Follow-up						
<i>Median follow-up time(month)</i>	30	35		31	35	
<i>Local recurrence</i>	0	0		0	0	
<i>Pleura dissemination</i>	4	0		2	0	
<i>Distant metastasis</i>	2	0		1	0	

Conclusion:

Tumor size alone (>5cm) is not a limitation for minimal invasive thymectomy. MIT is also a safe and feasible approach for surgical treatment of large size thymic tumors.

Disclosure: No significant relationships.

Keywords: minimal invasive thymectomy, propensity-score match, large size thymic tumor.

P-76

SURGICAL RESTAGING WITH IMMUNOHISTOCHEMICAL STAINING OF MEDIASTINAL LYMPH NODES ALLOWS FOR BETTER IDENTIFICATION OF NON SMALL CELL LUNG CANCER (NSCLC) PATIENTS WITH POORER PROGNOSIS AFTER NEOADJUVANT THERAPY

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Objectives:

This study was undertaken to evaluate the utility of the detection of occult micrometastases (OM) by immunohistochemical (IHC) staining of mediastinal lymph nodes (LN) obtained during surgical restaging of NSCLC patients after neoadjuvant treatment.

Methods:

We retrospectively analyzed records of all IIIA-N2 NSCLC patients with pathologically confirmed mediastinal LN metastases who underwent surgical restaging (Transcervical Extended Mediastinal Lymphadenectomy, TEMPLA) after chemotherapy or chemoradiotherapy in years 2007-2016. 51 patients, with mediastinal LN harvested during TEMPLA diagnosed as metastases-free in routine haematoxylin&eosin staining, were included. To detect OM, IHC staining with anticytokeratin antibodies was performed on mediastinal LN obtained during TEMPLA. Survival analysis using Kaplan method was performed in 43 patients who underwent radical surgical treatment (20 pneumonectomies, 23 lobectomies) after TEMPLA.

Results:

One thousand, one hundred and sixty three mediastinal LN were IHC-stained and examined. Persistent OM were found in mediastinal LN of 5 patients (9.8%). In all cases, only single LN was affected. After a median observation period of 23.5 months (range 5 to 60) after curative surgery, OM+ patients showed significantly reduced overall survival (16.7%) in comparison to OM- patients (63.9%) (log-rank, p=0.021). In Cox multivariable analysis, persistent OM were independent negative factor for overall survival.

Conclusion:

IHC staining of mediastinal LN obtained during TEMPLA allows for more accurate restaging. Persistent N2 micrometastases after neoadjuvant treatment are associated with reduced survival after pulmonary resection.

Disclosure: No significant relationships.

Keywords: restaging, immunohistochemistry, mediastinal lymph nodes, micrometastases

P-77

JEJUNOSTOMY PLACEMENT BEFORE NEOADJUVANT CHEMORADIOTHERAPY FOR ESOPHAGEAL CANCER

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Objectives:

The aim of this study was to assess the safety and impact of selective placement of jejunostomy feeding tube (JFT) before neoadjuvant chemoradiotherapy (nCRT) and to compare outcomes to patients having JFT placed at time of esophageal resection.

Methods:

Consecutive patients who underwent esophagectomy for cancer following nCRT between 2009 and 2016 were included. Patients who received a JFT either before nCRT (pre-nCRT) or during esophagectomy (post-nCRT) were compared. Indication for JFT placement before nCRT was in accordance with the American Society for Parenteral and Enteral Nutrition. Propensity score matching (PSM) was used to correct for differences in baseline characteristics. Primary endpoints were JFT-related complications and completion of nCRT, secondary endpoints included nutritional status, postoperative morbidity and 5-year survival.

Results:

Some 133 patients were included, of which 53 (39.8%) patients in the pre-nCRT group and 80 (60.2%) post-nCRT group. Twenty-five (18.8%) patients had a JFT-related complication, of which 3 (2.3%) needed reintervention under general anesthesia. In the pre-nCRT group 52 (98%) patients, and in the post-nCRT group 79 (99%) completed all planned cycles of nCRT ($p=1.000$). In the pre-nCRT group a significantly higher percentage patients were malnourished at diagnosis as demonstrated by greater weight loss $p<0.001$, lower body mass index $p=0.002$ and lower albumin $p=0.023$. No differences in total postoperative complications were observed: 52% (pre-nCRT group) vs. 54% (post-nCRT group); $p=0.596$. Five-year survival was 35% in the pre-nCRT group and 57% in the post-nCRT group ($p=0.033$), this statistical significant difference ceased to exist after PSM (45% (pre-nCRT) vs. 65% (post nCRT-group); $p=0.451$).

Conclusion:

JFT can support nutrition during trimodality therapy for esophageal cancer and JFT-related complications are typically minor. The postoperative outcomes of patients who were malnourished at diagnosis and received a JFT before nCRT were equivalent to the postoperative outcomes in non-malnourished patients, however JFT placement prior to nCRT does improve survival.

Disclosure: No significant relationships.



Keywords: esophagectomy, feeding jejunostomy, neoadjuvant chemoradiotherapy, esophageal cancer

P-78

TREATMENT OF PULMONARY METASTASES IN THE NETHERLANDS – DATA FROM THE DUTCH LUNG SURGERY AUDITMartijn Van Dorp¹, H. Schreurs¹, W.H. Steup²¹*Surgery, NWZ Alkmaar, Alkmaar, Netherlands,*²*Surgery, Haga Hospital, The Hague, Netherlands***Objectives:**

Throughout Europe great disparity is seen regarding the treatment of pulmonary metastases of colorectal cancer. Limited research is currently available to clearly delineate the proper criteria for local surgical treatment in the field of oligometastatic disease. However, acceptable survival can be seen following radical pulmonary metastasectomy of 35% at 5 years. Currently, most data are derived from retrospective studies and results from the randomized controlled Pulmicc trial remain to be published. To provide a thorough understanding of current practice regarding pulmonary metastasectomy in the Netherlands, we have analyzed the Dutch Lung Surgery Audit (DLSA) for all pulmonary metastasectomies performed from 2012 to 2016.

Methods:

The DLSA is a national prospective clinical database. Patients by the clinicians themselves. Participation in the DLSA is compulsory by the healthcare inspectorate. The study evaluated anonymous data of parenchymal lung resections for the treatment of pulmonary metastasis between January 2012 and December 2016. Data requirements for inclusion in the analysis were the pathological analysis of the primary tumor, type of parenchymal resection, 30-days postoperative mortality and complication rate.

Results:

One thousand, six hundred and thirty two eligible patients underwent pulmonary metastasectomy in the Netherlands. The type of parenchymal resection was in 70.3% a wedge resection. Other types of resection were a lobectomy 20.9%, anatomical segmentectomy 4.3%, bi-lobectomy 1.4% and pneumonectomy 0.7%. In 72.2% resection by means of video-assisted or robot-assisted thoracic surgery was performed, including a conversion rate of 2.5%. Primary thoracotomy or sternotomy was performed in 26.1%. The most common primary tumor was a colorectal carcinoma in 53.7%, followed by the urogenital carcinoma in 14.2% and sarcoma in 6.4%. The overall complication rate was 12.1% and the overall 30-days mortality was 0.7%.

Conclusion:

The DLSA has shown on a national platform that we can safely perform a pulmonary metastasectomy; the challenge remains not to cause more physiological harm than oncological good.

Disclosure: No significant relationships.

Keywords: pulmonary metastases, pulmonary metastasectomy, lung metastases

P-79

A CASE SERIES OF ULTRA LOW-DOSE CATHETER DIRECTED ACOUSTIC PULSE THROMBOLYSIS IN EARLY POSTOPERATIVE PATIENTS WITH PULMONARY EMBOLISM

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Objectives:

Severe pulmonary embolism (PE) in patients immediately after surgery poses a difficult challenge with regards to bleeding complications. Catheter directed acoustic pulse thrombolysis (CDT) has proven to be an effective therapy for severe PE. In this case series we present 3 cases with severe PE immediately after surgery treated by ultra low-dose CDT (uldCTD).

Methods:

In 2017 three patients (two male (60 & 61-year-old), one female 16 year old) with symptomatic PE (mean PESI: 169) early after surgery were presented to our interdisciplinary PE response team where uldCTD was decided to be applied due to the extent of PE and previous surgery in all patients. The patients were fitted with 2 EKOS® 12 cm devices in each respective pulmonary artery across the occlusive thrombi for six hours receiving 1 mg/h/catheter rt-PA. Transthoracic echograms and CT-scans were performed before and within 48 hours of therapy initiation.

Results:

All three patients survived CDT uneventful with minor bleeding receiving a total dose of 12 mg rt-PA per patient. Within the first hours of therapy significant reduction of RV/LV ratio (1.3±0.2 vs. 0.7±0.08, p: 0.043) and mean pulmonary arterial pressure (MPAP, 33.4±6.1 mmHg vs. 21.7±3.2 mmHg, p: 0.021) was observed. Notable reduction of heart rate, longitudinal peak systolic strain (RV ST) and an increase in tricuspid annular plane systolic excursion (TAPSE) were documented (see table). Follow-up CT scans revealed only minor remaining non-obstructive thrombi.

	Baseline	48 h.	p-values
Heart rate {s ⁻¹ }	125 ± 17	78 ± 11	0.103
TAPSE {mm}	14.5 ± 3.8	21.5 ± 4.0	0.146
TASV {cm/s}	7.5 ± 2.1	15.8 ± 2.3	0.071
RV/LV ratio	1.3 ± 0.2	0.7 ± 0.08	0.043
RV ST {%	-13.8 ± 3.5	-20.6 ± 2.9	0.117
RV STR {s ⁻¹ }	-1.12 ± 0.07	-1.37 ± 0.05	0.011
SPAP {mmHg}	47.3 ± 10.8	31.7 ± 11.5	0.060
MPAP {mmHg}	33.4 ± 6.1	21.7 ± 3.2	0.021
O2 sat. {%	83.6 ± 4.1	99.3 ± 1.1	0.012

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Conclusion:

In this case series, uldCTD resulted in nearly complete resolution of thrombus within 6 hours of therapy with rapid recovery of hemodynamics and no relevant bleeding complications. Thus, uldCTD appears to be a safe and reasonable option for postoperative PE and this also in thoracic surgery patients.

Disclosure: No significant relationships.

Keywords: treatment, catheter directed acoustic pulse thrombolysis, postoperative, pulmonary embolism.



P-80

PLEURAL LAVAGE WITH 40% GLUCOSE PROMOTES THE HEALING OF LUNG PARENCHYMAL AIR LEAKMohamed Salama, M. Mueller*Department of Thoracic Surgery, Otto Wagner Hospital, Vienna, Austria***Objectives:**

Pleurodesis with 50 % glucose was recently presented as a novel approach for the treatment of air leak. However, some concerns regarding the safety and the mechanism of glucose pleurodesis were reported. The current study analyzed alternatively the pleurodesis with 40% Glucose in patients suffering of lung parenchymal air leak.

Methods:

Thirty-two patients with persistent air leak were prospectively enrolled in the study. A bolus (100ml) of 40% Glucose was instilled intrapleurally through the chest tube two times daily after using of intrapleural 2% xylocaine. Chest tube was elevated above the patient level for 2 hours. This procedure was repeated until air leak cessation. Furthermore, an animal rat model was used to explore the efficacy of 40% glucose in vivo.

Results:

Repeated measures ANOVA revealed significant reduction of air flow after 24 and 72 hours ($p=0.03$ and $p=0.02$ respectively). Complete air leak cessation was observed in 30 % of patients on 2nd day and in 50% on the 3rd day. Chest tube was removed in 80 % of the patient after 3 days of the treatment. In the remaining 20%, the treatment continued for 6 days till the complete improvement of the air leak. All patients tolerated the treatment. Additional pain killer was required during the treatment in 73% of Patients. The amount of evacuated pleural fluid was slightly elevated during the treatment. No complications or recurrence were observed in patient cohort. Animal experiment revealed that 40% glucose induces wound healing in the injured tissue by stimulation of fibroblast proliferation without induction of pleural injury or inflammation.

Conclusion:

Moderate amount of 40% Glucose promotes the healing of lung parenchymal leak through the stimulation of fibroblast proliferation without initiation of additional pleural injury and could be considered as a safer conservative treatment for air leak without reasonable comorbidities.

Disclosure: No significant relationships.

Keywords: glucose, air leak, pleurodesis.

P-81

COMMUNICATING RAMI SYMPATHECTOMY: A NEW TECHNIQUE TO TREAT COMPENSATORY HYPERHIDROSIS

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Objectives:

Patients with compensatory hyperhidrosis (CH) suffer physically and mentally from this disease, which cannot be treated adequately using only conservative measures. This report details the author's experience of and new technique with endoscopic communicating rami sympathectomy for patients that have presented disabling CH.

Methods:

Since 2008 we have been performing communicating rami sympathectomy from the level of the 5th rib to 9th rib, sectioning only the communicating ramis and detaching the chain from the intercostal band. VATS were performed on all patients in ventral position to allow better vision and exposure of the thoracic sympathetic chain. A total of 221 patients, 130 (59%) males and 91 (41%) females were operated on up to December 2017, with ages varying from 19 to 65 years (M-31).

Results:

Almost all patients had CH reduced after this procedure. 179 (81%) patients reported satisfactory results with a dramatic decrease of sweating of the torso, 31 (14%) patients had a significant decrease of sweat but without reaching full satisfaction and in 11 (5%) patients no results were found. In 148 (67%), we also reported in the immediate postoperative period complaints of pain in the thoracic region more severe than endoscopic thoracic sympathectomy. No conversion, no bleeding and no serious complications were reported.

Conclusion:

Communicating rami sympathectomy from 5th rib to 9th rib has proved to be efficient and safe in reducing Compensatory Sweating in 210 (95%) patients, showing it to be a reliable and feasible technique.

Disclosure: No significant relationships.

Keywords: sympathectomy, communicant rami, compensatory hyperhidrosis

P-82

CLINICOPATHOLOGICAL CHARACTERISTICS AND SURGICAL OUTCOMES FOR THE METACHRONOUS SECOND LUNG LESIONS AFTER ANATOMICAL RESECTION FOR NON-SMALL CELL LUNG CANCER

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Objectives:

We investigated clinicopathological characteristics and surgical outcomes for the metachronous second lung lesions after anatomical resection for non-small cell lung cancer (NSCLC).

Methods:

Among 2507 surgically resected NSCLC (2008-2016), we investigated 133 (5.3%) patients with metachronous second lung lesions after anatomical resection for the primary NSCLC. Metachronous was defined as at least two years after the first operation. Based on the operative modes for the first surgery, they were classified into two groups, i.e., lobectomy or more (LOB, n=114 (4.5%)) and segmentectomy (SEG, n=19 (0.8%)).

Results:

The 3y-OS was not significantly different between the LOB and SEG group (84.6% vs. 87.2%, $p=0.117$). Neoplasms in the second lesion were 127 (95%). Cox proportional hazard model revealed that sublobar resection for the second lesion, radiological solid tumor, low pulmonary function were independently significant prognosticators for the survival ($p=0.003$, 0.047, 0.001), but operative modes for the first surgery was not associated. Furthermore, multivariable analysis showed that ipsilateral re-anatomical resection for the second lung lesion and low VC% were independently significant predictors of postoperative complications after the second surgery ($p=0.008$, 0.026). Metachronous same side lesions was found in 57 (43%), and the surgical modes was as follow; completion pneumonectomy (CP) in 19, lobectomy after segmentectomy in 3 and lobectomy/segmentectomy after lobectomy in 15 (non-CP, n=18), wedge resection after lobectomy/segmentectomy in 20. Among them, the oncological outcomes between CP and non-CP was similar regarding the prognosis (3y-OS, 77.4% vs. 87.5%, $p=0.486$), operative time ($p=0.649$) or postoperative morbidities ($p=0.944$).

Conclusion:

Operative modes for the first surgery were not associated with the survival, while sublobar resection for the second lesion was prognosticator of the survival, and ipsilateral re-anatomical resection was predictor of the morbidity. Ipsilateral re-anatomical resection to avoid CP is technically challenging but allows pulmonary reserve. Further discussion would be required for proper operative strategy of the metachronous lung lesions.

Disclosure: No significant relationships.

Keywords: metachronous lesions, prognosis, morbidity, surgical modes, lung cancer, second lung cancer

P-83

RADIOLOGICAL FINDINGS AND TUMOR INVASIVENESS OF SMALL LUNG ADENOCARCINOMA ACCORDING TO THE EIGHTH EDITION OF THE TNM CLASSIFICATION: OPTIMAL ESTIMATION OF TUMOR INVASIVENESS FROM THIN-SECTION COMPUTED TOMOGRAPHY FINDINGS

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Objectives:

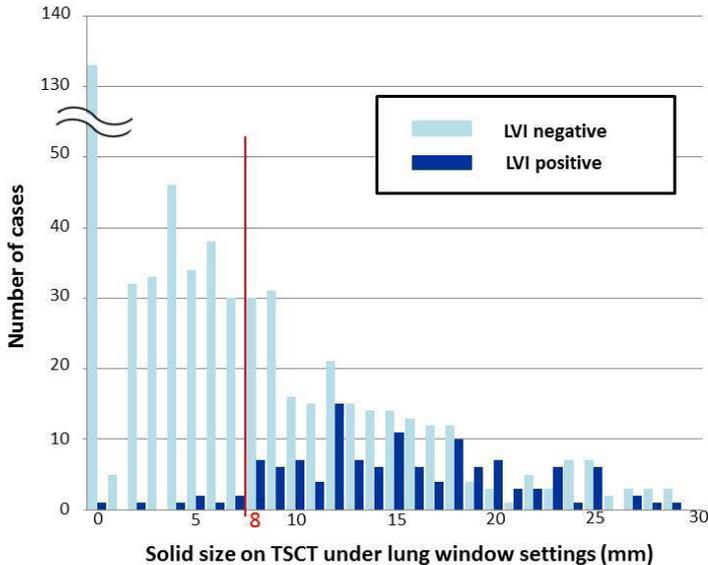
The purpose of this study was to analyze the correlation between radiological solid size on thin-section computed tomography (TSCT) and pathological invasive size of small lung adenocarcinoma and to make an optimal estimation of tumor invasiveness from TSCT findings.

Methods:

Seven hundred and twelve patients with small lung adenocarcinoma (diameter 1-3 cm) who underwent surgical resection from 2011 to 2016 at the Cancer Institute Hospital, Japan were enrolled in this retrospective study. We reevaluated radiological solid size on TSCT under both lung and mediastinal window settings and pathological invasive size. The correlations between them were evaluated by Pearson's correlation coefficient. We searched for optimal criteria of TSCT findings to detect the pathological invasive lesions (pT1a or greater in the 8th TNM classification, invasive size > 5mm) and the lesions with lymphovascular invasion (LVI) by using histogram.

Results:

Figure Radiological solid size and lymphovascular invasion (LVI)



Solid size on TSCT under both lung and mediastinal window settings showed a positive linear relationship with pathological invasive size. Solid size under lung window setting was a slightly stronger indicator than solid size under mediastinal window setting (Pearson’s correlation coefficient: 0.725 vs. 0.700). However, as many as 14% of the pathological invasive lesions were 5mm or less in solid size on TSCT under lung window setting. So, it was difficult to find an optimal cut-off of radiological solid size to detect pathological invasive lesions. Regarding LVI, 8mm of solid size on TSCT under lung window setting was an optimal cut-off to detect it (Figure). 94% of the lesions with LVI were 8mm or more in radiological solid size.

Conclusion:

Solid size on TSCT was totally related to pathological invasive size, although it was difficult to accurately detect pathological invasive lesions by TSCT findings. 8mm of solid size on TSCT was optimal cut-off to detect LVI, an important factor of tumor invasiveness.

Disclosure: No significant relationships.

Keywords: lung cancer, lymphovascular invasion, adenocarcinoma, TNM Classification, thin-section computed tomography

P-84

25 GAUGE VERSUS 22 GAUGE NEEDLES IN COMPLETE ENDOSONOGRAPHIC NODAL RESTAGING OF NON-SMALL CELL LUNG CANCER – A RANDOMIZED TRIAL

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Objectives:

To compare the diagnostic yield of the complete endosonographic nodal restaging (rCUS-b-NA) with use of 25G vs 22G needles of the NSCLC patients.

Methods:

A single center randomized trial was performed. A group of consecutive NSCLC patients with N2 disease confirmed by CUS-b-NA (cIIIA-B) underwent induction chemotherapy. Then rCUS-b-NA with use of 25G or 22G needles was performed randomly. All patients with negative rCUS-b-NA for N2 disease underwent TEMPLA and if negative – lung resection with SLND.

Results:

Fifty three patients underwent rCUS-b-NA and in two groups: gr. 25G – 27 and gr. 22G – 26. Four patients were excluded because of progressive disease confirmed by endosonography. In 49 patients 120 lymph nodes were biopsied. The rCUS-b-NA revealed metastatic lymph node involvement in 11/26 patients (42.3%) in gr. 25G and in 8/23 patients (34.8%) in gr. 22G. In 30 patients with negative rCUS-b-NA, after TEMPLA metastatic mediastinal nodes were found in gr. 25G – 1(6.7%) patient and in gr. 22G – 2 (13.3%) patients. After negative TEMPLA five patients were excluded. In 22 patients who underwent lung resection and SLND only in 1 patient single mediastinal N2 nodes were found. N1 metastases were confirmed by SLND in: gr. 25G – 1(9.1%) and in gr. 22G – 3 patients. The FN results of biopsies were obtained in the vast majority only in single nodes. A diagnostic sensitivity, accuracy, and NPV of the rCUS-b-NA for all N1/N2/N3 nodes in gr. 25G were 78.6%, 88.5%, 80.0% and in gr. 22G were 61.5%, 78.3%, 66.7%, respectively. A diagnostic yield of rCUS-b-NA in gr. 25G was higher than for gr. 22G, but not significantly (P=0.34). No complications of rCUS-b-NA in both groups were observed.

Conclusion:

rCUS-b-NA performed by 25G needles is as effective and safe technique as by 22G for mediastinal and better for N1 restaging in NSCLC patients.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, rCUS-b-NA, restaging, 25G needles

P-85

ON THE RELATIONSHIP BETWEEN INTESTINAL/DIFFUSE HISTOLOGY SUB-TYPES, THE PRESENCE/ABSENCE OF INTESTINAL METAPLASIA IN THE ESOPHAGUS AND STOMACH AND SURVIVAL, GASTRIC GREATER CURVATURE LYMPHATIC METASTASES, IN SIEWERT II ESOPHAGEAL ADENOCARCINOMA

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Objectives:

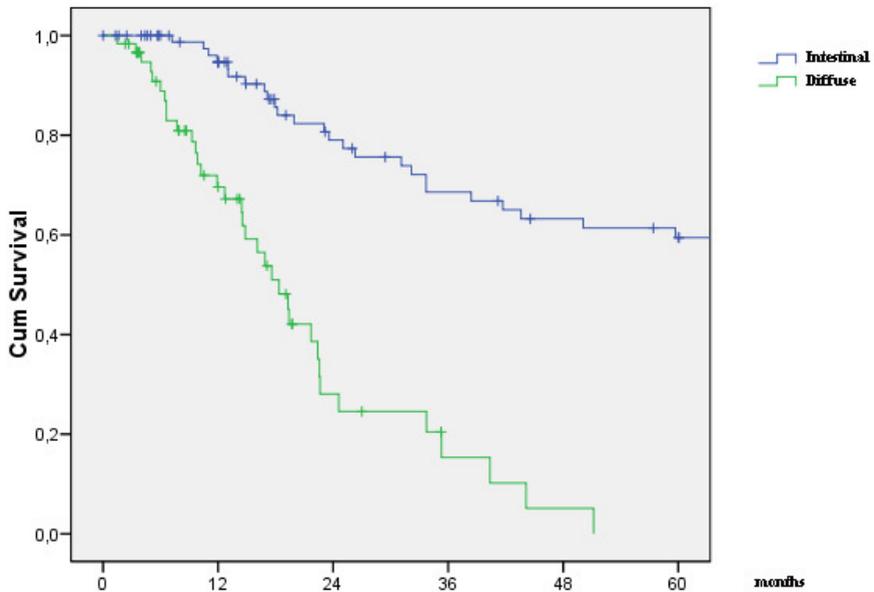
In Siewert type II adenocarcinoma we reconsidered the relationship between adenocarcinoma sub types and survival, the histologic/biologic patterns related to the presence/absence of gastric greater curvature metastases.

Methods:

One hundred and fifty four patients who underwent primary transthoracic esophageal resection, total gastrectomy, thoracic-abdominal lymphadenectomy according to a research prospective protocol were considered. Cases were categorized in intestinal and diffuse sub types, in Barrett's-like, cardiopyloric-like, and gastric-like adenocarcinoma according to the presence/absence of intestinal metaplasia in the esophagus and stomach, to assess gastric greater curvature metastases.

Results:

Pathological stage (7th TNM ed) was IA-IIA in 11%; IIB in 15.6%; IIIA-IV in 73.4%. Cases were: 59% intestinal-type, 41% diffuse-type; Barrett's-type 1.3%, cardiopyloric-type 65%, gastric-type 33.7%. Greater gastric curvature lymph node metastases were detected in 22%, in stage IIIa-IV only, intestinal-type 47%; diffuse-type 53%. The number of metastatic lymph nodes at station 4 was higher in cardiopyloric-like than in gastric-like type ($p < .0001$). Overall 5-year cancer-specific survival was 40.5%, 59.4% for intestinal type, 0% for diffuse type. 5-year cancer-specific survival in the absence/presence of greater gastric curvature metastases was respectively 48.7% and 14.9%, for intestinal type it was 67.4% and 27.9%. Histological subtype was an independent prognostic factor.

**Conclusion:**

The radical difference of five year survival between intestinal and diffuse types of Siewert type II adenocarcinoma after primary surgery, the frequency and biologic patterns of station 4 nodal metastases do require further investigation to reassess indications for neo adjuvant therapy, indication for total gastrectomy is questionable.

Disclosure: No significant relationships.

Keywords: adenocarcinoma of the esophagus, esophageal surgery, esophageal cancer

P-86

THE ANALYSIS OF THE SAFETY OF A MODIFIED LEFT RECURRENT LARYNGEAL LYMPH NODES DISSECTION IN THORACOSCOPIC ESOPHAGEAL CARCINOMA SURGERY

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Objectives:

To explore the thoroughness and safety of a modified left recurrent laryngeal lymph nodes dissection in thoracoscopic esophageal carcinoma surgery.

Methods:

Retrospectively analyzed the clinical data of 136 patients with the left recurrent laryngeal lymph nodes dissection from October 2015 to October 2017 in the First Hospital Affiliated to Xiamen University. 67 cases were divided to the traditional dissection group (double lumen endotracheal intubation, 90 ° lateral position) and 69 cases were classified to the modified dissection group (single cavity tracheal intubation, thoracic CO₂ positive pressure ventilation, lateral prone position and esophageal suspension technology). Observed and compared the left laryngeal recurrent nerve lymph nodes cleaning and time, intraoperative complications including thoracic duct injury, tracheal injury, hoarseness and pneumonia.

Results:

The cleaning time of the modified dissection group (23 + 8 min) was significantly less than that of the traditional cleaning group (32 plus or minus 5min) (P<0.01). 5 patients occurred left laryngeal nerve injury in the modified dissection group, with statistically significance (P<0.01), less than traditional dissection group of 12 patients. The modified dissection method improves the exposure of intraoperative field, the probability of thoracic duct and tracheal injury (1/69, 0/69) were lower than the traditional group (2/67, 1/67), but the difference was not statistically significant (P>0.05). Moreover, there was no significant difference in lymph nodes metastasis and complications incidence rate (P>0.05).

Conclusion:

The modified dissection method, including single cavity tracheal intubation, thoracic CO₂ positive pressure ventilation, lateral prone position and using esophageal suspension technology, can achieve good operation field exposure, the left recurrent laryngeal lymph nodes “the whole block” cleaning, and the greatest degree protection of laryngeal recurrent nerve, thoracic duct, trachea and other organs damage. It is worthy of clinical popularization and application.

Disclosure: No significant relationships.

Keywords: left recurrent laryngeal lymph nodes, esophageal carcinoma, esophageal suspension technology, thoracic CO₂ positive pressure ventilation

P-87

COULD CHEST ULTRASOUND (CUS) REPLACE CHEST X-RAY (CXR) FOR EVALUATING POST-LOBECTOMY LUNG EXPANSION AND GUIDE CHEST DRAINAGE REMOVAL?

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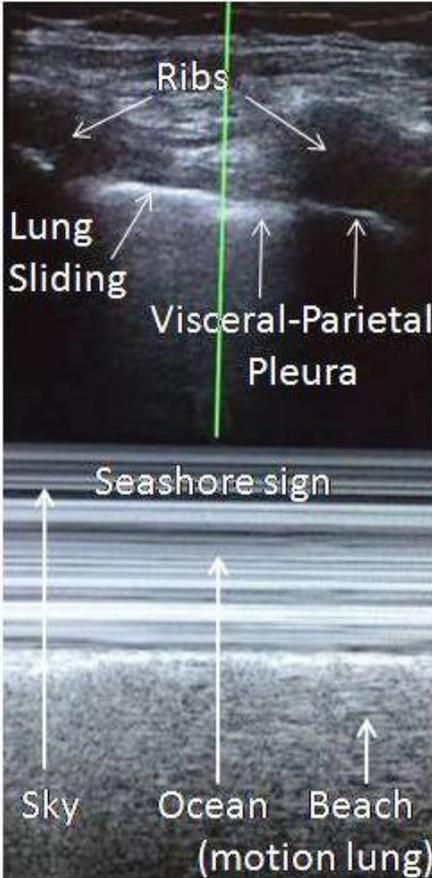
Objectives:

Chest US (CUS) is become a reliable technique in the evaluation of different thoracic diseases. Chest US (CUS) is widely used to detect pneumothorax in ICU patients, but there are few data regarding its use to follow-up lung expansion after lung resection. We aimed to evaluate the accuracy of CUS over traditional CXR to confirm lung expansion after lobectomy and guide the chest drainage removal.

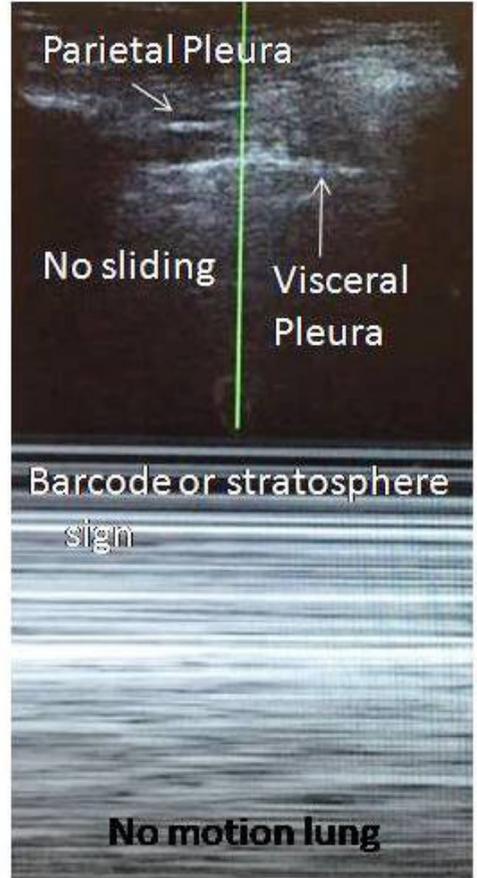
Methods:

It was an observational single-center study including all consecutive patients undergoing lobectomy where post-operative lung expansion were daily assessed by CUS and CXR until the chest drainage was removed. US diagnosis of Pneumothorax relied on four main signs as follows: (i) abolition of lung sliding; (ii) the A-sign; (iii) the lung point; and (iv) lung pulse. The gold standard procedure for diagnosis of pneumothorax was Computed Tomography (CT) scan. Sensitivity, specificity, PPV, NPV of CUS and CXR were calculated and statistically compared (Mc Nemar test).

Lung Expansion



Pneumothorax



Results:

Fifty-three patients were included in the study and 245 pairs of examination (CUS and CXR) were performed. Seventy-three/245 (30%) patients presented pneumothorax due to lack of complete lung expansion during post-operative follow-up. Of these, 63/73 (87%) were detected by CXR and CUS; 9/73 (12%) were detected by US but missed by CXR; and 1/73 (1%) was missed by both methods and detected only by CT scan. The sensitivity, specificity, PPV, NPV of CUS and CXR were, respectively: 86% vs. 98% ($p=0.002$); 100% vs. 100% ($p=1.0$); 100% vs. 100% ($p=1.0$); 94% vs. 75% ($p=0.231$); and 94% vs. 99% ($p=0.7$).

Conclusion:

CUS is a valuable tool for checking post-lobectomy lung expansion. Its routine use could reduce the need for CXR and thus decrease the health cost and radiation exposure. Prospective study should corroborate our impressions.

Disclosure: No significant relationships.

Keywords: lung expansion, residual pneumothorax, chest ultrasound



P-88

SPHERICITY RATIO OF LYMPH NODES EVALUATED USING THREE DIMENSIONAL (3D) COMPUTED TOMOGRAPHY (CT) PREDICTS LYMPH NODE METASTASIS IN LUNG CANCER PATIENTS

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Objectives:

Short diameter > 1 cm is widely known as a method for assessing the presence of lymph node metastasis in lung cancer, but it is not accurate enough. Empirically it is said that the shape of lymph nodes with metastasis transform to be spherical, which is subjective. In this study, we defined the sphericity ratio using 3D-CT. Sphericity ratio as 1 represents real sphere, and low index means oval shape. Lymph nodes with around 1 sphericity ratio was considered to be metastatic. The morphology of the lymph nodes was evaluated using the sphericity ratio and compared with pathological metastasis.

Methods:

Total 61 subjects were included. 31 patients with pN2 metastasis from August 2012 to November 2016 in our hospital and 30 patients without metastatic lymph node during the same period were included. 1 mm slice enhanced CT which was performed within 2 months before the operation. In pN2 cases, in addition to metastatic lymph nodes, # 7 was examined. In pN0 cases, # 2R, # 4R, and #7 were measured. Sphericity ratio = [surface area] / [4π × (major axis / 2)²] was applied to predict lymph node metastasis.

Results:

When the short diameter > 1 cm was set as the cut-off value, the conventional method, the sensitivity was 45.4% and the specificity was 64.0%. The average spherical ratio of pN2 cases was 1.24, which was significantly higher than the average spherical ratio of 0.77 in pN0 cases. When the cut-off value of the sphericity ratio was 0.82, the sensitivity was 78.3% and the specificity was 82.9%.

Conclusion:

Sphericity ratio of lymph nodes evaluated using 3D-CT correlates with pathological lymph node metastasis. Sphericity ratio could be useful to predict lymph node metastasis in lung cancer patients.

Disclosure: No significant relationships.

Keywords: sphericity ratio, Lymph node metastasis, 3D-CT, lung cancer

P-89

VIDEO-ASSISTED THORACOSCOPE 3D AND 2D MODE COMPARATIVE ANALYSIS FOR ESOPHAGEAL CHEST SURGERYJie Jiang, X. Yu, G. Geng, H. Liu, Y. Mi, N. Li, L. Wang, P. Yin, J. Ma*The Thoracic Surgery Department, The First Hospital affiliated to Xiamen University, Xiamen, China***Objectives:**

To study the advantages and disadvantages of 3D and 2D thoracoscope in the thoracic surgery of esophageal carcinoma.

Methods:

Retrospectively analyze esophageal cancer cases between July 2013 and July 2017 of the first affiliated hospital to Xiamen University, depending on the different mode of Video-Assisted Thoracoscopic, which can be divided into 3D-VATS group 353 cases (observation group) and 2D-VATS group 351 cases (control group). Comparing the difference in operation time, intraoperative bleeding, lymph node transmission, volume of the drain by the first 24 hours, total volume of the drain, chest tube time and postoperative complications.

Results:

All the 704 patients with esophageal cancer were performed under the video-assisted thoracoscope. In terms of surgery time, 3D-VATS group (51.4±13.3min) was shorter than 2D-VATS group (65.7±9.1min), with statistical significance ($t=-9.751$, $P=0.013$); on blood loss, 3D-VATS group (34.1±10.5ml) was less than 2D-VATS group (50.2±9.4ml) with statistical significance ($t=-9.274$, $P=0.009$); about lymph nodes transmission, 3D-VATS group (16.8±3.2) was more than 2D-VATS group (13.1±3.7), with statistical significance ($t=5.213$, $P=0.007$); in volume of the drain by the first 24 hours, 3D-VATS group (171.2.15±20.2ml) was less slightly than 2D-VATS group (180.3±35.2ml), no statistical difference ($t=-1.347$, $P=0.281$); about total volume of the drain, 3D-VATS group (530.2±53.4ml) was less slightly than 2D-VATS group (553.8±57.5ml), no statistical difference ($t=-1.911$, $P=0.093$); on chest tube time, 3D-VATS group (4.2±0.7d) as less slightly than 2D-VATS group (4.9±1.1d), no statistical difference ($t=-1.806$, $P=0.069$); Postoperative complications in two groups including the incidence of arrhythmia, pulmonary infection, anastomotic leakage and recurrent laryngeal nerve injury has no obvious difference ($P>0.05$).

Conclusion:

Video-assisted thoracoscopic surgery of esophagectomy under 3D-mode has certain advantages in operation time, intraoperative bleeding and lymph nodes transmission over 2D-mode. While in the item of volume of the drain by 24 hours, total volume of the drain, chest tube time and postoperative complications, they have no obvious difference.

Disclosure: No significant relationships.

Keywords: esophageal carcinoma, video-assisted thoracoscopic surgery, 3D thoracoscope, 2D thoracoscope.

P-90

ADJUVANT CHEMOTHERAPY DOES NOT IMPROVE PROGNOSIS IN RESECTED PATHOLOGICAL N1-N2 NON-SMALL CELL LUNG CANCER PATIENTS WITH EPIDERMAL GROWTH FACTOR RECEPTOR MUTATIONS

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Objectives:

The results of large-scale trials were consistent in that adjuvant chemotherapy improved survival in resected pathological N1-N2 non-small cell lung cancer patients (NSCLC). However, the efficacy of it for them with epidermal growth factor receptor (EGFR) mutations was controversial.

Methods:

A retrospective study was conducted on consecutive 353 patients with resected pathological N1-N2 NSCLC between 2010 and 2016. Mutant EGFR (mEGFR) were observed in 76 patients (21.5%). Adjuvant chemotherapy (AC) was performed in 151 patients (42.8%). In multivariate analysis, we investigated prognostic factors in patients with wild-type EGFR (wEGFR) and with mEGFR. The following predictors related to prognosis were analyzed: AC or surgery alone (SA), gender, age, tumor size, adenocarcinoma (Ad.) or others, lymphatic invasion (Ly), vascular invasion (V) and pN1 or pN2. We compared overall survival (OS) between AC and surgery alone (SA) group in patients with wEGFR and mEGFR, using propensity-score matched analysis.

Results:

A multivariate analysis revealed there were no significant prognostic factors in patients with mEGFR, although in patients with wEGFR, prognostic factors were SA (vs. AC) (HR; 2.865, p-value; <0.0001), gender (HR; 1.757, p-value; 0.019), tumor size (HR; 1.015, p-value; 0.001), Ly (HR; 0.640, p-value; 0.045) and pN1 (vs. pN2)(HR; 0.533, p-value; 0.004). And the differences in OS between AC and SA groups with wEGFR were significant (82.1%(2y)/61.7%(5y) vs. 46.9%(2y)/28.8%(5y), p-value<0.0001), but OS in mEGFR patients were similar between AC and SA groups (94.4%(2y)/70.6%(5y) vs. 88.4%(2y)/59.7%(5y), p-value=0.189). OS between AC and SA groups with wEGFR were significant in 95 matched pairs (p-value<0.0001), but OS in mEGFR patients were similar between AC and SA groups in 18 matched pairs (p-value=0.785).

Conclusion:

Adjuvant chemotherapy improved overall survival of patients not with mEGFR, but with wEGFR. So, adjuvant chemotherapy may not be necessary in resected pN1-N2 NSCLC patients with mEGFR because prognosis of these patients could depend on EGFR-TKI after recurrences.

Disclosure: No significant relationships.

Keywords: adjuvant chemotherapy, lung cancer, epidermal growth factor receptor mutation

P-91

COMPARISON OF SHORT-TERM OUTCOMES BETWEEN ROBOT-ASSISTED MINIMALLY INVASIVE ESOPHAGECTOMY AND VIDEO-ASSISTED MINIMALLY INVASIVE ESOPHAGECTOMY IN TREATING MIDDLE THORACIC ESOPHAGEAL CANCERYi-Dan Lin*Department of Thoracic Surgery, West China Hospital, Sichuan University, Chengdu, China***Objectives:**

Whether robot-assisted minimally invasive esophagectomy (RAMIE) has any advantages over video-assisted minimally invasive esophagectomy (VAMIE) remains controversial. In this study, we tried to compare the short-term outcomes of RAMIE with that of VAMIE in treating middle thoracic esophageal cancer from a single medical center.

Methods:

Consecutive patients undergoing RAMIE or VAMIE for middle thoracic esophageal cancer from April 2016 to April 2017 were prospectively included for analysis. Baseline data and pathological findings as well as short-term outcomes of these two group (RAMIE group and VAMIE group) patients were collected and compared. A total of 84 patients (RAMIE group: 42 patients, VAMIE group: 42 patients) were included for analysis.

Results:

The baseline characteristics between the two groups were comparable. RAMIE yielded significantly larger numbers of total dissected lymph nodes (21.9 and 17.8, respectively; $P=0.042$) and right recurrent laryngeal nerve (RLN) lymph nodes (2.1 and 1.2, respectively; $P=0.033$) as well as abdominal lymph nodes (10.8 and 7.7, respectively; $P=0.041$) than VAMIE. Even though RAMIE may consume more overall operation time, it could significant decrease total blood loss compared to VAMIE (97 and 161 ml, respectively; $P=0.015$). Postoperatively, no difference of the risk of major complications or hospital stay was observed between the two groups.

Conclusion:

RAMIE had significant advantage of lymphadenectomy especially for dissecting RLN lymph nodes over VAMIE with comparable rate of postoperative complications. Further randomized controlled trials are badly needed to confirm and update our conclusions.

Disclosure: No significant relationships.

Keywords: robot-assisted minimally invasive esophagectomy, esophageal cancer, short-term outcomes

P-92

POSTPNEUMONECTOMY BRONCHOPLEURAL FISTULA: ANALYSIS OF RISK FACTORS AND ROLE OF BRONCHIAL STUMP COVERAGE

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Objectives:

Bronchopleural fistula (BPF) is a potentially fatal complication occurring after pneumonectomy. The objective of this study is to analyse BPF incidence and risk factors in a large cohort of patients.

Methods:

All patients who underwent pneumonectomy at our Institution from January 1990 to March 2016 were reviewed. Relevant preoperative, intraoperative and post-operative risk factors for BPF development were analysed by univariate and multivariate analyses.

Results:

There were 557 patients (448 males and 109 females). Indication for pneumonectomy was primary malignancy in 536 cases, metastatic disease in 10 and benign aetiology in 11 cases. BPF developed in 23 patients (4,1%). Univariate analysis demonstrated that operative side ($p = 0.002$), residual tumor at the bronchial stump ($p = 0.016$), bronchial stump coverage ($p = 0.033$) and completion pneumonectomy ($p = 0.049$), were factors significantly associated to development of BPF, while need for postoperative invasive/non-invasive ventilation ($p = 0.059$), gender ($p = 0.065$), and inactive tuberculous disease ($p = 0.084$) were marginally significant. In the multiple logistic regression model, independent risk factors for BPF were: no coverage of the bronchial stump, right side, residual tumor at the bronchial stump, inactive tuberculous disease, need for postoperative invasive/non-invasive ventilation and male gender. Before and after year 2000, the incidence of BPF changed significantly from 9.5% to 2.2% respectively ($p = 0.0004$). Factors which changed over the latter period were the proportion of patients receiving bronchial stump coverage (from 43.7% to 86.1%, $p < 0.0001$), of females (from 12.8% to 22.0%, $p = 0.016$) and of right pneumonectomies (from 35.8% to 44.9%, $p = 0.065$).

Factors significantly associated with incidence of postoperative BPF at univariate analysis			
FACTOR	BPF (%)	No BPF (%)	p VALUE
Operative side - Left - Right	6 (1.9) 17 (7.2)	314 (98.1) 219 (92.8)	0.002
Residual tumor at bronchial stump - Negative - Positive	19 (3.6) 4 (16.0)	513 (96.4) 21 (84.0)	0.016
Bronchial stump coverage - Yes - No	11 (2.8) 12 (7.2)	379 (97.2) 155 (92.8)	0.033
Completion pneumonectomy - Yes - No	5 (9.8) 18 (3.6)	46 (90.2) 488 (96.4)	0.049
Postop. ventilation - Yes - No	4 (10.8) 19 (3.7)	33 (89.2) 501 (96.3)	0.059
Gender - Male - Female	22 (4.9) 1 (0.9)	426 (95.1) 108 (99.1)	0.065
Inactive tuberculous disease - Yes - No	2 (16.6) 21 (3.9)	10 (83.4) 524 (96.1)	0.084

Conclusion:

Several known risk factors were associated with the development of BPF. The introduction of systematic bronchial stump coverage seems to be an effective preventive measure, associated with a significant reduction in the incidence of postpneumonectomy BPF.

Disclosure: No significant relationships.

Keywords: pneumonectomy, bronchopleural fistula, bronchial stump coverage, risk factors



P-93

A NOVEL METHOD OF QUANTITATIVELY DEFINING THE LOCATION OF CT1 NON-SMALL CELL LUNG CANCER AND ITS CLINICAL SIGNIFICANCE

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Objectives:

To develop a novel method for quantitatively defining the location of cT1 non-small cell lung cancer (NSCLC) and to validate its clinical significance.

Methods:

Two-dimensional chest computed tomography images were translated into 3-dimensional structure by our novel method, and the distance between a cT1 lung cancer and the hilum was calculated using Pythagorean theorem. A cohort of NSCLC patients undergoing lobectomy or segmentectomy with systematic lymphadenectomy or systematic lymph node(LN) sampling was retrospectively analyzed. By comparing two groups according to the status of pathological LN metastasis, risk factors concerning age, gender, history of malignant tumors, smoking history, lobe specific tumor location, tumor size, tumor location (defined by the tumor's distance to the hilum), enlargement of LNs on CT scans, pathological type were statistically analyzed.

Results:

A total of 405 patients were included. There were 170 males and 235 females, mean age was 57.64 ± 10.17 years. LN positive group involved 68 patients and LN negative group involved 337 patients. Univariate analysis showed that gender ($P=0.000$), tumor size($P=0.000$), histology type($P=0.001$), differentiation ($P=0.000$), tumor location ($4.62 \pm 2.08\text{cm}$ VS $5.60 \pm 1.88\text{cm}$, $P=0.000$), visceral pleural invasion ($P=0.000$), lymphatic vessel invasion ($P=0.000$), and enlargement of LNs ($P=0.001$) were risk factors associated with LN metastasis. Multivariable analysis demonstrated that gender ($P=0.029$), tumor location ($P=0.021$), differentiation ($P=0.000$), history of tumor ($P=0.045$), lymphatic vessel invasion ($P=0.007$) were independent predictors of LN metastasis.

Conclusion:

Our novel method was proved to be feasible. The measured distance between a tumor and the hilum was found to be an independent risk factor of LN metastasis for NSCLC $\leq 3\text{cm}$.)

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, quantitatively defining the location, clinical significance

P-94

SINGLE VS DOUBLE LUNG TRANSPLANTATION FOR EMPHYSEMA IN THE LUNG ALLOCATION SCORE ERA: A SINGLE CENTER EXPERIENCE

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Objectives:

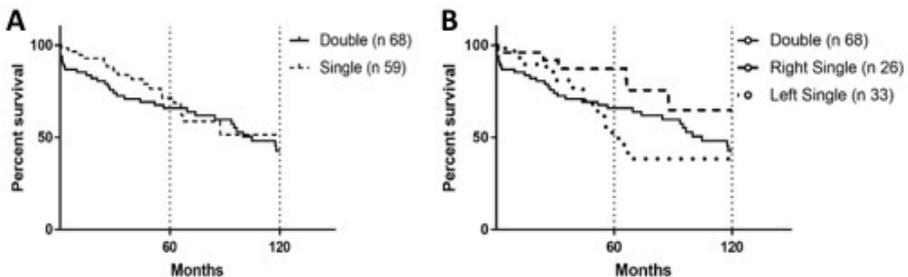
Single (S) and double (D) lung transplantation (lung-Tx) are accepted treatment for end-stage emphysema. However, literature has revealed conflicting long-term outcomes of S versus D lung-Tx in emphysema. We investigated our long-term results after the introduction of the Lung Allocation Score (LAS) and explored differences among D, left single (LS) and right single (RS) lung-Tx recipients.

Methods:

Retrospective analysis of 127 patients with emphysema who underwent lung-Tx after LAS inception: 68 received D, 59 S (26 RS and 33 LS). Survival at 5 and 10 years, chronic lung allograft dysfunction (CLAD) development, and broncho-alveolar infection rates were assessed. Non-adjusted Kaplan-Meier analysis and Mann Whitney test were performed.

Results:

No survival differences at 5 and 10 years were found in S vs D ($p=0.59$ and $p=0.56$ respectively) (Figure-A). The sub-analysis of RS and LS cohorts showed a greater survival for RS recipients both at 5 and 10 years ($p=0.03$ and $p=0.02$, respectively) (Figure-B). No significant differences were found between either S lung-Tx procedure versus D. Age cutoff analysis ($>$ or $<$ 60yrs) showed comparisons reached significance only for pts $>$ 60yrs. No differences were found for freedom from CLAD between RS and LS. LS lung-Tx had a greater broncho-alveolar bacterial/fungal infection rate/year (median 1.81, IQR 0.56-3.48) compared to RS (median 0.51, IQR 0.26-1.17), ($p=0.01$).





Conclusion:

Our experience following LAS inception showed that RS lung-Tx for end stage emphysema had better long-term outcomes than LS: greater 5 and 10-year survival along with lower airway infection rate. We speculate RS lung-Tx have lower infection rate being less likely compressed from contralateral native lung hyperinflation. These observations, if confirmed in a larger cohort may support the allocation of single as opposed to double lung-Tx in emphysema recipients for better utilization of scarce lung donor organs.

Disclosure: No significant relationships.

Keywords: lung transplantation, outcomes, emphysema

P-95

OUTPATIENT CONTINUOUS PARAVERTEBRAL NERVE BLOCK FOR POST-OPERATIVE PAIN MANAGEMENT FOLLOWING THORACIC SURGERY IN A ENHANCED RECOVERY PROGRAM: A COMPARATIVE STUDY.

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Objectives:

The inappropriate management of the post-operative pain after thoracic surgery may cause respiratory disorders and severe complications and the long term alteration of the quality of life. In a previous study, we have identified high risk patients for acute and chronic post-operative pain. The goal of this study was to evaluate the influence of continuous paravertebral nerve block (CPNB) on pain and drug consumption continuing after hospital discharge in an enhanced recovery program.

Methods:

Between January 2016 and June 2017, we proposed to high risk patients the inclusion in the study. Randomization was done using a sealed envelope technique Patients were divided into two groups regarding the pain management with or without cpnb. In the CPNB + group, patients had a continuous analgesia via T5 paravertebral catheter with infusion of ropivacaine 0.2% for 8 days with outpatient management after discharge. In the CPNB – group, patients had continuous analgesia via T5 paravertebral block in cases of ambulatory surgery or via catheter with infusion of ropivacaine 0.2% only during hospital stay. Visual analog scale (VAS) scores at post-operative day three, day eight, and day 30 were recorded

Results:

Twenty five patients accepted the inclusion in the study, 12 in the CPNB + (mean age 50.8, 8 male) and 13 in the CPNB- (mean age 51.2, 9 male). There were 14 outpatient surgeries. The types of surgery performed in group CPNB+ and CPNB- were wedge resection (four cases and five cases, respectively), segmentectomy (three cases in each group), lobectomy (two cases, in each group), thymectomy (two cases in each group) and blebs resection (one case in each group). VAS score differs significantly only at day 8 (group CPNB +: 1.51 +/- 1.5; group CPNB -: 3.2 +/- 2.2; p=0.003).

Conclusion:

Outpatient CPNB can be beneficial for post-operative pain control as part of multimodal analgesia strategy after early discharge.

Disclosure: No significant relationships.

Keywords: outpatient surgery, paravertebral catheter, pain control



P-96

ARE OPEN BIOPSY OR PERCUTANEOUS BIOPSY A RISK FACTOR OF THE PLEURAL RECURRENCE AFTER SURGERY FOR NON-SMALL CELL LUNG CANCER?

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Objectives:

Several reports have reported that the preoperative CT-guided needle biopsy (PCTGNB) increases the risk of postoperative pleural recurrence (PR). However, it is still unclear whether the intraoperative fine-needle aspiration biopsy (IFNAB) is a risk factor of postoperative PR. The aim of this study is to clarify the relationship of percutaneous or open biopsy and PR after surgery.

Methods:

From 2008 to 2017, 1333 patients with primary lung cancer underwent curative lung resection at Chiba University Hospital. Among them, incomplete resection, small cell lung cancer and non-synchronous multiple primaries were excluded, and 1047 patients were divided into two groups; those who were diagnosed plural dissemination or malignant effusion ipsilateral to the operated side as the first recurrent site (PR group) and the others (control group). The risk factors associated with postoperative PR were examined by univariate and multivariate analyses.

Results:

The recurrence was occurred in 191 patients (18.2%), and 25 patients were in PR group (17 malignant effusion, 10 dissemination). Pathological T factor (2-4), N factor (1-2), p1 factor (≥ 1), ly/v factor (≥ 1) and the frequency of the PCTGNB in PR group were significantly higher than control group (each $p < 0.01$). The frequency of IFNAB as well as age, sex, the presence of chronic obstructive pulmonary disease or interstitial pneumonia, type of operative methods, histological types did not show significant difference between two groups by univariate analysis. A multivariate analysis identified pathological N factor and the frequency of the PCTGNB as independent risk factors for PR. Each odds ratio was 7.26 $p < 0.01$ and 11.7 $p < 0.01$, respectively.

Table: Univariate and Multivariate analysis of Pleural Recurrence

	Univariate Analysis		Multivariate Analysis	
	Odds Ratio (95.0%CI)	p value	Odds Ratio (95.0%CI)	p value
Age (\geq 70yrs.)	1.68 (0.75-3.78)	0.20	NA	NA
Male	0.52 (0.24-1.14)	0.10	NA	NA
Right side	0.53 (0.24-1.18)	0.11	NA	NA
Interstitial pneumonia	1.44 (0.42-4.93)	0.55	NA	NA
COPD	0.55 (0.16-1.87)	0.33	NA	NA
Operative method (partial resection & segmentectomy)	1.17 (0.46-2.97)	0.74	NA	NA
Adenocarcinoma	1.22 (0.48-3.08)	0.68	NA	NA
pT2 \leq	5.23 (1.95-14.0)	<0.01	2.53 (0.75- 8.49)	0.13
pN1 \leq	8.15 (3.44-19.3)	<0.01	7.26 (2.67-19.7)	<0.01
pP11 \leq	4.38 (1.96-9.79)	<0.01	1.65 (0.60-4.56)	0.21
Lymphatic vessel invasion	3.24 (1.42-7.40)	<0.01	0.91 (0.33-2.52)	0.85
PCTGNB	8.56 (3.00-24.4)	<0.01	11.7 (3.55-38.4)	<0.01
IFNAB	0.46 (0.11-1.96)	0.28	NA	NA

COPD: Chronic obstructive pulmonary disease, PCTGNB: Postoperative computed tomography guided needle biopsy, IFNAB: Intraoperative fine needle aspiration biopsy, N.A.: not applicable

Conclusion:

The IFNAB was not the risk factor of postoperative PR, but the PCTGNB should be avoided as much as possible.

Disclosure: No significant relationships.

Keywords: pleural recurrence, intraoperative fine-needle aspiration biopsy, CT-guided needle biopsy

P-97

PROGRAMMED DEATH LIGAND 1 (PD-L1) EXPRESSION IN CIRCULATING TUMOR CELLS IN EARLY STAGES OF NON-SMALL CELL LUNG CANCER

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Objectives:

The new research lines in lung cancer are strongly focused on immune therapies, where the programmed death ligand (PD-L1) plays an important role. The main objective of this study consists in detecting circulating tumor cells (CTCs) in peripheral blood expressing PD-L1 in early stages of Non Small Cell Lung Cancer (NSCLC) treated by radical surgery. Secondly, our study examines the association between the expression of PD-L1 in CTCs and clinical and pathological characteristics.

Methods:

This is a retrospective study based on a prospective data base of 28 patients who received radical surgery for NSCLC in early stages (I, II and III) in which CTCs were detected in peripheral blood before surgery. In those patients PD-L1 expression in CTCs was analyzed, as well as its possible correlation to other variables. The CTCs were isolated using immunomagnetic techniques.

Results:

PD-L1 expression was detected in 10 patients (35.71%) with a median of 4.9 CTCs PD-L1 per 10 ml of blood. The analysis between CTCs PD-L1 positive and the variables included in the study shows a higher frequency of PD-L1 expression in advanced stages (II-III). 70% of PD-L1 positive patients experienced recurrent disease during a median followup period of 48 months, being in all cases a distant recurrence. The mean disease-free survival (DFS) in patients with CTCs PD-L1 positive was 24.9 months compared to 35.1 months in those with CTCs PD-L1 negative ($p=0.17$).

Conclusion:

It is possible to detect CTCs expressing PD-L1 in early stages of NSCLC although the frequency is probably higher in advanced stages. - A broader study is necessary for further validation of prognostic significance of PD-L1 expression in CTCs in early stages of NSCLC.

Disclosure: No significant relationships.

Keywords: programmed death ligand 1 (PD-L1), non-small cell lung cancer, circulating tumor cells

P-98

THYMECTOMY VIA LAPAROSCOPIC TRANS-DIAPHRAGMATIC APPROACHRyan Knoper, R. Andrade, M. Rao*Thoracic and Foregut Surgery, University of Minnesota, Minneapolis, MN, United States of America***Objectives:**

We describe our technique for laparoscopic trans-diaphragmatic (LTD) thymectomy without intercostal incisions and focus on technique and safety. The eventual goal of LTD thymectomy will be to improve postoperative pain management and prevent intercostal neuralgia.

Methods:

We place one supraumbilical port (#1), one intraabdominal subxyphoid port (#2), and two subcostal ports (#3, 4). We make two small openings anteriorly in the hemidiaphragm and advance the subcostal ports trans-diaphragmatically into the chest (figure). We place the scope through a subcostal port for thoroscopic view and advance the subxyphoid port into the chest. We place 1 additional subxyphoid (#5) port 3cm left-lateral to the midline. The intrathoracic portion of the operation resembles VATS. At the end, we place a chest tube through the subxyphoid port, pull the ports back into the abdomen and close the diaphragmatic openings laparoscopically.

Results:

We performed LTD thymectomy in 11 patients with indications for surgery being myasthenia gravis (7), thymoma (3) and parathyroid adenoma (1). The median BMI was 30 (19.5 – 36.7). The median operative time was 188 minutes (157-365) and estimated blood loss was 30 mL (10-300). One patient had a left phrenic nerve injury requiring laparoscopic diaphragm plication during the same anesthetic. Post-operative complications occurred in 3 patients, hemothorax requiring left VATS with cauterization of a pericardial fat vessel (1); respiratory failure (1), and atrial fibrillation (1). Our median length of stay was 3 days (2-8). Operative mortality was 0. Four patients had follow up CT imaging with a median interval of 112 days (39-404) with no evidence of diaphragmatic hernia.

Conclusion:

Our early experience suggests that LTD thymectomy is feasible and safe on short-term follow up. The specific role of LTD thymectomy will require definition of patient selection criteria, further experience to reduce OR time, long-term follow-up, and eventual comparison of post-operative pain versus standard VATS.

Disclosure: No significant relationships.

Keywords: thymectomy, vats, laparoscopy, innovation

P-99

EARLY POSTOPERATIVE REDUCTION OF PULMONARY ARTERIAL PRESSURE AFTER LUNG VOLUME REDUCTION SURGERY

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Objectives:

Lung volume reduction surgery (LVRS) is nowadays a standard approach for patients with severe pulmonary emphysema. One of the contra-indications for LVRS is the presence of pulmonary hypertension (PH). Aim of this study is to assess the postoperative changes in pulmonary arterial pressure (PAP) after LVRS for patients with severe pulmonary emphysema.

Methods:

N=16 patients (n=5 female, mean age 65, range 49-82) with severe pulmonary emphysema and preoperative evidence for PH were included into this study. All patients underwent uniportal VATS-LVRS. Pulmonary arterial systolic pressure (PASP) was measured with echocardiographic assessments to quantify PH before and after surgery. Primary end points were the changes in PASP pre- and postoperatively as well as mortality.

Results:

In all patients the preoperative mean PASP was ≥ 35 mmHg (35-80). Postoperatively, a significant decrease was observed regarding the PASP (preoperative mean PASP 53 ± 4 vs. 39 ± 2 mmHg postoperative, $p=0.02$). In n=5 patients, no tricuspid valve regurgitation was detectable anymore suggesting normal PAP. N=3 patients underwent bilateral uniportal LVRS. In n=1 patient v-v-ECLS was implemented preoperatively. In n=7 cases veno-venous-ECLS was applied intraoperatively and continued postoperatively. Mean duration of postoperative ECLS was 2 days (1-10). Intravenous levosimendan was preoperatively administered to n=6 patients. The mean ICU stay was 9 days (1-34 days). The postoperative hospital stay was 19 days (2-53). Postoperative complications included persisting air leak (> 5 days) with prolonged chest tube therapy (n=5), respiratory insufficiency requiring mechanical ventilation via tracheostomy (n=2) and right heart failure (n=1). N=2 patients died due to acute right heart decompensation (n=1) and acute pulmonary embolism (n=1).

Conclusion:

This study suggests a beneficial effect of LVRS on PAP, which may ultimately help to protect and stabilize right ventricular function. Further studies, implementing pre-and postoperative right heart catheterization in order to ensure the correct evaluation of hemodynamic parameters and PAP are necessary.

Disclosure: No significant relationships.

Keywords: lung volume reduction surgery, pulmonary arterial pressure, lung emphysema

P-100

NEOADJUVANT ANTI PROGRAMMED DEATH 1 (PD-1) IMMUNOTHERAPY IN RESECTABLE NON SMALL CELL LUNG CANCER (NSCLC): THE NEOMUN TRIAL

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Objectives:

Immunotherapies targeting the PD1/PD-L1 pathway made a large impact in the treatment of advanced NSCLC. Concerning multimodal tumor therapy in locally advanced stage II and IIIA disease limited clinical data is available investigating feasibility and safety of a neoadjuvant anti PD-1 immunotherapy prior to radical tumor resection in order to improve long term survival. Aim of the NEOMUN investigator-initiated trial (NCT03197467) therefore is to assess feasibility and safety of neoadjuvant anti PD-1 immunotherapy followed by curative intent surgery.

Methods:

The study is designed as an open-label, single arm, prospective, monocenter, phase II study in patients with resectable NSCLC stage II/IIIA suitable for curative intent surgery. The planned sample size is N=30. Investigational drug is Pembrolizumab at fixed dose, given 200 mg q3w i.v. for two cycles. After completion of immunotherapy lobectomy/ bilobectomy with curative intent is scheduled. Primary objectives are to assess feasibility and safety of a neoadjuvant application of pembrolizumab and to assess antitumor activity of pembrolizumab with regard to clinical and pathologic tumor response. Secondary objective is to assess the impact of neoadjuvant pembrolizumab on patient disease free and overall survival. Exploratory objective is to analyze potential predictive biomarkers for pembrolizumab efficacy by immune cell and cytokine analysis of tumor tissue.

Results:

The study protocol was approved by the local ethics committee and the federal authority. Start of patient enrollment is scheduled for February 2018. A detailed study protocol and the planned translational research program as well as first in human results will be presented.



Conclusion:

The NEOMUN trial will be one of the first clinical trials investigating a multimodal treatment strategy including neoadjuvant immunotherapy using pembrolizumab as an investigational drug. Safety of neoadjuvant immunotherapy in connection with lung surgery will be of great interest for thoracic surgeons.

Disclosure: No significant relationships.

Keywords: PD1/PD-L1, lung cancer, Checkpoint Inhibitor, neoadjuvant, thoracic surgery

P-101

FIVE HUNDRED METERS IS A RESULT OF 6-MINUTE WALK TEST WHICH DIFFERENTIATES PATIENTS WITH HIGH AND LOW RISK OF POSTOPERATIVE COMPLICATIONS AFTER LOBECTOMY – A VALIDATION STUDY

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Objectives:

Six-minute walk test (6MWT) is a simple, low-tech test, which enables identification of patients with high risk of postoperative complications and longer postoperative hospital stay, as published by our group before. In this study we internally validated the previously obtained threshold value of 500 meters in 6MWT as differentiating populations of high and low risk of postoperative complications after lobectomy.

Methods:

Between November 2011 and November 2016 847 patients underwent radical surgery due to lung cancer in a single center. We excluded 146 patients who underwent operations other than lobectomy and 78 patients who did not undergo 6MWT due to medical conditions. Six hundred twenty-four patients who underwent lobectomy and had 6MWT performed preoperatively entered this study. We compared the complication rates of two groups of patients – those who did more and less than 500 meters. The validation group was independent of the pilot study group with the common daily pattern of postoperative care.

Results:

The patients who did not reach the distance of 500 meters were older (70 vs 63 years $p<0.001$), had poorer pulmonary function tests (FEV1% 84 vs 88 $p=0.041$) and higher Charlson Comorbidity Index ($p<0.001$). The patients who had worse result of 6MWT had higher complication rate (52% vs 42% $p=0.019$; OR: 1.501 95% CI: 1.066-2.114) and longer median postoperative hospital stay (7 vs 6 days $p=0.010$). In a multivariate analysis the result of 6MWT proved to independently influence the risk of postoperative complications (reference value: 500 m, $p=0.008$).

Conclusion:

An internal validation study confirms that 500 meters is a result of 6-minute walk test which differentiates patients with higher risk of postoperative complications and prolonged hospital stay after lobectomy.

Disclosure: No significant relationships.

Keywords: Lobectomy, 6-minute walk test, lung cancer, complications

P-102

THE CALCULATION OF PREDICTED POSTOPERATIVE FEV1% IN PATIENTS WHO UNDERGO VIDEO-ASSISTED THORACOSCOPIC SURGERY (VATS) LOBECTOMY SHOULD BE CORRECTED BY 1.17Tomasz Marjanski¹, M. Ostrowski¹, D. Wnuk², R. Dziedzic², W. Rzyman¹¹*Thoracic Surgery Department, Medical University of Gdansk, Gdansk, Poland*²*Department of Physical Therapy, Medical University of Gdansk, Gdansk, Poland***Objectives:**

The theoretical concept of calculation of predictive postoperative (ppo) values of the results of pulmonary function tests (PFT) basing on the percentage of resected segments is well validated in patients who undergo thoracotomy. In this study we have compared the ppo and actual postoperative (postop) values of PFTs in two groups of patients who underwent lobectomy by VATS or by thoracotomy.

Methods:

Between December 2015 and November 2016 73 patients who underwent lobectomy due to non-small cell carcinoma entered this prospective study. All patients underwent a common routine physiological qualification, preoperative work-up and a postoperative pattern of care. Additionally, patients had PFT performed a month after the surgery.

Results:

There were 35 patients in VATS and 38 patients in thoracotomy group. Patients in both study groups did not differ concerning age, preoperative (preop) PFTs, Charlson Comorbidity Index or BMI. There were more patients in stage IA in the VATS group (60% vs 8%, $p < 0.001$). The upper lobectomies were more commonly performed in the thoracotomy group (58% vs 31%, $p = 0.023$). The ppoFEV1 did not differ in the study groups (VATS - 1.66 L vs thoracotomy - 1.60 L $p = 0.802$). We have observed that the postopFEV1 were higher after VATS than after thoracotomy (1.94 L vs 1.66 L, $p < 0.05$). In a multivariate analysis ppoFEV1% ($p = 0.002$) and upper lobectomy ($p = 0.011$) influenced the postopFEV1 with the operative access (VATS vs. thoracotomy) being very close to the level of statistical significance $p = 0.051$. We have calculated the relative error: $[(\text{postopFEV1} - \text{preopFEV1}) / \text{preopFEV1}]$ and on this basis we have assessed the corrective index, which enables appropriate calculation of ppoFEV1 in patients who undergo VATS lobectomy. This corrective index was 1.07 in thoracotomy and 1.17 in VATS lobectomy group ($p = 0.037$).

Conclusion:

The calculation of predicted postoperative FEV1% in patients who undergo VATS lobectomy should be corrected by 1.17.

Disclosure: No significant relationships.

Keywords: lung cancer, surgery, spirometry, vats

P-103

THE CLINICAL SIGNIFICANCE OF BOTH GLASGOW PROGNOSTIC SCORE AND MODIFIED GLASGOW PROGNOSTIC SCORE IN PATIENTS WITH OPERABLE PRIMARY LUNG CANCER

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Objectives:

The Glasgow Prognostic Score (GPS) and modified GPS (mGPS) are based on serum C-reactive protein (CRP) and albumin (ALB) levels and reflect the host systemic inflammatory response. Previous studies have shown that GPS and mGPS are independent prognostic factors in patients with various types of malignancies. Their significance however remains undetermined in patients undergoing pulmonary resection for primary lung cancer. This study aims to evaluate the clinical significance of GPS and mGPS as pre-operative prognostic indicators in patients with operable lung cancer

Methods:

We retrospectively analysed patients who underwent surgical resection for primary lung cancer between April 2007 and March 2017. GPS and mGPS of 0, 1, or 2 were assigned based on pre-treatment CRP and ALB. Pearson's Chi-square testing and Kaplan-Meier estimator were utilized to assess the correlation between GPS, mGPS and survival

Results:

Over ten-years period 772 patients were identified. The average operative age was 68.1±10.2 years (53.9% males). The median values for CRP and ALB were 4.4mg/L (0.6-332.5 mg/L) and 44.0g/L (20-55 g/L), respectively. Only 3.5% of patients had evidence of hypoalbuminemia (<35 g/L) with no evidence of correlation with mortality ($X^2=0.39$, $p=0.532$). 25.6% of patients had CRP of 10mg/L or higher with a significant correlation to survival ($X^2=16.07$, $p<0.001$). Overall survival was 64.8% with an estimated post-operative median survival of 114 months. 198 patients had a GPS of 1 or 2 (26.6%) whilst 207 patients had mGPS of 1 or 2 (27.9%) and both were significantly associated with higher mortality ($X^2=9.2$, $p=0.002$ and $X^2=14.5$, $p<0.001$, respectively).

Conclusion:

In patients with primary lung cancer high CRP levels adversely affected the outcome. This study showed that higher GPS and mGPS were associated with worse overall survival. The assessment of GPS and mGPS are easily measurable significant prognostic factors which could assist the identification of patients with poor prognosis.

Disclosure: No significant relationships.

Keywords: GPS, mGPS, lung cancer



P-104

NOMOGRAM FOR PREDICTING RECURRENCES AND SURVIVALS OF PATHOLOGICAL STAGE I LUNG CANCER TREATED BY THORACOSCOPIC SURGERY

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Objectives:

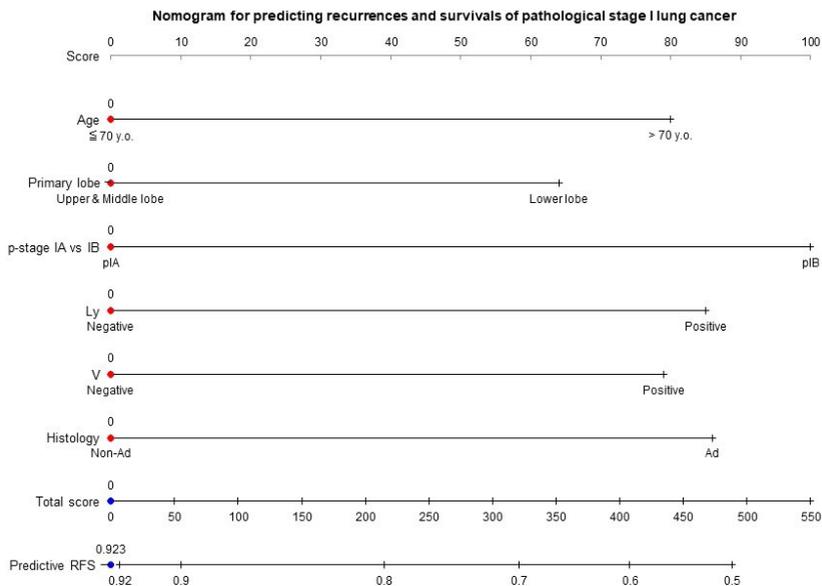
The aim of this study is to develop a nomogram that can predict recurrence-free survival (RFS) of p-stage I lung cancer patients after thoracoscopic surgery.

Methods:

We reviewed 296 patients with p-stage I (IA: n=230, IB: n=66) primary lung cancer who underwent lobectomy or segmentectomy with mediastinal lymph node dissection by video- or robot-assisted thoracoscopic surgery at our institution. All cases were restaged according to the 8th edition TNM classification for this study. A nomogram for recurrence prediction was developed using Cox proportional hazards regression.

Results:

The median follow-up period was 43 months. In multivariate analysis, age, primary lobe, p-stage, lymphatic permeation, vascular invasion were identified as independent predictive factors for RFS of p-stage I lung cancer. The nomogram was made based on these factors as RFS predictors with different weighting hazard ratios and characteristics. Kaplan-Meier analysis showed a 5-year RFS of 90% in low-risk patients (n=209) and 52% in high-risk patients (n=85) with the highest 30% scores.



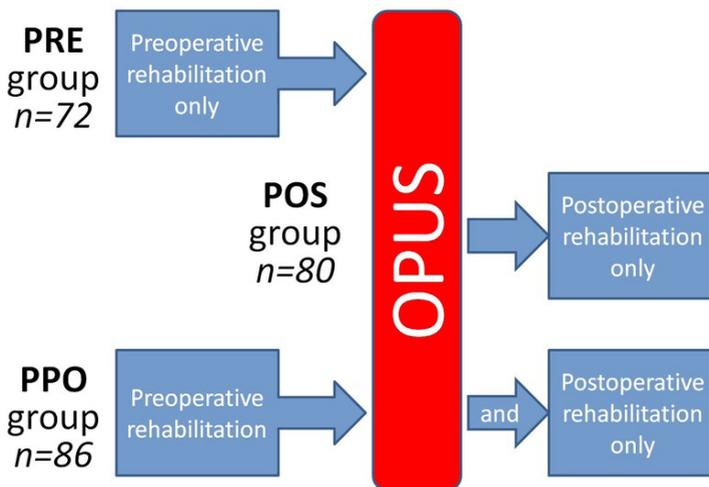
Conclusion:

Nomograms using above clinicopathological factors could be useful to predict accurate individual RFS for p-stage I lung cancer patients after thoracoscopic surgery. High-risk patients should be considered as candidates for intensive adjuvant chemotherapy even though they have p-stage I diseases.

Disclosure: No significant relationships.

Keywords: lung cancer, thoracoscopic surgery, nomogram

P-105

RISK STRATIFICATION AND PERIOPERATIVE PULMONARY REHABILITATION IN THORACIC SURGERYAttila Vagvolgyi¹, Z. Rozgonyi², M. Kerti³, C. Feher¹, M. Molnar¹, P. Vadasz¹, J.T. Varga³¹Department of Thoracic Surgery, National Koranyi Institute for Pulmonology, Budapest, Hungary²Central Department of Anaesthesiology and Intensive Care, National Koranyi Institute for Pulmonology, Budapest, Hungary³Department of Pulmonary Rehabilitation, National Koranyi Institute for Pulmonology, Budapest, Hungary**Groups of patients (n=238; 2012-2016)****Objectives:**

Pulmonary rehabilitation can improve exercise capacity and functional reserves before and after thoracic surgery as well. Our aim was to evaluate the improvements of the functional parameters and a possible connection between the markers and the postoperative complication rate.

Methods:

Two hundred and thirty eight COPD patients participated perioperative pulmonary rehabilitation in connection with thoracic surgery. 72 patients had preoperative (PRE), 80 had postoperative (POS), and 86 patients had pre- and postoperative rehabilitation (PPO). Breathing and personalised training for cycle and treadmill 2-3 times for 10-25 minutes were parts of the program. Quality of life tests, lung function, chest kinematics, 6 minutes walking distance (6MWD), breath holding time, grip strength and exercise capacity were measured. Significance was accepted at $P < 0.05$ level. Postoperative complications were classified into two groups as “not severe” and “severe”. Relationship of the 3 groups to 2 severity groups of complications and functional parameters were analyzed.

Results:

Rehabilitation resulted significant improvement in FEV_1 , FVC, 6MWD, chest wall expansion and health status of all three groups ($p < 0.0001$). Improvement of breath holding time, grip strength, cycle conditioning parameters and quality of life (mMRC and CAT questionnaires) were also detected ($p < 0.0001$). Older population had strong correlation with “severe” complications. The following 4 parameters showed 67,0% correlation with “severe” complication group: gender, maximum value of preoperative FEV_1 after rehabilitation, preoperative 6MWD before rehabilitation and preoperative kilometer value of cycle conditioning before rehabilitation. Initial value of 6MWD, walking distance on the treadmill and Modified Medical Research Council Dyspnoea Scale grade (mMRC) were significantly better in the “not severe” complication group. Higher lung function values in preoperative conditions were associated with “not severe” complication group.

Conclusion:

Perioperative pulmonary rehabilitation improved exercise capacity and functional reserves significantly. Postoperative rehabilitation could moderate the function-depressing effects of the operation. Not severe complications were associated with age, exercise tolerance, dyspnoea and lung functions.

Disclosure: No significant relationships.

Keywords: perioperative pulmonary rehabilitation, risk stratification, thoracic surgery, COPD, lung function

P-106

CLINICAL MANIFESTATION OF STAGE I (THE AMERICAN JOINT COMMITTEE ON CANCER (AJCC) 8TH EDITION) LUNG ADENOCARCINOMA WITH SPREADING TUMOR CELL THROUGH AIR SPACES.E. Yi¹, Jae Ho Chung¹, J.H. Lee², Y. Lee², S.H. Lee¹¹*Department of Thoracic and Cardiovascular Surgery, Korea University Anam Hospital, Seoul, Republic of Korea*²*Department of Pathology, Korea University Anam Hospital, Seoul, Republic of Korea***Objectives:**

To investigate the clinical importance of spreading tumor cell through air spaces existing around tumor border for predicting recurrence patterns in stage I lung adenocarcinoma.

Methods:

A total of 106 patients who underwent surgery resection for their stage I lung adenocarcinomas between January 2013 and July 2016 were enrolled in this study. Pathologic results were reviewed by two expert pathologists and the stages were revised as AJCC 8th edition. Spreading tumor cell through air spaces were defined as micropapillary structure without fibrovascular structures, solid nest or single cell cluster in alveolar space beyond the edge of main tumor. Enrolled patients were divided into two group, one without spreading tumor cells, STAS (-), and other with them, STAS (+).

Results:

Spreading tumor cell through air spaces (STAS) were identified in 44 patients. The mean distance of STAS from tumor space were 1.61mm (± 1.37), and the mean distance counted by the number of alveolar spaces were 7.02 (± 5.63). Patients with STAS were older ($p = 0.037$), and have larger tumor sizes either in total and invasive ($p = 0.009$, and $p < 0.000$ respectively) than patients without STAS, while smoking history revealed no statistical differences ($p = 0.425$). Presence of micropapillary patterns were higher in STAS patients (65.9%, $p < 0.000$), however, the presence lymphatic and vascular invasions were not ($p = 0.559$ and $p = 0.660$ respectively). Overall recurrence rates were 13.3% and lung cancer related mortality rates were 1.9%. Recurrence-free survival rates of STAS (-) patients were significantly higher than those of STAS (+) ($p = 0.012$), Locoregional recurrence were significantly higher in STAS (+) group ($p = 0.001$), however, rates of distance metastasis revealed no statistical significance (0.059).

Conclusion:

The presence of spreading tumor cells in air spaces beyond the edge of tumor border is a significant risk factors for locoregional recurrence in stage I lung adenocarcinomas.

Disclosure: No significant relationships.

Keywords: lung adenocarcinoma, recurrence, prognosis

P-107

CYTOREDUCTIVE SURGERY COMBINED BY INTRATHORACIC HYPERTHERMIC CHEMOPERFUSION (HITHOC): A SINGLE CENTER EXPERIENCE IN MESOTHELIOMA AND ADVANCED THYMOMA PATIENTS

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Objectives:

The best surgical treatment for malignant pleural mesothelioma and stage IV thymoma is still under debate. Lung sparing cytoreductive surgery by extended pleurectomy and decortication combined by HITHOC (CS-HITHOC) represents a promising treatment strategy that may be associated with reduced morbidity and improved survival. Aim of the study was to investigate feasibility and perioperative safety of the procedure conducted in a high volume center and to analyze overall survival.

Methods:

A standardized CS-HITHOC procedure was established in 2014. Clinical data of all patients treated by CS-HITHOC were included in this retrospective analysis. Extended pleurectomy and decortication comprised total parietal and visceral pleurectomy. In case of transmural tumor infiltration diaphragm and pericardium were additionally resected and replaced using alloplastic materials. HITHOC was performed using a Rand Performer HT perfusion pump with 200mg cisplatin in isotonic saline. Intrathoracic target temperature was set to 42°C. Perfusion time was 60 min and flow was set to 1 l/min. Survival data were analyzed according to Kaplan-Meier. Data are given as mean±SD.

Results:

Between 2014 and 2017 64 patients were treated by CS-HITHOC among 54 (84%) were male and 10 (16%) female. Mean age was 62±12y (age 21-80y). Predominant diagnosis was pleural mesothelioma with mainly epitheloid subtype in 50 (78%), stage IV thymoma in 11 (17%), and secondary pleural carcinosis in 3 (5%) patients. Perioperative, 30 and 60 day mortality was 0%, 90 day mortality was 1.6% related to rapid tumor progression. 1 year survival rate in patients with a follow-up time of at least 18 month was 91%.

Conclusion:

Cytoreductive surgery in combination with HITHOC appears feasible and safe in mesothelioma and stage IV thymoma patients with low perioperative morbidity and mortality. Initial survival data are promising, but for a more objective assessment a longer follow-up period has to be awaited.

Disclosure: No significant relationships.



Keywords: pleural mesothelioma, stage IV thymoma, HITHOC, cytoreductive surgery.

P-108

DIAGNOSTIC PERFORMANCE OF GALLIO 68 DOTATOC POSITRON EMISSION TOMOGRAPHY (68GA-DOTATOC) AND FLUORODEOXYGLUCOSE POSITION EMISSION TOMOGRAPHY (FDG PET) IN PULMONARY CARCINOID TUMORS AND INTER-RELATIONSHIP WITH HISTOLOGICAL FEATURES

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Objectives:

Despite encouraging, few data are available reporting the diagnostic performance of PET with ⁶⁸Ga-DOTA-peptides in pulmonary carcinoid tumors (PCs). Herein, we describe the diagnostic performances of both ⁶⁸Ga-DOTATOC and ¹⁸F-FDG PET/CT scans in PCs and their inter-relationship with histological features.

Methods:

From 01/09 to 08/17, the clinical data, radio-metabolic (¹⁸F-FDG) and radio-receptorial (⁶⁸Ga-DOTATOC) PET-findings as well as surgical and pathological information of 62 PCs occurring in 57 patients were selected and retrieved. T- and chi-square tests were adopted to compare continuous and categorical variables.

Results:

Mean age and female/male ratio were 68.2±12.3 and 3:1, respectively. Table-1 summarized the main characteristics of the population. Typical carcinoids (TCs) were observed in 55 lesions while Atypical Carcinoids (ACs) in 7. All patients underwent at least one PET/CT scan: ⁶⁸Ga-DOTATOC in 26 patients, ¹⁸F-FDG in 52 patients and both techniques in 20 patients. Overall detection rates (DR) of ⁶⁸Ga-DOTATOC PET (mean SUV_{max}=15.5) and ¹⁸F-FDG PET (mean SUV_{max}=3.2) were 88.4% and 53.8%, respectively. When adopted SUV_{max}=1.5 as threshold, the DRs increased to 100% and 80.8%, respectively. The DRs of both techniques remarkably vary according to histology (Table-2), with a higher DR of ⁶⁸Ga-DOTATOC PET in TCs than in ACs (91.7% vs 50.0%, p=0.076). Exploring the relationship between the number of mitoses and the presence of necrosis and both PET-findings, we found as a low number of mitosis (<2/10HPF) significantly correlates with ⁶⁸Ga-DOTATOC PET-positivity (p=0.004); a trend of association (p=0.076) was also observed between the presence of necrosis and ⁶⁸Ga-DOTATOC PET-negativity.

Table 1

Factor	Value	Factor	Value
Age (mean ±SD)	68,2 ± 12,3	Surgery Type	
Gender		Lobar Resection	32 (51,6 %)
Female	43 (75,4%)	Sublobar Resection	30 (48,4 %)
Male	14 (24,6%)	Tumor size (mean ±SD)	(1,9 ± 1,3) cm
Smoke history		R-status	
Yes	24 (42,1 %)	R0	61 (98,4 %)
No	15 (26,3 %)	R+	1 (1,6 %)
Not known	18 (31,6%)	pTNM	
Symptoms at Presentation		IA	48 (77,4 %)
Yes	23 (40,4 %)	IB	6 (9,7 %)
No	31 (54,4 %)	IIB	6 (9,7 %)
Not known	3 (5,3 %)	Not known	2 (3,2 %)
ECOG PS		Histology	
0	48 (84,2 %)	Typical Carcinoid	55 (88,7 %)
1-2	9 (15,8 %)	Atypical Carcinoid	7 (11,3 %)
Previous Malignancy		Number of Mitosis	
Yes	16 (28,1 %)	<2/10 HPF	50 (80,7 %)
No	41 (71,9 %)	(2-20)/10 HPF	12 (19,3 %)
Tumor Location		Presence of Necrosis	
Central	26 (41,9 %)	Yes	5 (8%)
Peripheral	36 (58,1 %)	No	57 (92%)
¹⁸ F-DG PET Scan			
Done	52 (83,9 %)		
Not Done	10 (16,1 %)		
⁶⁸ Ga-DOTATOC PET-Scan			
Done	26 (41,9 %)		
Not Done	36 (58,1 %)		
Pre-operative Diagnosis			
Yes	21 (33,9%)		
No	41 (66,1%)		

Table 2

	Detection Rate					
	All carcinoids		TC		AC	
	SUVmax with Cut-off= 1.5	SUVmax with Cut-off= 2.5	SUVmax with Cut-off= 1.5	SUVmax with Cut-off= 2.5	SUVmax with Cut-off= 1.5	SUVmax with Cut-off= 2.5
¹⁸ F-FDG PET-CT	42/52 (81%)	28/52 (54%)	36/45 (81%)	23/45 (51%)	6/7 (86%)	5/7 (71%)
⁶⁸ Ga-DOTApeptide PET-CT	26/26 (100%)	23/26 (88%)	24/24 (100%)	22/24 (92%)	1/2 (50%)	1/2 (50%)

Conclusion:

⁶⁸Ga-DOTATOC has a better diagnostic performance compared with ¹⁸F-FDG PET in detecting pulmonary carcinoids; the detection rates of both techniques remarkably vary according to histology with ⁶⁸Ga-DOTATOC PET performing at its best in typical carcinoids and ¹⁸F-FDG PET in atypical carcinoids. ⁶⁸Ga-DOTATOC PET results seems to be associated with the number of mitosis and the presence of necrosis.

Disclosure: No significant relationships.

Keywords: ⁶⁸Ga-DOTATOC PET, ¹⁸F-FDG PET, pulmonary carcinoid tumours, PET, bronchial tumor

P-109

PRIMARY MEDIASTINAL SARCOMAS: CONTRIBUTION OF SURGERY TO MULTI-MODALITY TREATMENT APPROACHES

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Objectives:

Primary sarcomas of the mediastinum are extremely rare. Direct outcomes comparing the effectiveness of possible treatment modalities, including chemotherapy, radiation and surgery, are lacking in the current literature.

Methods:

A retrospective analysis of 94 patients with primary mediastinal sarcoma was carried out from a single institution between 1973 and 2010. The treatment groups included patients that received either surgery, chemotherapy, radiation or a combination. Overall survival was defined as the period from the date of initial surgery or diagnosis until death or the date of last follow up. Progression free survival was measured from the date of diagnosis until the date of tumor recurrence or date of last follow up.

Results:

The most common tumor types were: 11 fibrous histiocytomas (12%), 10 neurilemmomas (11%), 9 leiomyosarcomas (10%), and 9 spindle cell sarcomas (10%). Patients with higher grade (III/IV) tumors tended to have worse survival outcomes compared to lower grade (I/II) tumors ($p = 0.09$). Surgical resection was the primary treatment modality in 58 patients, 37 patients received external beam radiation therapy, and 27 patients received chemotherapy. Overall survival of patients after surgical resection (3.3 years) was significantly improved compared to patients who did not receive surgical resection (1.8 years) ($p = 0.04$). Median disease-free survival in patients after surgical resection was 2.7 years. Radiation therapy alone without surgery did not significantly improve progression free or overall survival. Radiation therapy did not improve survival even if patients had surgical debulking. Patients who received chemotherapy had worse overall survival, as chemotherapy administration was associated with higher grade tumors.

Conclusion:

Our data show the benefit of surgical debulking in primary mediastinal sarcoma. Mediastinal radiation or chemotherapy did not provide a survival advantage without surgery. This is the largest analysis of patients with primary mediastinal sarcomas and may guide future treatment approaches.

Disclosure: No significant relationships.

Keywords: Mediastinum, sarcoma, mediastinal sarcoma



P-110

APPROPRIATE INTRAOPERATIVE FLUID VOLUME AND COLLOID CAN REDUCE THE INCIDENCE OF POSTOPERATIVE PULMONARY COMPLICATIONS IN CHINESE PATIENTS UNDERGOING MINIMALLY INVASIVE LOBECTOMYYihe Wu¹, R. Yang², J. Hu¹¹*Department of Thoracic Surgery, The First Affiliated Hospital, College of Medicine, Zhejiang University, Hangzhou, China*²*Department of Radiology, The First Affiliated Hospital, College of Medicine, Zhejiang University, Hangzhou, China***Objectives:**

Perioperative fluid management is always important during lung resections. The potential postoperative pulmonary complications (PPCs) of giving too little fluid during surgery must be balanced with the risks of administering too much. We analyzed the dose-response relationship between intraoperative fluid administration and postoperative outcomes in lung resection patients.

Methods:

A retrospective analysis of 446 adult patients undergoing minimally invasive lobectomy between 2016-05 and 2017-04 was performed. Age, gender, body mass index, pulmonary function data, smoking, the infusion rate and the total amount of intraoperative fluids (including crystalloid, colloid, and blood products), type of lung resection, duration of anesthesia, duration of operation, intraoperative bleeding, intraoperative urine output, total hospital care costs, hospital stay, PPCs, acute kidney injury, and mortality were recorded. Intraoperative fluid infusion rate (ml/kg/hr) and intraoperative colloid infusion rate (ml/kg/hr) were correlated with perioperative outcomes. Univariate analyses and multivariate logistic regression were performed.

Results:

In 446 patients, types of resections were all lobectomy (video-assisted or robotic-assisted thoracoscopic surgery). 201 PPCs were observed in 172 patients (acute respiratory distress syndrome [n=3], reintubation [n=0], atelectasis [n=11], pulmonary embolism [n=2], need for bronchoscopy [n=4], pneumonia [n=160], prolonged air leak [n=9], and failure to expand [n=12]). No patient died. Mean hospital stay was 5.7±2.0 days. Univariate analyses showed that gender, body mass index, smoking, pulmonary function data, duration of anesthesia, duration of operation, intraoperative fluid infusion rate (ml/kg/hr), intraoperative colloid infusion rate (ml/kg/hr) and intraoperative bleeding were significant for pneumonia and PPCs (P<0.05). In multivariate logistic regression analysis intraoperative fluid infusion rate (ml/kg/hr), intraoperative colloid infusion rate (ml/kg/hr) and duration of operation were significant (P<0.05). An intraoperative fluid infusion rate of >9.4 to 11.8 mL/kg/h and colloid exceed 3.8 mL/kg/h were found to be the threshold which had the least pneumonia and PPCs.

Conclusion:

In patients undergoing minimally invasive lobectomy, the occurrence of postoperative pneumonia and PCs is seen less if the intraoperative infusion rate of fluids between >9.4 to 11.8 mL/kg/h and colloid exceeds 3.8 mL/kg/h.

Disclosure: No significant relationships.

Keywords: postoperative pneumonia, intraoperative fluid management, acute kidney injury, minimally invasive lobectomy, postoperative pulmonary complications



P-111

UNIORTAL THORACOSCOPIC SIMULTANEOUS BILATERAL LOBECTOMY FOR BILATERAL MULTIPLE EARLY LUNG CANCER SINGLE CENTER EXPERIENCEH. Zheng, YuMing Zhu*General Thoracic Surgery, Shanghai Pulmonary Hospital, Shanghai, China***Objectives:**

Uniportal thoracoscopic lobectomy has been widely performed on patients with early-stage lung cancer; meanwhile indications of bilateral thoracoscopic lobectomy have not been clearly defined due to technical difficulties and unclear postoperative pulmonary function. The aim of this study was to present and discuss the feasibility and prognosis of simultaneous bilateral lobectomy by uniportal VATS for synchronous bilateral multiple nodules, adjusted for preoperative factors including sex, age, preoperative forced expiratory volume in 1 s (FEV1).

Methods:

The clinical data of patients who had received simultaneous bilateral lobectomy by uniportal VATS in our center from January 2011 to December 2016 were retrospectively analyzed. Preoperative clinical parameters including gender, age, tumour size, pathological stage, histology and forced expiratory volume in 1 s (FEV1) were analyzed. The lungs were totally divided into 19 segments (9 segments in left, 10 segments in right)

Results:

All 32 cases were undertaking simultaneous bilateral lobectomy by uniportal VATS. There was no case lost or death during follow-up. The range of resection of segments were from 6 to 10 (6.32 ± 2.13). There were four cases of postoperative complications, including two cases of postoperative air leakage, 1 cases of pulmonary infection and one cases of arrhythmia. Patient's lung function was significantly reduced at fifth days after operation, the reexamination results after 1 months postoperation showed that the recovery was good. The prognosis analysis revealed the total segment number of bilateral lobectomy is less than or equal to eight segments, preoperative pulmonary function $FEV1 < 1.2L$, percentage of predicted value is less than 60%, were both the risk factors of postoperative complications

Conclusion:

Simultaneous bilateral lobectomy by uniportal VATS is a safe and feasible. Total segment number of resection and preoperative pulmonary function were the risk factors of postoperative complications.

Disclosure: No significant relationships.

Keywords: non-small cell lung cancer, uniportal VATS, bilateral, lobectomy, simultaneous

P-112

RESULTS OF SILICONE DRAIN USE FOR VIDEO-ASSISTED THORACOSCOPIC SURGERY (VATS) LOBECTOMY. A PROSPECTIVE RANDOMIZED STUDY

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Objectives:

To compare the efficacy of the silicone drain type with the Argyll type TED in terms of pain reduction and safety in patients undergoing VATS lobectomies

Methods:

Prospective randomized study performed included 60 patients undergoing VATS lobectomy between November 2016 – November 2017. The patients were divided into two groups in a randomized manner, Control Group (A) carriers of DET type Argyll and Experimental Group carrier of DET SmartDrain (SM) and subsequently evaluated postoperative pain at the site of placement of the drainage using a pain scale (EVA) daily that patients should answer in the immediate postoperative period until discharge; both groups of patients carry a digital device that detect obstruction and air leakage; Likewise, chest x ray was made for the correct evaluation of pleural effusion and residual aerial chamber

Results:

Sixty patients included in the final analysis were divided into two groups: experiment group (N=30) and control group (N=30). There was no significant difference between both groups in terms of age, sex, height, weight, clinical diagnosis and type of surgical procedure. The experimental group present less pain in the 2 first postoperative days with a statistically significant difference ($p \leq 0.05$), likewise only 8% of the experimental group needed rescue analgesia (Methadone) compared to the 16% in control group with a statistically significant difference ($p \leq 0.05$). There were no major postoperative complications in both groups. No drain obstructions were detected. No statistical differences were detected between groups in terms of air leak, pneumothorax, pleural effusion and atelectasis were comparable in both groups. Only one patient of the control group required repeated drainage after their drain removed for pneumothorax and moderate subcutaneous emphysema.

Conclusion:

Silicone drain tube is safe with non-statistical differences in correct operation than conventional type. The softer structure seems to provide less pain and less need for rescue analgesia.

Disclosure: No significant relationships.

Keywords: silicone drain, reduce pain VATS, drainage

P-113

PROPENSITY-MATCHED EVALUATION OF NODAL RECURRENCE IN PATHOLOGICALLY N0 NON-SMALL CELL LUNG CANCER PATIENTS

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Objectives:

Nodal upstaging in NSCLC by thoracotomy was previously shown to more frequent than with VATS, suggesting better oncologic-outcomes. However, one criticism is the effect of surgeon-bias on patient selection. We chose to evaluate the rate of locoregional-recurrence in pathologically-N0 patients as an alternative method of evaluating the effectiveness of nodal-dissection.

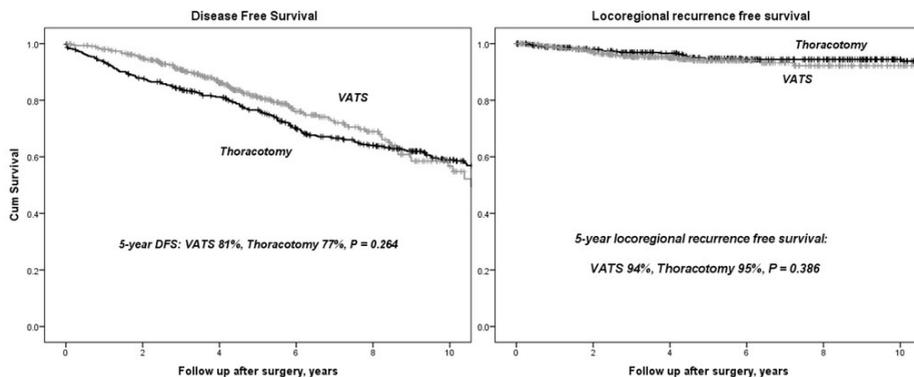
Methods:

A prospectively collected single-institution database was queried for non-small cell lung cancer (NSCLC) patients who underwent anatomic lobectomy (VATS or thoracotomy) and were deemed pathologically N0 (1990-2016). Patients receiving induction therapy were excluded. Propensity matching analysis was performed (1:1, caliper 0.01, controlling for age, gender, histology, and tumor size). Locoregional recurrence free survival (RFS) and disease-free survival (DFS) were estimated using the Kaplan-Meier method and differences were compared using the log-rank test.

Results:

A total of 3054 patients underwent lobectomy of which 1764 were pN0 and met study criteria. Propensity matching produced 456 matched pairs. The adequacy of matching was ascertained by the lack of statistical differences between the patient groups (Table). There was no difference in the median number of lymph nodes resected between VATS and thoracotomy (10 vs. 11, P = 0.255). The median follow-up of the studied cohort was 72 months. Five-year DFS was 77% in the thoracotomy patients compared to 81% in the VATS patients (p=0.264) (Figure). In addition, 5-year locoregional RFS was 95% for thoracotomy patients and 94% in VATS patients (p=0.386) (Figure).

Variable	Thoracotomy (n=456)	VATS (n=456)	P Value
Age	70 (63-76)	71 (62-76)	0.653
Gender (Male)	184 (40%)	179 (39.3%)	0.735
Histology			0.583
Adenocarcinoma	347 (76.1%)	337 (73.9%)	
Squamous cell ca	60 (13.2%)	71 (15.6%)	
Others	49 (10.7%)	48 (10.5%)	
Path Tumor Size	2 (1.4-3.2)	2 (1.4-3.1)	0.842

**Conclusion:**

Patients with NSCLC who are pN0 by thoracotomy and VATS have similar DFS and locoregional RFS. Although this study does not directly measure the rate of nodal upstaging, our data supports the adequacy of VATS compared to thoracotomy with regard to oncologic outcomes, particularly with regard to locoregional control.

Disclosure: No significant relationships.

Keywords: vats, thoracotomy, nodal recurrence

P-114

SURGICAL OUTCOMES IN PATIENTS AGED 75 YEARS OR OVER WITH NON-SMALL CELL LUNG CANCER: AN INFLAMMATION-BASED PROGNOSTIC SCORE INFLUENCES OVERALL AND NON-LUNG CANCER SURVIVAL AND POSTOPERATIVE COMPLICATIONS

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Objectives:

Although there is often a divergence between chronological age and physiologic condition within the aged population, how we should objectively evaluate the surgical indications still remains controversial. The purpose of this study is to examine the postoperative morbidity and prognostic factors of patients ≥ 75 years with NSCLC who underwent pulmonary resection.

Methods:

Patients ≥ 75 years who underwent pulmonary resection for NSCLC with p-stage I-III between 2003 and 2012 were analyzed. We investigated clinico-pathological factors affecting postoperative complications under the Clavien-Dindo classification, overall survival (OS). The modified Glasgow Prognostic Score (mGPS) that used a selective combination of CRP and albumin and the Charlson Comorbidity Index (CCI) were also measured as potential factors affecting outcomes.

Results:

Three hundred thirty-four patients were included in this study. Patient characteristics were: p-stage I/II/III: 238(71%)/ 63(19%)/ 38(10%), lobectomy/limited resection: 289(87%)/ 45(13%), VATS/ open thoracotomy: 74(22%)/ 260(78%). During the study period, 85 patients (25%) died, of whom lung cancer (n=42, 49%), perioperative events (n=7, 2%), and other causes (n=36, 45%). Postoperative complications occurred in 110 patients (32%), especially major events in 13 patients (4%). Thirty-days and ninety-days mortality were 0.6% (n=2) and 1.5% (n=5). On multivariate analysis, only increasing mGPS was an independent predictor of major complications (HR 7.30, 95%CI 1.31-40.82, $p=0.024$). Multivariate analysis showed that higher CCI (HR 2.431, 95%CI 1.311-4.509, $p=0.005$), histology (HR 1.811, 95%CI 1.082-3.080, $p=0.024$), having postoperative complications (HR 1.631, 95%CI 1.035-2.570, $p=0.035$) and p-stage II-III (HR 3.627, 95%CI 2.279-5.772, $p<0.001$) were associated with poor OS.

Conclusion:

The present study demonstrated that pulmonary resection for NSCLC in patients ≥ 75 years show acceptable morbidity and mortality. The mGPS can serve as a significant factor of the occurrence of postoperative complication and the CCI is a predictive factor of poor prognosis.

Disclosure: No significant relationships.

Keywords: Charlson Comorbidity Index, non-small cell lung cancer, elderly patients, modified Glasgow Prognostic Score

P-115

METACHRONOUS AND SYNCHRONOUS OCCURRENCE OF PRIMARY MALIGNANCIES IN PATIENTS WITH RESECTED NON SMALL CELL LUNG CANCER (NSCLC): A RETROSPECTIVE OBSERVATIONAL STUDY

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Objectives:

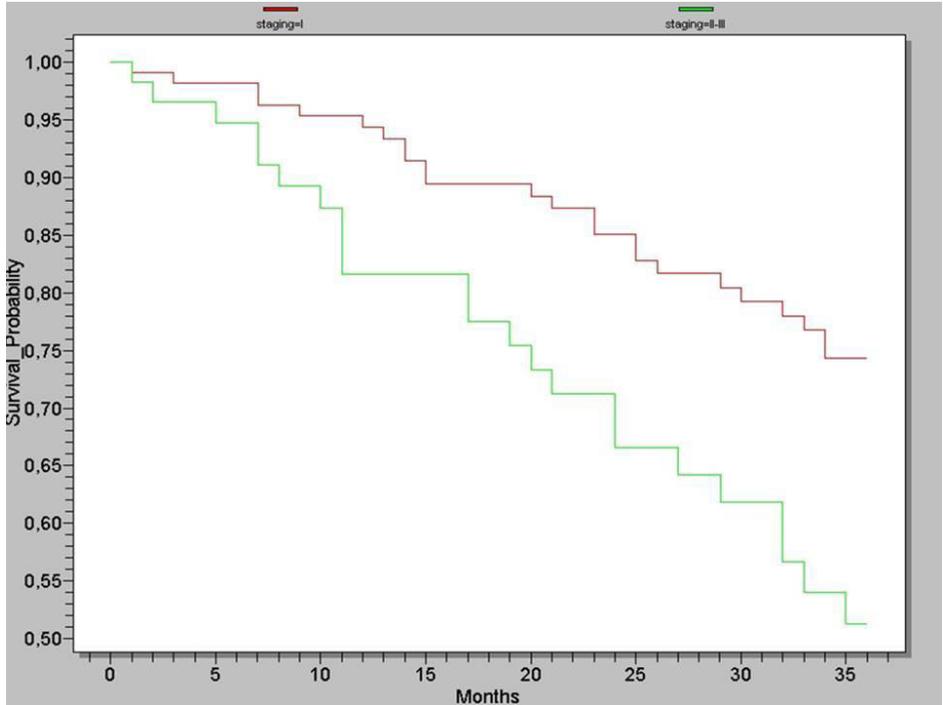
This study investigated the characteristics and prognosticators of patients with resected NSCLC presenting metachronous or synchronous other primary malignancies.

Methods:

All consecutive patients undergoing radical resection for primary NSCLC having other metachronous or synchronous primary malignancies in a 10-year-period were retrospectively evaluated. The International rules for multiple primary cancers proposed by the International Association of Cancer Registry, European Network of Cancer Registry and the International Agency for Research on Cancer were considered. A prospective database including patients' characteristics, primary lung cancers and primary non-pulmonary malignancies data were analysed. Data were retrieved by patients' medical records and regional tumour registry. An informed consent for scientific purposes was obtained prior to lung resection. Statistical analysis included Kaplan-Meier curve and Chi squared test. A $p < 0.05$ was considered significant. Statistical analysis was performed with Epi-info™ (CDC, Atlanta, GA, USA).

Results:

Among 1163 patients undergoing major lung resections for primary NSCLC, 246 (21.1%) were diagnosed to have metachronous or synchronous non-pulmonary malignancies. 177 (71.95) were male, 127 (51.63%) were aged 70 or over; 45 (18.29%) cases of NSCLC were synchronous with other malignancies, 24 (9.75%) were diagnosed as having lung cancer first. Primary non-pulmonary malignancies derived from the genitourinary tract mostly (40.24%) and gastrointestinal tract secondly (21.95%). Patients aged 70 or over had a significantly higher percentage of genitourinary tract tumours than younger patients (48.03% vs 31.93, respectively). Lung adenocarcinomas were 132 (53.66%), 32 of those were synchronous and first tumours. G3 NSCLC tumours were observed in 58.64% cases. Females had a significantly higher 3-year survival than males (79.2% vs 63.9%, respectively). Irrespectively from other primary malignancies, patients with stage I NSCLC had a significantly longer survival than stage II-III NSCLC patients ($p=0.004$, Fig1).

**Conclusion:**

Pathological stage of resected NSCLC is an independent predictor of survival irrespective of other primary non-pulmonary malignancies. Molecular investigations have been planned.

Disclosure: No significant relationships.

Keywords: International Association of Cancer Registry, primary non-pulmonary malignancies, multiple primary cancers

P-116

THE EFFICACY AND SAFETY OF SURGERY FOR SECONDARY SPONTANEOUS PNEUMOTHORAX IN ELDERLY PATIENTS

Shunichi Nagata, M. Omasa, T. Nakanishi

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Although secondary spontaneous pneumothorax (SSP) in elderly patients sometimes leads to a refractory condition, surgical indications are controversial. The purpose of this study is to estimate the surgical efficacy and safety for SSP in elderly patients.

Methods:

Elderly patients (≥ 70 years), operated for SSP during 1996 to 2016 in our institution, were reviewed retrospectively. The prolonged postoperative air leaks (≥ 2 days) as the efficacy assessment and the postoperative complications (\geq Grade 3; Clavien-Dindo Classification) as the safety assessment were analyzed by means of clinical backgrounds.

Results:

A total of 82 patients were included in this study. Patients characteristics were as follows: men/female (76/6), mean age of 77 (70-90) years, performance status (PS) 0/1/2/3/4 (18/29/19/9/7), the presence of COPD/ heart disease/ pleurodesis (56/6/30), pleural adhesions none/mild/severe (8/44/30). The Goddard score, a scoring system of COPD on CT, ranged from 0 to 22. Postoperative air leak continued 0 (0-25) days and postoperative complications developed in 14.6%. Age, gender, PS, Goddard score, heart disease, pleurodesis, and pleural adhesions had limited effect on the efficacy and safety. By univariate analysis, poor PS (≥ 3) ($p=0.014$) and higher PaCO₂ ($p=0.002$) were risk factors of postoperative complications and higher PaCO₂ ($p=0.046$) was a risk factor of postoperative air leak. By multivariate analysis, higher PaCO₂ prolonged postoperative air leak (OR; 1.09, 95%CI; 1.00-1.19) and increased postoperative complications (OR; 1.11, 95%CI; 1.00-1.25). PaCO₂ with a cutoff value of 51.6mmHg (AUC=0.677) by ROC analyses predicted postoperative complications. The recurrence occurred in 6.1% and the mortality counted 3 patients (3.7%) with PS4. Three-year survival rate after surgery was 77.5%.

Conclusion:

Surgery for selected elderly patients with SSP was efficient and safe. Low PaCO₂ could predict the efficacy and safety of surgery, while good PS could predict the safety.

Disclosure: No significant relationships.

Keywords: secondary spontaneous pneumothorax, elderly patients, surgery, the efficacy and safety

P-117

OVEREXPRESSION OF GALECTIN-3 IN CANCER-ASSOCIATED FIBROBLASTS SERVES AS A PROGNOSTIC FACTOR IN INVASIVE PULMONARY ADENOCARCINOMAYoko Kataoka¹, Y. Ohshio¹, T. Igarashi¹, K. Teramoto², J. Hanaoka¹¹*Surgery, Shiga University of Medical Science, Otsu, Shiga, Japan*²*Medical Oncology, Shiga University of Medical Science, Otsu, Shiga, Japan***Objectives:**

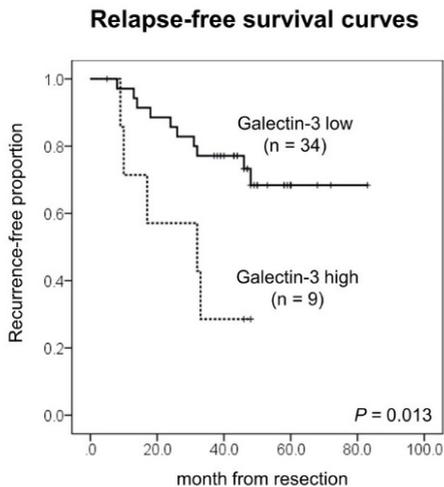
Galectin-3 is a β -galactoside binding lectin. Several studies reported that galectin-3 is involved not only in cell proliferation, angiogenesis and metastasis, but also in myofibroblast activation. In human pulmonary adenocarcinoma, galectin-3 is highly expressed on tumour cells and cancer-associated fibroblasts (CAFs). However, the significance of galectin-3 expression in CAFs of pulmonary adenocarcinoma remains to be elucidated. The purpose of this study was to examine whether galectin-3 expression on CAFs could serve as a prognostic marker in invasive pulmonary adenocarcinoma.

Methods:

The expression of galectin-3 in CAFs was analyzed by immunohistochemistry in 43 patients with stage I invasive pulmonary adenocarcinoma who underwent radical surgery at Shiga University of Medical Science Hospital between 2009 and 2012. Patients who received preoperative chemotherapy or radiation therapy were excluded. Galectin-3 expression was described as being high if more than 10% of fibroblasts were positively stained.

Results:

Galectin-3 was highly expressed on CAFs in 9 (20.9%) cases. Univariate analysis showed that galectin-3 expression on CAFs were significantly associated with the occurrence of microvessel invasion ($p < 0.001$) as well as tumour recurrence after surgery ($p = 0.003$). The Kaplan-Meier curves for relapse-free survival after surgery showed that patients with high expression of galectin-3 in CAFs had a significantly lower relapse-free survival than those with low expression of galectin-3 ($p = 0.013$).

**Conclusion:**

These findings suggested that galectin-3 expression on CAFs could serve as a prognostic marker in stage I invasive pulmonary adenocarcinoma. High expression of galectin-3 in CAFs is significantly related to microvessel invasion, suggesting that galectin-3-expressing CAFs may be involved in the progression and prognosis of pulmonary adenocarcinoma.

Disclosure: No significant relationships.

Keywords: galectin-3, cancer-associated fibroblasts, invasive pulmonary adenocarcinoma

P-118

EFFECTIVENESS OF REHABILITATION FOR POSTOPERATIVE PAIN AFTER SURGERY FOR PNEUMOTHORAX IN YOUNG ADULTS

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Objectives:

Video-assisted thoracoscopic surgery (VATS) has become the standard treatment for pneumothorax. Although it is minimally invasive, it does not reduce postoperative pain. As most cases of spontaneous pneumothorax are observed in young adults, postoperative pain management is important. In this paper, we present a retrospective study of the effectiveness of rehabilitation for postoperative pain in young adults (aged ≤ 40 years) who were treated for spontaneous pneumothorax at our institution.

Methods:

We chose 70 young adults (aged ≤ 40 years) who underwent surgery between October 1, 2012 and September 30, 2017 as subjects for this study, and investigated the effects of perioperative rehabilitation on postoperative pain during hospitalization by measuring (1) the presence or absence of painkiller use other than intravenous patient-controlled analgesia and oral loxoprofen, and its frequency, (2) the number of times the patients complained of pain in regular nursing records, and (3) changes in pain intensity as reported using the numerical rating scale (NRS). Range-of-motion exercises, walking exercises and aerobics, but not respiratory muscle training, were instituted for pneumothorax patients and were conducted every day except on the day of surgery.

Results:

Thirty patients out of the 70 (42.9 %) underwent rehabilitation. An investigation of the items above revealed that rehabilitation significantly reduced pain as measured by the presence or absence of painkiller use ($p=0.001$), the frequency of painkiller use ($p=0.000$), complaints of pain ($p=0.003$), and the NRS of postoperative day 1 to 3 ($P=0.009, 0.010, 0.040$).

Conclusion:

Rehabilitation could be an option for reducing pain after surgery for pneumothorax in young adults.

Disclosure: No significant relationships.

Keywords: pneumothorax, rehabilitation, postoperative pain.

P-119

PREDICTIVE AND PROGNOSTIC VALUE OF CLINICAL AND MOLECULAR FEATURES IN PATIENTS UNDERGOING PULMONARY METASTASECTOMY FROM RENAL CELL CARCINOMA

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¹*Department of Medicine and Surgery, Thoracic Surgery, University Hospital of Parma, Parma, Italy*

²*Medicine and Surgery, Pathological Anatomy and Histology, University Hospital of Parma, Parma, Italy*

³*Department of Medicine and Surgery, Urology, University Hospital of Parma, Parma, Italy*

⁴*Department of Medicine and Surgery, Medical Oncology, University Hospital of Parma, Parma, Italy*

Objectives:

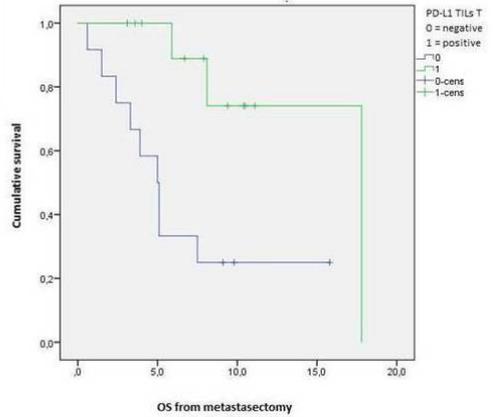
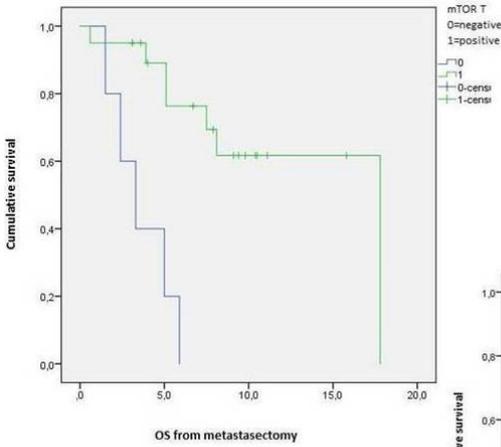
To assess clinical and molecular aspects with prognostic value in patients undergoing pulmonary metastasectomy from renal cell carcinoma (RCC).

Methods:

We retrospectively collected all consecutive patients undergoing pulmonary metastasectomy from RCC. Paired samples of primary tumours (after nephrectomy) and corresponding synchronous or metachronous pulmonary metastases (after metastasectomy) were analysed, testing druggable targets (MET, mTOR, PDL1) by immunohistochemistry. The study was approved by the local Ethical Committee.

Results:

Twenty five patients with complete clinical and pathological data regarding both primary and corresponding secondary tumours were considered. Median overall survival (mOS) from metastasectomy was 5.5 years (95%CI=1.9-9.1). The laterality of metastases had a strong predictive value, with median relapse free survival (mRFS) from metastasectomy not reached at mean follow-up (FU) of 60.8 months for left lung involvement, mRFS of 52.9 months (95%CI=0-145.5) for right lung and 6.4 months (95%CI=1.7-11) for bilateral metastases (p=0.028). Primary renal cell carcinomas with positive expression of mTOR had higher mOS after metastasectomy compared to negative cases (p<0.001), not reached at mean FU of 4.3 years vs mOS of two years (95%CI=0.7-3.3), respectively. PD-L1 positivity on intra-tumour (TILs) and peri-tumour (RILs) infiltrating lymphocytes of pulmonary metastases was related to higher OS, not reached vs 2 years (95%CI=1.2-2.7, p=0.003) and not reached vs 1.4 years (95%CI=0.2-2.6, p=0.012), respectively. The shorter was the interval between nephrectomy and pulmonary metastasectomy, the more probably the metastases had PD-L1 expression >10% on TILs (p=0.024) and high MET expression (>70%) on cancer cells (p=0.007), suggesting to consider those patients for systemic treatment taking advantage of these druggable targets.



Conclusion:

mTOR positivity on primary renal cell carcinoma could be a favourable prognostic factor to select patients for pulmonary metastasectomy. The significant positive impact of PD-L1 expression in TILs and RILs of pulmonary metastases is opposite to the well-known negative prognostic value of PD-L1 expression in RCC tumour cells.

Disclosure: No significant relationships.

Keywords: renal cell carcinoma, pulmonary metastasectomy, lung metastases

P-120

PNEUMONECTOMY FOR NON-SMALL CELL LUNG CANCER IS SAFE AFTER NEOADJUVANT TREATMENT – EXPERIENCE OF A HIGH-VOLUME CENTER

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Objectives:

In patients with centrally located non-small cell lung cancer (NSCLC), pneumonectomy might be indicated after neoadjuvant treatment in order to achieve radical tumor resection. However, pneumonectomy after neoadjuvant treatment has been reported to be associated with increased morbidity and mortality. The aim of this study is to evaluate short-term outcome in patients with curative intent pneumonectomy for NSCLC after neoadjuvant treatment.

Methods:

We retrospectively reviewed all patients undergoing pneumonectomy at a single high-volume center between 2006 and 2016 with regard to peri- and postoperative clinical parameters. 90-day mortality of pneumonectomy after neoadjuvant treatment was defined as the primary endpoint. Clinical factors were correlated with morbidity (all case, in-hospital) and mortality by using uni- and multivariate regression models.

Results:

One hundred and fifty patients undergoing curative intent pneumonectomy for NSCLC (mean age 62 ± 9.3 years; 106 male, 71%), have been identified. 64 (43%) patients underwent neoadjuvant treatment (51 (34%) chemotherapy (CHT), 13 (9%) chemoradiotherapy (CHT/RT)). Morbidity in patients with and without neoadjuvant treatment was 23.4% vs. 22.1%, $p=0.84$, respectively. Patients had similar morbidity when undergoing neoadjuvant CHT or CHT/RT (23.5% vs. 23.1%). 30- and 90-day mortality in patients who had pneumonectomy after neoadjuvant therapy were 1.5% and 4.6%, respectively. Age older than 65 years and postoperative stage III/IV were identified as significant risk factors for increased 90-day mortality in univariate analysis ($p=0.047$ and $p=0.01$, respectively). Advanced pathological stage remained a significant risk factor for 90-day mortality in a multivariate model. Neoadjuvant treatment did not significantly influence 30- or 90-day mortality in univariate or multivariate analysis.

Conclusion:

Pneumonectomy for NSCLC performed at a high-volume center offers encouraging results with low morbidity and mortality, even in patients with neoadjuvant treatment. Patients older than 65 years and higher stages have worse short-term outcome and should be carefully selected for this procedure.

Disclosure: No significant relationships.

Keywords: pneumonectomy, non-small cell lung cancer, neoadjuvant



P-121

COMPLICATIONS AFTER COMBINED ULTRASOUND MEDIASTINAL NODAL STAGING OF NON-SMALL CELL LUNG CANCER

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Objectives:

Endosonography, and particularly combination of EBUS-FNA and EUS-FNA, referred to as combined ultrasound (CUS) has been proven highly effective in mediastinal staging of non-small cell lung cancer (NSCLC). Although considered minimally invasive, data on the safety of CUS is scarce. The aim of this study was to analyze the adverse effects of CUS in a high-volume centre.

Methods:

Retrospective analysis of hospital records of NSCLC patients who underwent CUS in a single university centre between 2010 and 2015.

Results:

A total of 1158 patients, including 814 men, mean age 66 (range: 24-88) and 344 women, mean age 64 (range: 29-85), were analyzed. In this group, the mediastinal nodes biopsy was performed transbronchially in 821 patients, transoesophageally in 279 patients and using both accesses in 324 pts. In the latter group, minor adverse effects occurred in 34 patients (10.49%). The most common complication was transient fever (>38,8) which occurred in 25 patients (7,72%) and minor haemoptysis in 7 (2,16%). In all these patients the problem was self-limiting or only conservative treatment was required. There were no severe adverse effects. A significantly higher rate of adverse effects occurred after CUS if the right lower paratracheal nodes (station 4R) were punctured, than for the left lower paratracheal (station 4L): OR - 5.75; 95% CI (1.66-19.92), ($p = 0.0058$).

Conclusion:

Adverse effects of CUS are mild and self-limiting, making this technique a safe option in mediastinal staging of NSCLC

Disclosure: No significant relationships.

Keywords: endosonographic nodal staging, adverse effects., lung cancer

P-122

PROGNOSTIC FACTORS FOR PULMONARY METASTASECTOMY IN MALIGNANT MELANOMA: SIZE MATTERS

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Objectives:

Pulmonary metastasectomy in malignant melanoma requires an individualized therapeutic decision. Due to improved medical treatment options the prognosis of melanoma patients recently improved significantly and validated prognostic factors that can identify the patients who most likely benefit from metastasectomy are urgently needed.

Methods:

We retrospectively analyzed all consecutive melanoma patients undergoing curative-intent pulmonary metastasectomy from 2010 to 2016. The prognostic impact of age, gender, presence of extrapulmonary metastasis, number of operations, number of metastasis, bilaterality and largest diameter of metastasis on the survival from metastasectomy was determined.

Results:

Sixty malignant melanoma patients underwent pulmonary metastasectomy the observation period. 28 male and 32 female patients were included with a mean (\pm SD) age of 59 \pm 15 years. Median follow-up time was 598 days. 39 patients had a single nodule, the mean number of removed metastases was 1.7 \pm 1.1 (range 1-5). 10 patients had bilateral metastases. R0 resection was achieved in 54 patients (90%). 10 patients had repetitive lung metastasectomy. 48 patients had open surgery and 12 patients were operated by VATS. 30-days mortality was 1.6%. Median survival was 1062 days with a two-year survival rate of 58%. Importantly, bilateral metastases or multiple nodules did not associate with significantly decreased overall survival after metastasectomy. Shorter overall survival was observed in male patients (HR 0.35, 95%CI 0.16 to 0.79, $p=0.011$) and in patients with nodules larger than 2 cm (HR 0.21, 95%CI 0.08 to 0.57, $p=0.002$). In multivariate analysis both gender and tumor size remained significant independent prognostic factors.

Conclusion:

Excellent overall survival rates after pulmonary metastasectomy for melanoma metastases are observed in patients with a metastatic diameter less than 2 cm and in female patients. In view of improved long-term outcome due to increased medical treatment options the selection of patients for pulmonary metastasectomy based on prognostic factors likely will become more important.

Disclosure: No significant relationships.



Keywords: pulmonary metastasectomy, tumor size, melanoma

P-123

STEP-BY-STEP PROLONGED AIR LEAK

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Objectives:

It is known that walking and breathing exercises reduce complications in the postoperative period. Prolonged air leak (PAL) is the most common complication after thoracic surgery. In our study, the relationship between the number of daily steps and PAL was evaluated.

Methods:

The patients were divided into three groups according to the surgical procedure. Group-1 consisted of spontaneous pneumothorax patients who were followed-up with tube thoracostomy, Group-2 consisted of patients who underwent sublobar lung resection, and Group-3 consisted of patients who underwent lobectomy and bilobectomy. All patients were given a standard pedometer and step counts were recorded starting from postoperative day 1, prospectively. Prolonged air leak was defined as the persistent air leak longer than 7 days.

Results:

The demographic data of the Group-1 and Group-2,3 was given in table 1 and 2 respectively. Prolonged air leak was observed in 11 (39,29%) of the 28 patients in Group-1, 1 (2,04%) of the 49 patients in Group-2 and 22 (36,07%) of the 61 patients in Group-3. Receiver operating characteristics (ROC) analysis for Group-1 showed that; if the cut-off value was taken as “2513 steps” for the first day, 100% sensitivity and 100% specificity were reached to determine the development of PAL. The relationship between first day step number, second day step number and development of PAL was significant ($p= 0.017$ and $p= 0.007$) in Group-3.

		n	(%)
Gender	Male	26	92,86
	Female	2	7,14
The average age		30,43±14,84	
Pneumothorax	Primary	21	75
	Secondary	7	25
Pneumothorax side	Right	15	53,57
	Left	13	46,43
Etiology of secondary pneumothorax	Bullous lung disease	4	14,29
	Histiocytosis	1	3,57
	Metastatic lung disease	1	3,57
	Tuberculosis	1	3,57
Patients with prolonged air leak	Primary spontaneous pneumothorax	6	21,43
	Secondary spontaneous pneumothorax	5	17,86

Table-1

		Group-2		Group-3		Total	
		n	(%)	n	(%)	n	(%)
Gender	Male	25	51,02	46	75,41	71	64,54
	Female	24	48,98	15	24,59	39	35,46
The average age	Male	53,96±17,46(18-80)		62,56±10,37(35-79)		59,54±13,81(18-80)	
	Female	56,42±15,08(21-76)		55,93±11,52(27-74)		56,23±13,66(21-76)	
	Male+Female	55,16±16,22(18-80)		60,93±10,95(27-79)		58,36±13,79(18-80)	
Operation type	Thoracotomy wedge resection	29	59,18	-	-	29	26,36
	Thoracoscopic wedge resection	20	40,82	-	-	20	18,18
	Right upper lobectomy	-	-	20	32,79	20	18,18
	Right middle lobectomy	-	-	1	1,64	1	0,91
	Right lower lobectomy	-	-	12	19,67	12	10,91
	Right upper bilobectomy	-	-	3	4,92	3	2,73
	Right lower bilobectomy	-	-	2	3,28	2	1,81
	Left upper lobectomy	-	-	15	24,59	15	13,64
	Left lower lobectomy	-	-	8	13,11	8	7,27
Histopathology	Adenocarcinoma	11	%22,45	32	52,46	43	39,09
	Squamous cell carcinoma	2	4,08	13	21,31	15	13,64
	Carcinoid tumor	1	2,04	1	1,64	2	1,81
	Metastatic lung disease	23	46,94	4	6,56	27	24,55
	Metastatic lung disease	11	22,45	4	6,56	15	13,64
	Other lung diseases	1	2,04	7	11,48	8	7,27
Prolonged air leak	(+)	1	2,04	22	36,07	23	20,91
	(-)	48	97,96	39	63,93	87	79,09

Table-2

Conclusion:

Early and sufficient postoperative mobilization is known to reduce complications. A study showing the relationship between the daily step count and PAL was not encountered in literature. We believe that our study, conceiving such terms as “postoperative daily step count”, “target step count”, and “number of daily steps for the prevention of PAL”, is a pioneering research in this regard.

Disclosure: No significant relationships.

Keywords: Step count, pedometer, prolonged air leak



P-124

WITHDRAWN

P-125

ROLE OF FLUORODEOXYGLUCOSE (FDG) POSITRON EMISSION TOMOGRAPHY/COMPUTED TOMOGRAPHY (PET/CT) ON PREOPERATIVE MANAGEMENT OF THYMIC EPITHELIAL TUMOURS

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Objectives:

To investigate the role of FDG-PET/CT on predicting malignancy and invasiveness of thymic epithelial tumours.

Methods:

Single-centre analysis including 60 patients operated from January 2010 to December 2017. The FDG-PET/CT parameters evaluated were: tumour SUVmax (T); tumour SUVmax/tumour size (T/d); tumour SUVmax/volume (T/vol); tumour to spleen (T/S), tumour to liver (T/L), tumour to blood pool (T/BP) SUV ratio. WHO-histological types were grouped in: low-risk (A, AB, B1) vs high-risk (B2, B3, carcinoma) tumours or thymomas vs carcinomas. Masaoka stages were considered as early (I, II) and advanced (III, IV).

Results:

WHO histology: 5 A, 16 AB, 6 B1, 15 B2, 6 B3, 12 carcinoma. Masaoka stage: 28 I, 12 II, 9 III, 11 IV. No statistically significant differences in tumour size and volume neither between low-risk and high-risk tumours nor between thymomas and carcinomas. T (r: 0.60, p<0.0001), T/d (r:0.44, p=0.001), T/S (r:0.51, p=0.0002), T/L (r:0.49, p=0.0003), T/BP (r:0.49, p=0.0019) significantly correlated with histology. Similarly, T (r:0.55, p<0.0001), T/d (r:0.29, p=0.03), T/S (r:0.39, p=0.006), T/L (r:0.38, p=0.0065), T/BP (r:0.37, p=0.008) significantly correlated with stage. No correlation was observed between T/vol and histology nor stage. According to univariate logistic regression model, T and T/d resulted as predictive factors in distinguishing low-risk from high-risk tumours (p=0.02, ROC-curve:0.779 and p=0.008, ROC-curve:0.7195). All the parameters but T/vol were predictive to define carcinomas from thymomas; the most effective was T (p=0.001, ROC-curve:0.913). T, T/S, T/L, T/BP were all useful to distinguish low stages from high stages, but T and T/S resulted as the most significant (p=0.01, ROC-curve:0.810 and p=0.02, ROC-curve:0.762, respectively). As T resulted the most effective parameter, we calculated the cut-off value to identify low-risk vs high-risk (3.28), thymoma vs carcinomas (5.65) and early vs advanced stage (5.25).



Conclusion:

FDG-PET/CT may be helpful to assess the grade of malignancy and to distinguish early from advanced stages.

Disclosure: No significant relationships.

Keywords: FDG-PET/CT, thymic epithelial tumors, SUVmax

P-126

ROBOTIC ASSISTED LOBECTOMY VERSUS TRIPORTAL VIDEO-ASSISTED THORACOSCOPIC SURGERY (VATS) LOBECTOMY: A MONOCENTRIC PROSPECTIVE RANDOMIZED TRIAL.

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Objectives:

Recently the minimally invasive lobectomy has become the treatment of choice for early stage NSCLC. Robotic Assisted Surgery is the natural evolution of minimally invasive techniques. Despite many studies confirmed no inferiority of Robotic Surgery compared to VATS there are few evidences of advantages.

Methods:

This is a monocentric, prospective, randomized trial in which patients suitable for minimally-invasive lobectomy were randomized 1:2 in two groups: Group A, Robotic lobectomy, and Group B, triportal VATS lobectomy. We had 25 patients for group A and 50 for group B and compared them in terms of operative time, pleural effusion, VAS scale for pain, post-operative complications and length of hospitalization.

Results:

The study started October 15th 2016 and closed on December 17th 2017. No differences were observed between the two groups in terms of hospital stay (6.6 ± 2.2 vs. 7 ± 3.6 , $p=0.682$). We observed lower pleural effusion on day 1 (140 vs. 214 ml, $p=0.003$) and 2 (186 vs. 321 ml, $p=0.001$) in group A. VAS scale showed lower pain on day 1 in group A (0.92 vs. 1.17, $p=0.005$). Surgery time in Group B was significantly lower (190 vs. 210', $p=0.036$). No differences emerged for complications rate (8/25 vs. 23/50, $p=0.44$) and air leak (4/25 vs. 11/50, $p=0.614$) while we found a significant difference in the onset of atrial fibrillation and other cardiac arrhythmias (0/25 vs. 9/50, $p=0.038$).

Conclusion:

Both techniques are equally safe and feasible, Robotic surgery is associated with a significant reduction in pleural effusion, pain on day 1 and lower incidence of cardiovascular postoperative complications. Vats lobectomy has a significant lower operative time. Despite significance these results have a very low clinical relevance as demonstrated by the same length of staying. On the basis of these findings however, we can speculate that the Robotic approach is more precise and accurate in manipulation of tissues.

Disclosure: No significant relationships.

Keywords: robotic surgery, minimally invasive, NSCLC, VATS lobectomy.



P-127

QUANTITATIVE MEASUREMENT OF AIR LEAK IN PATIENTS WITH CHEST DRAINS

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Objectives:

Prolonged air leak (PAL) is a common morbidity in patients with spontaneous pneumothorax (SP), as well as those who undergo lung resection. In our study, we developed a new and practical method for measurement of peak air leak speed (PALS) and peak air leak flow (PALF), which is considerably different and cheaper from conventional methods. We tried to obtain a new prognostic parameter that enables detection of PAL in advance.

Methods:

The study was a prospective study. The degree of air leak in patients was measured with the help of an anemometer connected to the top of a standard underwater drainage system (UDS), and a mobile phone with Android operating system (Image-1). Patients who underwent tube thoracostomy (TT) for SP were assigned to Group 1, whereas patients who underwent lung resection were Group 2. The receiver operating characteristics (ROC) analysis was performed to determine the correlation between measured PALF, and PAL development.

Results:

PAL was observed in five of 19 patients (26.3%) in Group 1, and in six of 53 patients (11.3%) in Group 2. Analysis of Group 1 measurements showed that first measurement on day 0 could detect PAL development with 100% sensitivity and 92.9% specificity. Analysis of Group 2 measurements were similar and showed that first measurement on day 0 could detect PAL development with 100% sensitivity and 87.2% specificity.

Conclusion:

Having significantly lower costs compared to digital drainage systems and owing to their ease of use, anemometers may find practical use in the clinic. In addition, PALF values may be allow early detection of PAL.

Disclosure: No significant relationships.

Keywords: air leak classification, prolonged air leak, peak air leak flow.

P-128

PULMONARY ARTERY RECONSTRUCTION COMPARED TO PNEUMONECTOMY: A PROPENSITY SCORE MATCHING STUDY

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Objectives:

Pneumonectomy is a surgical procedure for locally-advanced lung cancers, but it is burdened by high mortality and morbidity rates. Reconstruction of the pulmonary artery (PA) (angioplasty, sleeve resection, pericardial patch, prosthetic conduit), associated with parenchymal sparing techniques, is meant to be an alternative to pneumonectomy. In the present study we analyzed surgical and oncological results, comparing patients who underwent pneumonectomy with those receiving lobectomy by means of PA resection/reconstruction.

Methods:

Single-center retrospective study on clinical and oncological data of all patients undergoing pneumonectomy or arterial reconstructive procedures between 1994 and 2016. After propensity score matching, 189 patients were selected, 75 pneumonectomies and 114 lobectomies with PA reconstruction (49 angioplasty, 25 patch reconstructions, 34 sleeve resections, 6 prosthetic replacement) for statistical analysis.

Results:

Among patients undergoing arterial reconstruction, bronchoplastic procedures were associated in 52 cases (45.6%). R0 resection was achieved in 89.3% in pneumonectomies compared to 88.5% in the other group ($p=0.874$). Regarding post-operative outcome, the comparison showed an higher 30-day (5% vs 0%, $p=0.013$) and 90-day (11% vs 1%, $p=0.002$) mortality rates in pneumonectomies together with a higher morbidity trend (48% vs 37%, $p=0.592$) compared to PA reconstructions. In the latter group, 4.76% of patients showed reconstructive-related complications. Long-term results showed an equivalence of the two surgical approaches regarding 5-year overall survival (36% in pneumonectomy vs 38% in PA reconstructions) and 5-year disease free survival (50% in pneumonectomy vs 45% in PA reconstructions). The rate of recurrence did not differ between the two groups both for loco-regional (12% vs 17%, $p=0.33$) and distant recurrence (37% vs 31%, $p=0.38$) sites.

Conclusion:

Although technically demanding, PA reconstruction with lung sparing represents a reliable and safe alternative to pneumonectomy, with reduced short-term mortality and low rate of procedure-related complications. From the oncological point of view, long-term outcomes are comparable, in terms of both rate and site of recurrence.

Disclosure: No significant relationships.

Keywords: lung cancer, pneumonectomy, arterial reconstruction, sleeve resection

P-129

COMPARING SEVENTH AND EIGHTH EDITION OF THE TNM CLASSIFICATION FOR LUNG CANCER ON 965 PATIENTS

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Objectives:

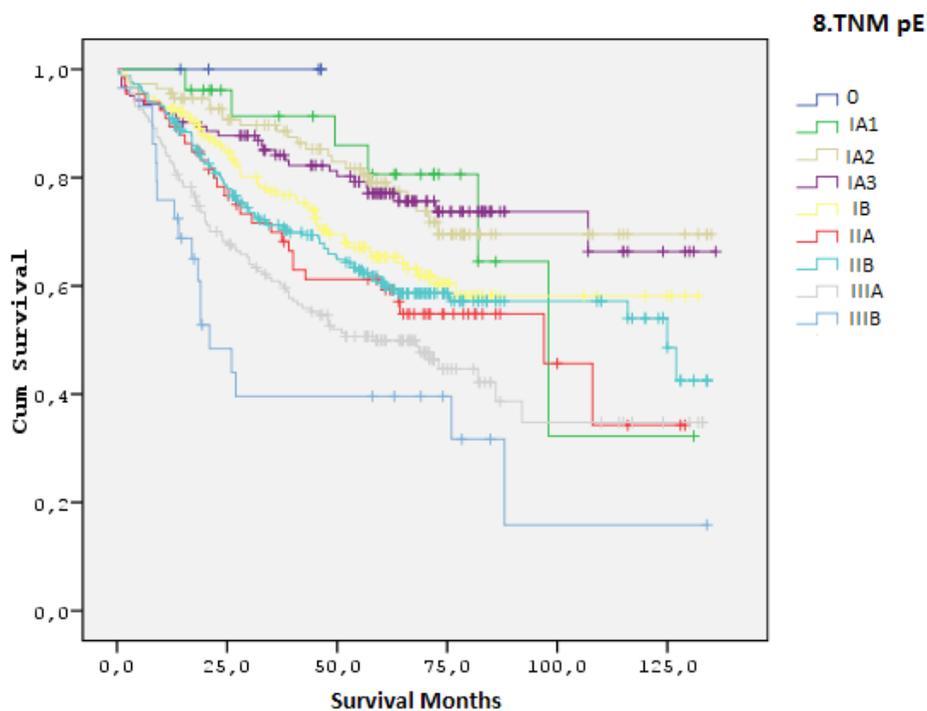
The 8th TNM Lung Cancer Classification was published in 2015 and it has a lot of changes from the previous one. New classification included huge number of Asian patients and it is assumed that more homogeneous staging groups are formed. In this study we aimed to evaluate the 8th TNM classification effectiveness on our patient cohort by comparing it with the previous classification.

Methods:

This study included 965 patients operated in our clinic between 2004 and 2016 who had systematic nodal dissection and complete survival data. Patients' age, sex, resection type, tumor histology, tumor size, 7. and 8. TNM classification data and survival data were collected and analysed.

Results:

One hundred and thirty nine (%14,4) patients were female. Mean age was 61,6 (24-84). 598 (%62) patients underwent lobectomy, 276 (%28,6) patients pneumonectomy, 91 (%9,4) patients underwent sublobar resection. 475 (%49,2) patients have adenocarcinoma, 394 (%40,8) patients squamous cell carcinoma, 96 (%10) patients have other cell types. 691 (%71,6) patients were pathological N0, 172 (%17,8) patients N1 and 102 (%10,6) patients were N2. 5-year overall survival rate was %63,7. Old and new pathological T stage grouping, pathological stage grouping, pairwise survival analysis, multivariate survival analysis and survival graphics are shown in tables and figures (Table 1-4, Figure 1-2).

**Conclusion:**

Although there are more stage groups in new classification, groups are more homogeneous and discrete. As a result, 8. TNM classification seems to be more accurate and effective.

Disclosure: No significant relationships.

Keywords: 8. TNM, lung cancer, staging

P-130

PREOPERATIVE ADDITION OF ANTI-ANGIOGENIC BEVACIZUMAB TO STANDARD INDUCTION CISPLATIN/PEMETREXED DOES NOT INCREASE THE RISK OF ACUTE POSTOPERATIVE BLEEDING AFTER SURGERY FOR MALIGNANT MESOTHELIOMA

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Objectives:

Adding anti-angiogenic Vascular Endothelial Growth Factor (VEGF) inhibitor bevacizumab to doublet cisplatin/pemetrexed (cis/pem) in 2nd line treatment for malignant pleural mesothelioma was reported to have a significant improvement on overall survival. In the present analysis, we report for the first time on surgical mortality and morbidity when bevacizumab (avastin) was used as induction therapy before pleurectomy/decortication (P/D) for mesothelioma.

Methods:

Fifteen patients were treated with three to six cycles of induction chemotherapy with cis/ pem and bevacizumab whereas the last cycle prior to surgery was conducted without bevacizumab. The period between last cycles of chemotherapy and surgery has been 4-6 weeks and 10 weeks for the last dose of bevacizumab in all patients. The use of erythrocytes until postoperative day (POD) 14 was analyzed. Standardized, tumor response to induction chemotherapy was assessed by modified response criteria in solid tumors (mRECIST) in a restaging CT scan as shown in Figure 1. The present patient cohort was compared with a historical cohort undergoing doublet induction chemotherapy with cis/pem alone.

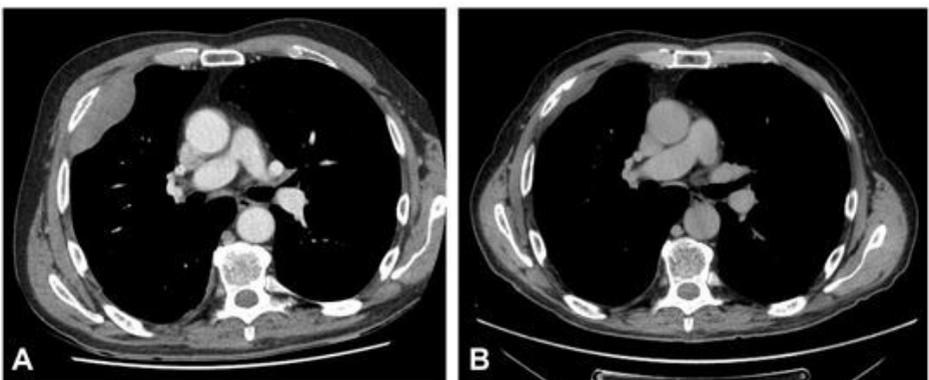


Figure 1: CT pre (A) and post (B) chemotherapy

Results:

According to mRECIST criteria, all patients, except four with partial remission (PR), showed a stable disease (SD) after triplet chemotherapy and no significant difference was seen between both groups ($p=0.3$). None of the patients showed intraoperative or postoperative bleeding complications. 90-day mortality was zero. The median intraoperative blood loss in the bevacizumab group was 650ml and in the historical group 750ml without necessity of blood transfusion in both groups. The use of erythrocyte concentrates was not higher during the first 2 weeks compared to our historical control.

Conclusion:

These initial data demonstrate that P/D can be performed safely if appropriate time frames are respected between last cycle of chemotherapy and surgery. Response rates were not different when adding bevacizumab, but overall survival (OS) of this triplet induction chemotherapy has to be further evaluated.

Disclosure: No significant relationships.

Keywords: malignant pleural mesothelioma, anti-angiogenic therapy, bevacizumab, hemorrhage, avastin, induction chemotherapy

P-131

LYMPHOCYTE TO MONOCYTE RATIO PREDICTS SURVIVAL IN OPERATED NON-SMALL CELL LUNG CANCERM. Ciftci, A. Bolukcu, I. Sarbay, M.B. Sozen, H.V. Kara, K. Kaynak, Akif Turna*Department of Thoracic Surgery, Istanbul University Cerrahpasa Medical School, Istanbul, Turkey***Objectives:**

Tumor immunity promotes tumor initiation, progression, metastasis and plays a major role in the prevention of systemic response and anti-tumor response. It has been shown that, tumor associated neutrophils and tumor associated macrophages have stimulatory effects on tumor proliferation, angiogenesis, tumor invasion and metastasis. We aimed to analyze the potential correlation between survival and preoperative inflammatory and metabolic parameters in surgically resectable non-small cell lung cancer (NSCLC).

Methods:

A total of 656 patients with resected NSCLC seen between January 2004 and June 2017 were included in the study. Possible prognostic factors such as presence of diabetes mellitus(DM), gender, age, smoking history, clinical stage, histology and laboratory parameters including leukocyte, monocyte, lymphocyte counts were recorded. Survival analysis was performed using Kaplan-Meier test. Differences in survival were determined using log-rank test in the univariate analysis, and multivariate analysis was done using the Cox proportional hazards regression model. We defined the cut-off values for predicting OS and other parameters in NSCLC patients as 5 for NLR, 2.8 for LMR, $10 \cdot 1000/\text{mm}^3$ for leukocyte count, 10 for SUV_{max} of tumor.

Results:

The overall survival of patients who had higher lymphocyte to monocyte ratio(LMR) (Mean;69,4 months ,95%confidence interval:55,5-83,2 months) was found to be higher compared to that of patients with lower LMR (Mean;32,7months ,95%confidence interval:26,9-38,4 months p=0.045). Lower (≤ 5.0) neutrophil to lymphocyte (NLR) was associated with better survival (Mean;66,7 months ,95%confidence interval:53,4-79,9 months versus Mean;26,9 months ,95%confidence interval:17,4-36,3 months; p=0.001). On the other hand, the patients whose tumor had higher SUV_m (>10) values demonstrated lower survival (Mean;72,1 months ,95%confidence interval:64,3-79,8 months versus Mean;88,0 months; 95%confidence interval:78,8-97,1 months; p=0.046). By multivariable analysis T factor, N factor, higher NLR were independently associated with worse survival (odds ratio, 6,46;95% confidence interval, 1,51-27,7; p=0,012).

Conclusion:

The preoperative NLR and LMR were significantly associated with a poor prognosis in NSCLC patients who underwent resectional surgery.

Disclosure: No significant relationships.

Keywords: lymphocyte-to-monocyte ratio, non-small cell lung cancer, neutrophil-monocyte ratio, prognostic factor, surgical resection.

P-132

10 CENTIMETRE (CM) MAY BE THE NEW CUTOFF VALUE FOR TUMOR SIZE !

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Objectives:

In the 7th TNM lung cancer classification tumors greater than 7 cm were classified as T3 but in the 8th TNM classification they are reclassified as T4. In this study we tried to evaluate if there is another cutoff point for size of tumors greater than 7 cm.

Methods:

Between 1994 and 2013, 239 (%97.1 male) Non-small cell lung cancer patients whose tumor size were greater than 7 cm operated in our clinic. Patients with pathological N1 or N2 diseases were excluded. Patients were divided into two groups according to tumor size: Group 1:70-99 mm, group 2: ≥ 100 mm. These two groups were analysed for age, sex, resection type, tumor histology and survival.

Results:

150 (%62.6) patients were pN0, 43 (%18.2) patients pN1 and 46 (%19.2) patients pN2. For pN0 patients tumor histology was grouped as 84 (%56.2) patients squamous cell carcinoma, 44 (%28.9) patients adenocarcinoma, 22 (%14.9) patients other types. Between group 1 and 2 there were no significant difference for age, sex, resection type and tumor histology ($p > 0.05$). 5 year overall survival rate for patients was %52,8. Group 1 patients have a significantly better 5 year survival than group 2 patients (5ys %61 / $< \%10$, $p:0.002$) (Figure 1). In multivariate analysis tumor size grouping according to new cutoff value 10 cm was found to be independent prognostic factor on survival (HR:3.197, %95CI:1.554-6.577 $p:0.002$).

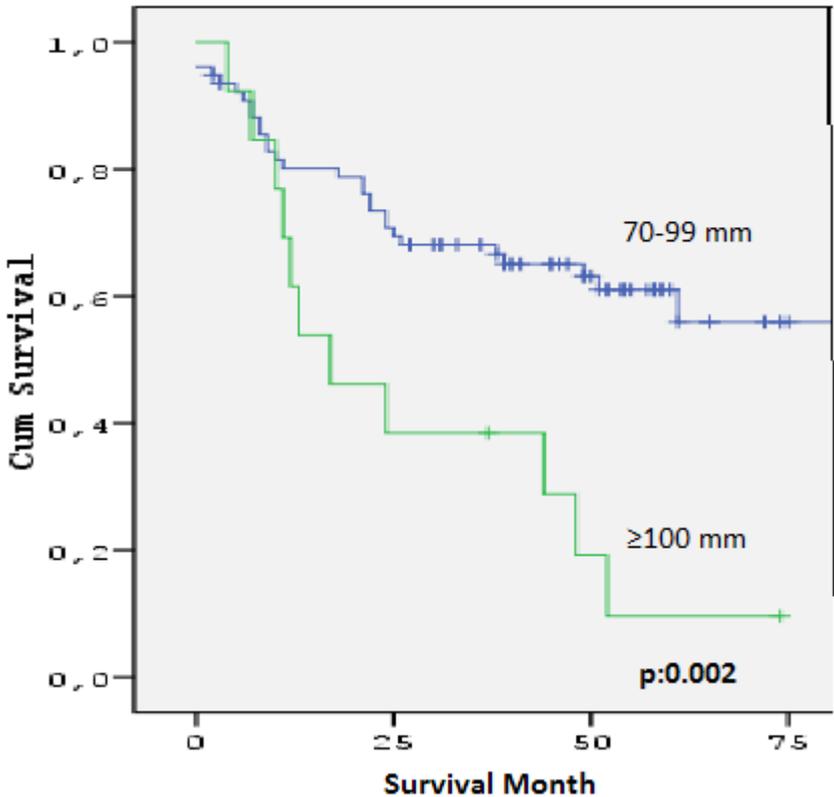


Figure 1: Survival analysis for pN0 patients according to tumor size

Conclusion:

For pN0 patients with tumor size greater than 7 cm when tumor size gets over 10 cm a significant survival decrease occurs. If this result can be supported with larger patient series, 10 cm may be a new cutoff value for T descriptor in the upcoming TNM lung cancer classification (T4a-b?).

Disclosure: No significant relationships.

Keywords: 10 cm, lung cancer, staging, tumor size.

P-133

NUTRITIONAL STATUS AFTER ESOPHAGECTOMY: A WORD OF CAUTION FOR MALE PATIENTS

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Objectives:

Survivors following esophagectomy experience a variety of digestive problems, including dumping syndrome, anemia and malnutrition. We analyzed the body composition and quality of life of esophagectomy patients.

Methods:

Twenty six of 63 surviving esophagectomy patients with no evidence of recurrence were analyzed. The patients underwent routine physical examination, blood analysis (including complete blood count, electrolytes, proteins and micronutrients), Tanita body composition analysis and completed SF-36 quality of life questionnaire. Change in body mass index (BMI) was analyzed based on gender, surgical technique, preoperative chemoradiation and duration of survival (≤ 2 years, > 2 years). Fisher's exact, student t-test, Chi square were performed for statistics.

Results:

Average age was 53 ± 12 (29-73, 15 females). Median follow-up was 102 months (2-162). Minimally invasive esophagectomy was performed in 19 (14 Ivor Lewis). Average hospital stay was 10.3 ± 4 days. Mean preoperative and current BMI were 26 ± 5.7 and 23.1 ± 4.8 kg/m² ($p=0.0004$). Average decrease in BMI was $10 \pm 12.1\%$. Mean recent fat mass was 13.9 ± 8.9 kg. There was a need for fat mass gain in excess of 5 kg in 11 patients (7 were males). Postoperative loss of more than 15% of BMI was seen 7/11 male and 4/15 female patients ($p=0.1$). Despite significant malnutrition (BMI <18.5) in 4 patients, only one patient had low albumin. There was no difference in quality of life scores between male and female patients (Figure 1). There were significantly higher energy levels in patients, who were more than 2 years past surgery ($p=0.05$). Hemoglobin levels were inversely correlated with physical functioning and emotional well-being ($p=0.008$ and $p=0.05$ respectively).

Table 1. SF-36 scores of male and female patients.

	Physical functioning	Role limitations due to physical health	Role limitations due to emotional problems	Energy/Fatigue	Emotional well-being	Social functioning	Pain	General health
<i>Male (n=11)</i>	70±24	64±44	79±31	70±23	63±24	78±28	61±47	75±21
<i>Female (n=15)</i>	67±18	42±47	69±26	60±17	47±25	68±29	38±45	67±13
<i>Whole Cohort (n=26)</i>	68±20	51±46	73±28	64±20	54±26	72±29	47±46	70±17
<i>P value</i>	0.72	0.24	0.22	0.12	0.27	0.36	0.41	0.21

Conclusion:

Males lose much more weight than females after they undergo esophagectomy which obviates the need for better nutritional support. Hemoglobin levels should be monitored for overall well being of the patients.

Disclosure: H. Batirel: Johnson and Johnson

Keywords: quality of life analysis, esophagectomy, body composition analysis

P-134

ORIGINAL APPROACH FOR CLOSURE OF THE RIGHT POST-PNEUMONECTOMY BRONCHIAL FISTULA IN CASES OF MULTIDRUG AND EXTENSIVELY DRUG RESISTANT (M-/ XDR) PULMONARY TUBERCULOSIS

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Objectives:

Insufficient efficacy of standard trans-sternal approach for closure of the right bronchial fistulas became the impetus for the development of new surgical technique. The aim: to investigate efficacy and safety of new surgical approach for post-pneumonectomy tuberculosis empyema with bronchial fistula.

Methods:

Eight patients with specific pleural empyema with bronchial fistula after pneumonectomy were included in the trial from 2014 to 2017. Bacteriological examination of pleural fluid found M-/XDR MTB in 8 cases, pseudomonas aeruginosa in 5 cases and aspergillus in 1 case. Complex treatment with chest tube thoracostomy and endoscopic procedures was failure. Four patients had ineffective transsternal occlusion of the right main bronchus. After open window thoracostomy and stabilized of empyema patients were underwent transpleural resection of bronchial stump and its myoplasty with subscapular muscle. Original method consisted in paravertebral approach with resection from first to fifth ribs. Carefully isolation of the bronchial stump, resection and closure of the fistula with myoplasty were performed after that. Vacuum assisted closure system in pleural cavity was applied in early postoperative period.

Results:

Overall operative time was 224 min (195-335 min), overall blood loss was 207 ml (50-300 ml). Relapse of the fistula was found in early postoperative period in 2 cases (25%). One patient was readmitted one month later after surgery with micro-fistula (treated by endoscopy). Other surgical complications were presented by progression of empyema (37,5%), bleeding (12,5%), and progression of tuberculosis in a single lung (12,5%). One patient (12,5%) was died due to progression of empyema with secondary esophageal fistula and septic endocarditis.

Conclusion:

Original method of closure of the bronchial fistula with subscapular muscle flap after right pneumonectomy associated with acceptable morbidity and mortality. Main benefits of new method are possibility of resection and myoplasty of bronchial stump after previously multiple surgeries (when other methods are invalid) and good cosmetic effect.

Disclosure: No significant relationships.

Keywords: tuberculous pleural empyema, closure of the bronchial fistula after pneumonectomy, thoracic surgery for surgical complication

P-135

THE EFFECT OF DISSECTED LYMPH NODE STATION NUMBER ON SURVIVAL OF N0 NON SMALL CELL LUNG CANCER (NSCLC) PATIENTS

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Objectives:

The extent of lymph node dissection type is still a debate for NSCLC. In this study we evaluated if dissected lymph node station number have an effect on survival of pathological N0 patients and what is the ideal number of lymph node stations to be dissected.

Methods:

Between 1994 and 2013, 1418 clinically N0 NSCLC patients underwent operation in our clinic. 157 (%11) were female and 1261 (%89) were male. Mean age was 59,4 (24-84). Patients' age, sex, tumor size, tumor histology, resection type, pathological N stage, dissected lymph node station number were recorded. Pathological N0 patients were divided into two groups according to dissected lymph node station number; Group 1: <4 station and group 2: ≥4 station and survival analysis was made between these two groups.

Results:

Six hundred and fifty two (%46) patients were squamous cell carcinoma, 573 (%40,4) patients adenocarcinoma and 193 (%13,6) patients were other cell types. 143 (%10,1) patients underwent sublobar resection (wedge or segmentectomy), 917 (%64,7) patients lobectomy and 358 (%25,2) patients underwent pneumonectomy. Dissected mean lymph node station number was 3,37. Pathologically %71.2 patients were N0, %16.1 N1, %12.7 patients were N2. According to pathological N stage mean dissected lymph node station numbers were as follow p N0:3.2, p N1:3.97 and p N2:3,98. Between group 1 and 2 there wasn't any significant difference on age, sex, tumor histology and resection types ($p>0.05$). Group 2 patients have significantly higher survival rates than group 1 patients ($p: 0,002$). In multivariate analysis dissected lymph node station number was found to be an independent prognostic factor on survival (HR: 0.777, %95 CI: 0.637-0.947, $p: 0,013$).

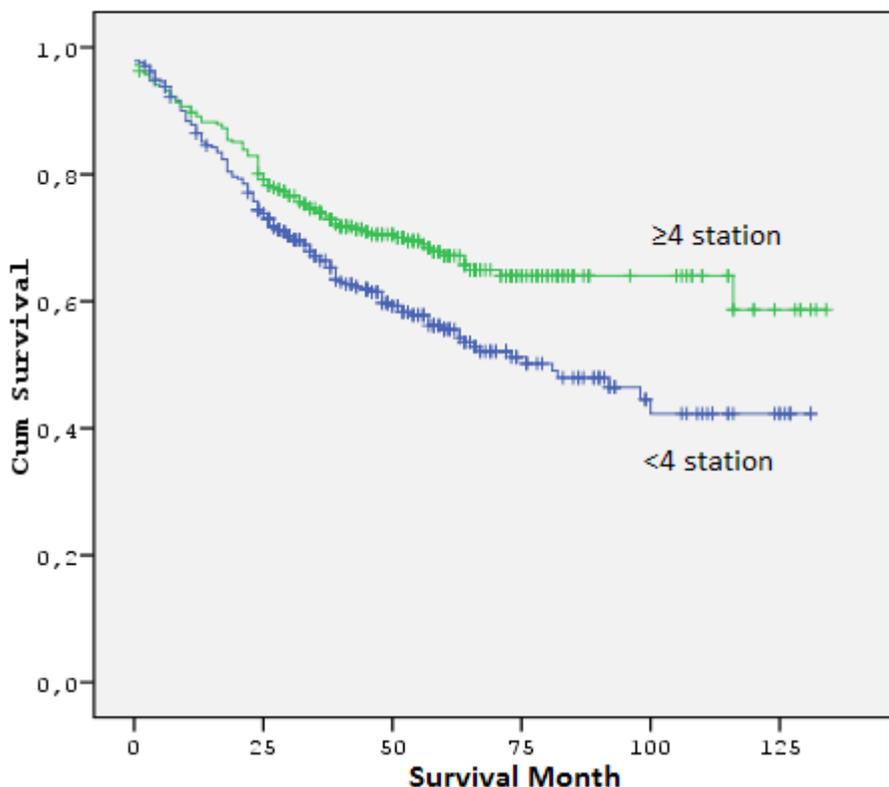


Figure 1: Survival analysis according to dissected lymph node station number among pathologic N0 patients

Conclusion:

At least 4 nodal station must be dissected for clinical N0 NSCLC patients during resection. For lesser dissections pathological N0 results can't be assumed.

Disclosure: No significant relationships.

Keywords: lymph node station number, lung cancer, survival

P-136

ANTI-PLATELET THERAPY COMPLICATIONS IN PATIENTS UNDERGOING LUNG ANATOMICAL RESECTIONS

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Objectives:

Anti-platelet therapy management in patients undergoing lung anatomical resection is controversial. Here we determined the impact of single or dual anti-aggregation on the postoperative morbidity/mortality.

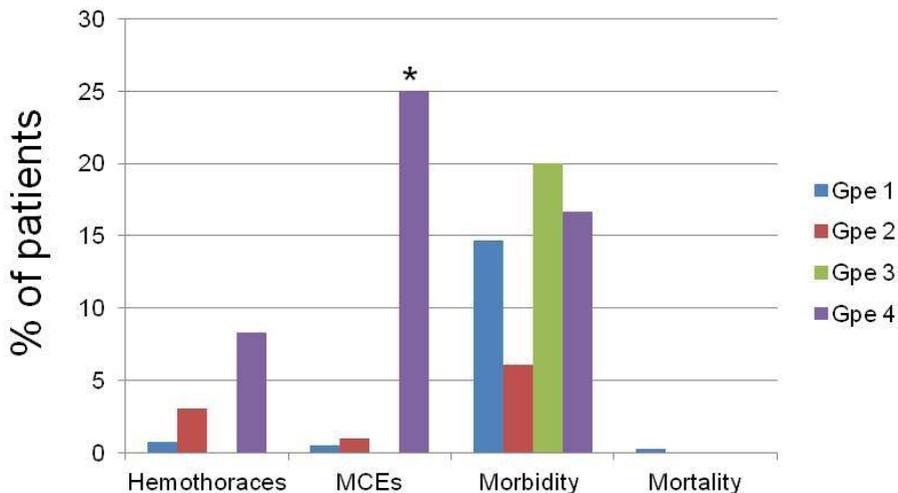
Methods:

We reviewed 494 prospectively collected files of patients who underwent lung anatomical resections between 2012 and 2015. Patients on dual anti-platelet therapy were switched to a single regimen before surgery when possible. Patients on single anti-platelet therapy were kept on their treatment. We determined the morbidity/mortality, the occurrence of hemothoraces requiring intervention and of major cardiovascular events (myocardial infarct and stroke, MCEs) in four groups: no anti-aggregation therapy (n=383, groupe 1), aspirin only (n=99, groupe 2), clopidogrel only (n=5, groupe 3) and aspirin + clopidogrel (n=12, group 4).

Results:

The surgical approach was comparable between groups (VATS in 305, 61% and thoracotomy in 189, 49% patients). Postoperative hemothoraces (n=12) developed in 0.8%, 3%, 0% and 8% of patients from groups 1 to 4 respectively. Major cardiovascular events (1 stroke and 5 myocardial infarcts) occurred in 0.5%, 1%, 0% and 25% of patients from groups 1 to 4 and were significantly more common in group 4 ($p<0.05$). Morbidity was comparable between groups and one in-hospital postoperative death occurred in a patient from group 1 following a massive pulmonary embolism.

Postoperative complications

**Conclusion:**

Single anti-platelet therapy continuation in patients undergoing lung anatomical resection is not associated to increased morbidity/mortality. High risk patients with dual anti-platelet therapy have significantly more MCEs and a trend to more postoperative bleeding although this does not increase in-hospital mortality

Disclosure: No significant relationships.

Keywords: anti-aggregation therapy, lung anatomical resection, morbidity/mortality, major cardiovascular events

P-137

DOES N2 LYMPH NODE SIZE AFFECT SURVIVAL OF SINGLE STATION N2 POSITIVE PATIENTS?

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Objectives:

For N2+ NSCLC patients treatment planning is a controversial issue. In this study we aimed to evaluate the prognostic factors for survival of patients with single station N2+ patients.

Methods:

Between 1994 and 2013 1975 NSCLC patients were operated in our clinic. We included only 47 patients treated with anatomical resections, single station pathologically proved N2 positive and have accessible survival information. Patients' age, sex, tumor size (≤ 4 cm / > 4 cm), clinic and pathologic tumor stage, resection type, sampled lymph node station number, tumor histology, pathological N1 positivity, positive N2 lymph node size ($\leq 1,5$ cm / $> 1,5$ cm) were recorded and they were analysed for their effect on survival.

Results:

Seven (%14.9) patients were female and mean age was 60.1 (34-81). Mean tumor size was $39.2 \text{ mm} \pm 17.6 \text{ mm}$. %51 patients underwent lobectomy and %49 patients underwent pneumonectomy. %44.7 patients have squamous cell carcinoma, %49 patients adenocarcinoma and %6.3 have other cell types of tumor. According to the pathologically positive N2 lymph node size %63.8 patients were in group 1 ($\leq 1,5$ cm) and %36.2 patients were in group 2 ($> 1,5$ cm). Patients with bigger N2 lymph node (group 2) have significantly better 5 year survival rate than smaller ones (group 1) (%75.6 / %35.8 p:0.004). In multivariate survival analysis N2 lymph node size grouping was found to be an independent prognostic factor (HR:0.167 %95CI:0.050-0.561 p:0.004).

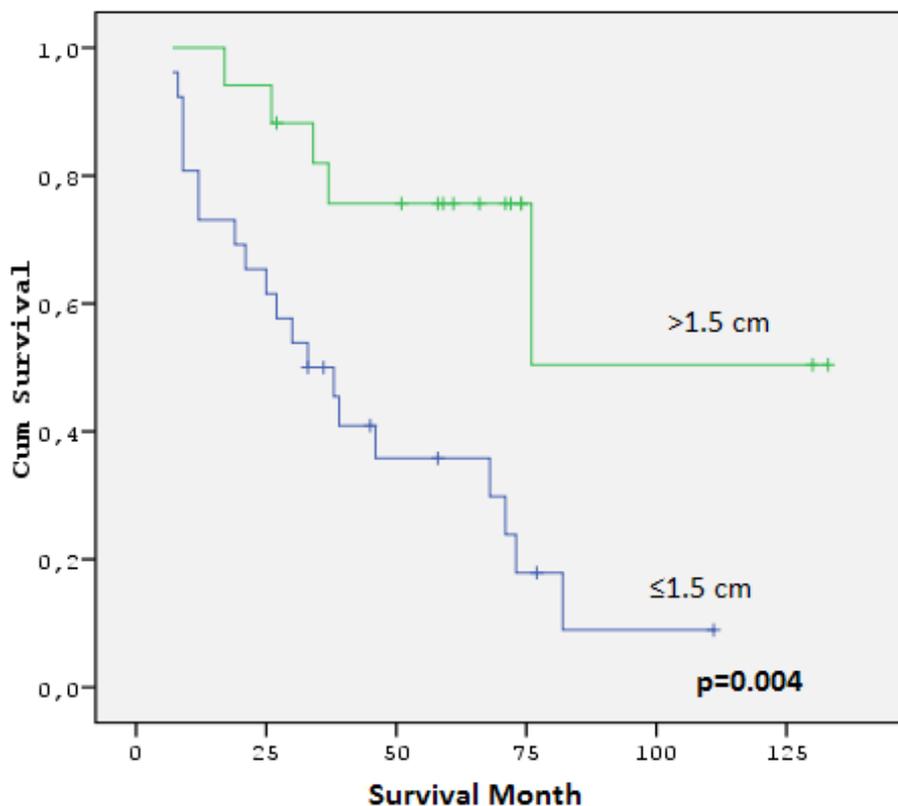


Figure 1: Survival analysis according to metastatic N2 lymph node size

Conclusion:

In this study we find out that for single station N2+ patients if N2 lymph node size is bigger than 1.5 cm, patients may have better survival with surgical resection. This result may be due to lymph node drainage blockage and lack of systemic dissemination as well as tumor genetics.

Disclosure: No significant relationships.

Keywords: single station N2, lung cancer, prognostic factors, survival

P-138

BIOADAPTABILITY OF 3D PRINTING MATERIAL NYLON 680 CO-POLYMER THAT CAN BE USED FOR CHEST WALL RECONSTRUCTIONNezih Onur Ermerak¹, T. Lacin², B. Sayan¹, M. Yuksel¹¹*Thoracic Surgery, Marmara University School of Medicine, Istanbul, Turkey*²*Thoracic Surgery, Marmara University, Faculty of Medicine, Istanbul, Turkey***Objectives:**

3D printing gained popularity among all fields of science in the recent years. New reports about utilization of 3D printing in terms of medical devices and human implants has been published. We presented our experience with 3D Printing in 24th ESTS Conference Copenhagen 2016 Young Investigator Award Session in an animal model on chest wall reconstruction. We hereby prove that our material Nylon 680 Co-Polymer, which is used in 3D Printing, is bioadaptable and can be used on human subjects.

Methods:

We produced ribs in different shapes and sizes Nylon 680 Co-Polymer/ FDA approved material (Taulman3D, Saint Peters, MO, USA) by using 3D Printer (Afinia H480, Chanhassen, MO, USA). We designed a project in concordance with The Scientific and Technological Research Council of Turkey (TUBITAK) consisting of 7 different tests. Printed materials had been delivered to Marmara Research Center-Genetic Engineering and Biotechnology Institute of TUBITAK. these 7 tests include; 1- Cytotoxicity (ISO 10993-5) 2- Sensitization (ISO10993-10) 3- Irritation and intracutaneous reactivity (ISO10993-10) 4- Acute Systemic Toxicity (ISO10993-11) 5- Subacute Systemic Toxicity (SIO10993-11) 6- Genotoxicity (OECD 471) 7- Implantation (ISO 10993-6).

Results:

It is reported after 8 weeks that Nylon 680 Co-Polymer is safe for using in interventions on human subjects. All of those tests revealed that our material is not toxic-bioadaptable to human tissues and genes following implantation.

Conclusion:

By the help of this project we proved that Nylon 680 Co-Polymer is a 3D Printing material that can be safely used for medical interventions on human subjects. This brought forward producing custom made implants according to the necessity of the patients designed by ourselves. We can produce any kind of implant by the help of medical tests and imaging modalities without the need for ordering it to commercial companies. We can produce custom-made implants, instruments etc. by ourselves with low cost in shorter time. *This project is funded by Marmara University Scientific Research Projects Committee (BAPKO).

Disclosure: No significant relationships.

Keywords: 3D printing, Nylon 680 Co-Polymer, custom made, medical instruments, chest wall reconstruction

P-139

PREVALENCE OF PERIOPERATIVE VENOUS THROMBOEMBOLISM (VTE) AFTER LUNG SURGERY IN CHINA: A SINGLE CENTER, PROSPECTIVE COHORT STUDY IN PATIENTS UNDERGOING MAJOR LUNG RESECTIONS WITHOUT PERIOPERATIVE VTE PROPHYLAXISY. Shargall¹, Hui Li², C. Song², B. Tian², S. Chen², J. Miao², Y. Fu², B. You², B. Hu²¹*Surgery, McMaster University, Hamilton, ON, Canada*²*Thoracic Surgery, Beijing Chao-Yang Hospital, Capital Medical University, Beijing, China***Objectives:**

Post-operative Venous Thromboembolism (VTE), including Deep Vein Thrombosis (DVT) and Pulmonary Embolus (PE), has a reported incidence of 2.3%- 15%. Best practices provide patients with perioperative chemical VTE prophylaxis, but that practice is seldom used in China. We conducted the first prospective single-center cohort study in China to evaluate VTE incidence in patients undergoing major lung resection without prophylaxis.

Methods:

Patients underwent lung resections without perioperative VTE prophylaxis between July 2016 and March 2017. Venous Ultrasound Doppler of lower extremities was performed immediately prior surgery and up to 30 days postoperatively, excluding patients with preoperative VTE. CT pulmonary angiography was performed if patients had symptoms of PE, Caprini risk assessment model (RAM) score of ≥ 9 , or new post-operative DVT. Outcomes were assessed using descriptive statistics and multivariate logistic regression.

Results:

The cohort (n=262) included 43% females (mean age 55), undergoing lung resection (67.4% lobectomy, 77.4% MIS), 147 for malignant diagnoses. Most patients (144/147, 98%) with malignant diagnosis had moderate (5-8, 125/147) or high (≥ 9 , 19/147) RAM score. 30 patients (11.5%) were diagnosed with VTE (80% DVT and 20% concomitant PE and DVT). Mean time for VTE diagnosis was 4.97 days (2-23d), 93% within one week postoperatively. (Graph). Incidence of VTE was 7.0% in benign and 15.0% in malignant cases ($p < 0.05$). No post-operative VTE events occurred in patients with low RAM (0-4) scores (n=63), whereas those with moderate (5-8) or high (≥ 9) scores had an incidence of 12.3% (22/179) and 40% (8/20) respectively ($p < 0.05$).

Conclusion:

This study represents the contemporary natural history of perioperative VTE in patients undergoing major lung resections without prophylaxis. While the high VTE incidence clearly justifies the usage of perioperative prophylaxis, this study indicates that a malignant diagnosis and moderate-high RAM score may indicate a higher need for prophylaxis in patients- undergoing major lung resections.

Disclosure: No significant relationships.**Keywords:** lung cancer surgery, prophylaxis, venous thromboembolism

P-140

COMPARISON OF RADIOMORPHOLOGY WITH MICROSCOPIC GROWTH PATTERNS IN PULMONARY METASTASESStefan Welter¹, H. Maschek², P. Bach³, R. Barile La Raia¹¹*Thoracic Surgery, Lung Clinic Hemer, Hemer, Germany*²*Pathology, Synlab-Pathologie, Hannover, Germany*³*Radiology, Lung Clinic Hemer, Hemer, Germany***Objectives:**

Risk factors for local intrapulmonary recurrence after pulmonary metastasectomy include incomplete resection, small margins and aggressive local tumor spread like interstitial growth, pleural involvement and spread through air spaces (STAS). Preoperative detection of histologic risk factors could lead to increased resection margins and maybe anatomical resection instead of enucleation.

Methods:

Microscopic growth patterns at the intersection of metastasis and healthy lung tissue were compared with preoperative radiomorphology in a prospective database of 47 patients for pulmonary metastasectomy. Microscopic categories like smooth metastasis surface, aggressive local spread like V1, L1, satellite nodules, STAS, pleural involvement or interstitial growth were compared with the shape, the surface of the lesion and the presence of spiculae on CT scans for various primaries.

Results:

Tumor size was a mean of 19 mm (median 15; 3 – 65) and the safety margin was mean 12.5 mm (median 7; 0 – 60). Aggressive pattern of local spread (2a) were detected: L1 (14), V1 (6), interstitial growth (20), spread through air spaces (27), microsattellite nodules (16) of 47 cases. A radiological irregular appearance (2b) of the surface was associated with at least one feature of aggressive local spread in 21/24 (87.5%); spiculation on CT and aggressive growth features in 15/17 (88.2%). In contrast, no spiculae on CT scans was associated with L0 in 26/29 and V0 in 26/29 (89.7%) cases and a smooth radiomorphology (1b) means no L0 and no V0 in 20/22 (90.0%) and no aggressive spread (1a) in 15/23 (62.2%) of the evaluated lesions.

Conclusion:

CT morphology of pulmonary metastases correspond with histologic growth characteristics and may serve as a guide for planning of resection margins. Lesions with a smooth radiomorphology may be completely resected with small margins, whereas irregular surface or circular spiculation requires wide margins to reach completeness of tumor removal.

Disclosure: No significant relationships.

Keywords: radiomorphology, pulmonary metastases, growth patterns

P-141

NEOADJUVANT CHEMORADIO THERAPY VERSUS NEOADJUVANT CHEMOTHERAPY PLUS CURATIVE INTENT SURGERY FOR INITIAL STAGE III/N2 NSCLC – RETROSPECTIVE RESULTS FROM A HIGH-VOLUME CENTER

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²*Thoracic Surgery Department, National Institute of Oncology, Budapest, Hungary*

Objectives:

In patients with potentially resectable stage III/N2 non-small-cell lung cancer (NSCLC) several guidelines recommend neoadjuvant therapy before attempting curative intent surgery. However, there is lack of robust data if neoadjuvant chemoradiotherapy (CHT/RT) is superior to neoadjuvant chemotherapy (CHT) alone. The aim of this study is to evaluate short- and long-term outcome in patients with initial stage III/N2 NSCLC with neoadjuvant CHT/RT or CHT followed by radical surgery.

Methods:

Patients with clinical stage III/N2 disease who underwent surgery after induction therapy at a single high-volume center between 2002 and 2013 were retrospectively reviewed focusing on peri- and postoperative clinical parameters. Overall survival (OS) and recurrence free survival (RFS) were analyzed by univariate and multivariate analyses.

Results:

A total of 93 patients with stage III/N2 NSCLC at diagnosis were identified. 40 (43%) patients received neoadjuvant CHT/RT, 53 (57%) neoadjuvant CHT. Overall 90-day mortality and morbidity were 25% vs. 20,8% and 0% vs. 3,8%, in patients with induction CHT/RT or CHT, respectively, with no significant difference between CHT/RT and CHT. RFS was 74.4 vs. 23.4 months in patients with CHT/RT and CHT (p=0.08). Patients treated with CHT/RT and surgery had improved median OS compared to those with neoadjuvant CHT alone (82.0 vs. 41.6 months, HR 0.56, p=0.074). Additionally, RFS (p=0.005) and OS (p=0.006) were significantly improved in patients with pathological downstaging (initially cN2, postoperative pN0-1). Age had no influence on the overall survival of patients, although younger patients received more often CHT/RT than CHT.

Conclusion:

Patients with clinical stage III/N2 NSCLC neoadjuvant CHT/RT followed by surgery was superior to CHT plus surgery only, in this retrospective patient cohort. However, these further warrants well designed randomized controlled trials in this setting.

Disclosure: No significant relationships.

Keywords: NSCLC, inductiontherapy, stage III, N2 disease, chemoradiotherapy, surgery



P-142

COAXIAL DRAIN IS MORE EFFECTIVE IN AIR LEAK EVACUATION AFTER LUNG LOBECTOMYMohamed Salama, A. Akan, J. Holbik, M. Mueller*Department of Thoracic Surgery, Otto Wagner Hospital, Vienna, Austria***Objectives:**

Chest tube is mandatory after lung surgery to evacuate air and fluid. Coaxial drain (CD) was recently presented as an alternative to conventional chest tube (CT), however, few data are available about the efficacy of coaxial drains. The current study intended to examine this issue.

Methods:

Hundred thirty-six patients who underwent lung lobectomy were prospectively randomized and received either a 24-F CD or 24-F CT which was then connected to digital chest drainage system. Air flow, fluid amount, subcutaneous emphysema, tube occlusion, drain duration were documented and compared between both groups.

Results:

Repeated measures ANOVA revealed no significant difference between both groups regarding the evacuated fluid over the postoperative course ($p=0.46$). Likewise, there was no significant difference regarding air flow in the postoperative time when both groups were compared ($p=0.48$). On the other hand, patients with air leak > 100 ml/min were separately analyzed. In this cohort, tube occlusion occurred in 30% of Patients with CT as compared to 5% in those with CD ($p=0.02$). The occluded CTs were successfully reopened through manual milking; however, this maneuver was difficult in the occluded CDs. Moreover, subcutaneous emphysema was observed in 50% in patients with CT as compared to 40% in those with CD. Furthermore, CD group was associated with shorter drain duration (6 ± 3 days) as compared to CT group (7 ± 4 days).

Conclusion:

CD is efficient in air leak evacuation might be due to its inner air lumen and thus associated with lower incidence of subcutaneous emphysema. Moreover, CD was associated with shorter drain duration and consequently shorter hospitalization.

Disclosure: No significant relationships.

Keywords: coaxial drain, chest tube, lung lobectomy

P-143

POST-OPERATIVE RADIOTHERAPY (PORT) AFTER COMPLETE SURGICAL RESECTION FOR MASAOKA STAGE II THYMOMA. IS IT SCIENTIFICALLY JUSTIFIED?

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Objectives:

Complete resection for stage II thymic tumors can be usually easily achieved, however 11-14% of these patients will experience local relapse. Some authors suggest routinely use of post-operative radiotherapy (PORT) for all stage II thymic tumours. However, evidence of PORT efficacy in these patients is generally derived from small retrospective studies with inconsistent results. The purpose of this study is to assess the impact of PORT in completely resected stage II tumours, on overall survival (OS) and relapse-free survival (RFS).

Methods:

We established a rigorous study based on electronic research of PubMed, Cochrane's Library, and Embase databases. Pooled analysis was searched for studies correlating the recurrence data for patients with complete resection of the stage II thymic tumors assigned to a PORT group. Patients with thymic carcinoma and studies with postoperative interventions confounded by chemotherapy were excluded from the study.

Results:

Eleven retrospective series were included and analysed. All of the patients underwent macroscopically complete resection, and thymoma histology was confirmed by the World Health Organization criteria. The evaluation of the results failed to show any statistically significant differences in the overall survival (HR 1.18; 95% CI 0.97 to 1.50 p=0.09) and RFS (p=0.35) in patients assigned to PORT. It is worth noting in three studies, patients with histological type B3 and large tumor size (> 7cm) showed an elevated probability of disease relapse despite surgical resection R0.

Conclusion:

Besides the potential limitations of this study -its retrospective nature, the absence of systematic review of staging, and a potential heterogeneity among patients - post-operative radiotherapy for completely resected stage II thymic tumours, show no benefit on OS and RFS in these patients. We support a more personalized risk-based assessment.

Disclosure: No significant relationships.

Keywords: thymoma, Masaoka II, PORT.



P-144

WITHDRAWN

P-145

NEGATIVE IMPACT OF POSTOPERATIVE DEPLETION OF SKELETAL MASS INDEX (SMI) ON PROGNOSIS AFTER COMPLETE RESECTION OF LUNG CANCERMasashi Nagata¹, H. Ito², T. Yokose³, H. Nakayama²¹*General Surgery, Okinawa Kyodo Hospital, Naha, Japan*²*Thoracic Surgery, Kanagawa Cancer Center, Yokohama, Japan*³*Department Of Pathology, Kanagawa Cancer Center, Yokohama, Japan***Objectives:**

Sarcopenia is a potential prognostic factor for smokers with complete resection of non-small cell lung cancer. We have assumed introducing effective treatment for sarcopenia like anamorelin perioperatively could improve postoperative prognosis in such patients. This study investigated postoperative depletion of skeletal muscle index (SMI), calculated by skeletal muscle area at the third lumbar vertebra on computed tomography divided by height in meters squared, as a predictor of prognosis in patients who are heavy smokers.

Methods:

We conducted a retrospective study of 192 males with a Brinkman index over 600 who underwent curative lobar resection for non-small cell lung cancer at our hospital from 2007 to 2010. We evaluated the change in SMI during six postoperative months and examined the association between postoperative mortality and clinico-pathological factors, including the change in SMI.

Results:

The median follow-up period was 53 months (range, 7 - 87.7). The 2- and 5-year overall survival rates were 89.5% and 69.9%, respectively. Among 56 dead patients, eighteen patients (32.1%) had no recurrence of lung cancer. Median preoperative and postoperative SMI were 45.6 cm²/m² (30.8-64.8) and 43.2 cm²/m² (27.2-62.4), respectively. Median rate of change of SMI during six postoperative months was -3.3% (-26.1-+9.8). Multivariate analysis showed SMI rate of change (p=0.010, Hazard Ratio following an increase by one unit 0.94 (95% confidence interval 0.90-0.99)) was an independent risk factors for poorer prognosis as well as pathological stage and lymphovascular invasion. The cut-off value of SMI rate of change for mortality was -10.4%. Multivariate analysis indicated past history of other cancers and postoperative complications were significantly associated perioperative factors with the SMI rate \leq -10.4%.

Conclusion:

Reduction in SMI during the six months after complete resection of lung cancer was a significant predictor for postoperative prognosis in heavy smokers. These results could guarantee they are desirable candidates for clinical trials of sarcopenia treatment.

Disclosure: No significant relationships.

Keywords: sarcopenia, prognosis, skeletal mass index, lung cancer, surgery



P-146

A NEW FLUORESCENCE TECHNIQUE FOR INVESTIGATING THE BLOOD SUPPLY OF GASTRIC CONDUIT DURING ESOPHAGEAL CANCER SURGERY

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Objectives:

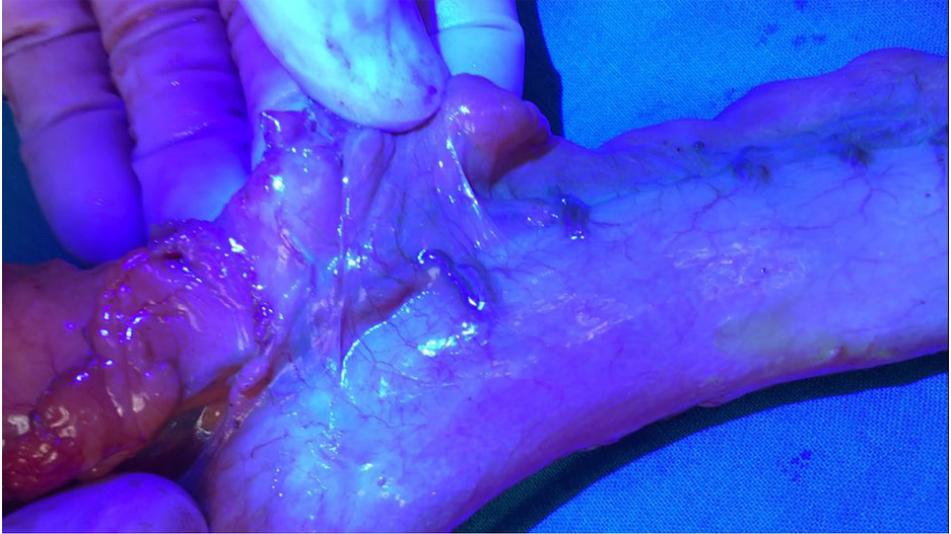
Fluorescence imaging has been recently applied in confirming the viability of gastric conduit during esophageal cancer surgery. In our institute, blue light fluorescence has been adopted in this field. The aim of this study was to validate the feasibility of blue light fluorescence in investigating the blood supply of gastric conduit.

Methods:

Since September 2014, blue light fluorescence has been applied in confirming the viability of gastric conduit for esophageal cancer surgery. 10 % Sodium fluorescein (5 mL) were administered intravenously, when gastric conduits was prepared. The vascular arcade and serosal surface of the gastric conduit were observed under blue light (at a wavelength of 440-490 nm) emitted from a commercialized LED curing light. In addition, the viability of gastric conduit was conventionally investigated by the tactile and visual inspection of arterial pulsation.

Results:

Blue light fluorescence imaging has been performed in a total of 14 patients with esophageal cancer. In all patients, the green-colored spots appeared in the vascular arcades of the gastric conduit. The mean time to detect the fluorescent spot was 12.1 ± 5.6 minutes. There was no anastomotic leakage in these patients. Furthermore, any hypersensitivity was not identified in every patient.

**Conclusion:**

Blue light fluorescence imaging showed the potential for visualizing the blood supply of gastric conduit for esophageal cancer surgery.

Disclosure: No significant relationships.

Keywords: fluorescence, esophageal cancer, gastric conduit, sodium fluorescein, blue light

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IMPORTANCE OF GROUND GLASS OPACITY COMPONENT IN SOLID DOMINANT CLINICAL STAGE IA LUNG CANCER

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Objectives:

We evaluated the clinical significance of the presence of a ground glass opacity (GGO) component in clinical stage IA solid dominant lung cancer.

Methods:

We reviewed 394 surgically resected clinical stage IA solid dominant GGO lung cancer which was defined as tumor having consolidation tumor ratio (CTR) 0.75 or more on thin section computed tomography (CT). These patients were classified into two groups based on CTR: CTR<1.0 (n=94), and CTR=1 (n=300). Impact of tumor size was assessed based on CTR using Cox proportional hazards model.

Results:

Among solid dominant lung cancer, multivariate analyses revealed that the abnormal value of carcinoembryonic antigen (p=0.006) and a radiologic pure-solid appearance (p=0.043) were independent significant prognostic variables. Significant difference in the 5-year overall survival (OS) was found between pure-solid and solid dominant GGO tumors (75.2% versus 93.6%, p < 0.001). As to maximum tumor dimension, whereas prognosis was better in lung cancer 20mm or less in size compared with larger tumor in pure solid population (≤ 20 mm: 81.9%, 21 to 30 mm: 65.7%, p < 0.001), it was not in solid dominant GGO tumor (≤ 20 mm: 96.2%, 21 to 30 mm: 89.5%, p = 0.16). OS was not different depend on maximum dimension of the solid component in solid dominant GGO tumor (≤ 20 mm: 93.4%, 21 to 30 mm: 91.7%, p = 0.91).

Table 1. Clinicopathological Characteristics of Clinical Stage IA Radiological Solid Dominant Lung Cancer between Solid Dominant GGO and Pure-Solid Tumors

	Clinical Stage IA Radiologic solid dominant lung cancer		p value
	Solid dominant GGO (n = 94, 0.75 ≤ CTR < 1.0)	Pure-solid (n = 300, CTR = 1.0)	
Gender, male	34 (36)	165 (55)	<0.01
Age, years	67.3 ± 9.5 (42-85)	67.0 ± 10.1 (35-89)	0.78
Pack-year smoking	15.2 ± 27.2 (0-162)	4.1 ± 6.3 ± 12.2 (0.5-145.9)	<0.01 <0.01
CEA, ng/mL	4.7 (0.4-21.1)	19.5 ± 5.4 (5-29)	0.78 <0.001
Maximum tumor size, mm	16.2 ± 4.7 (4-28)	19.3 ± 5.8 (5-30)	19.3 ± 5.8 (5-30)
Solid component size, mm	0.83 ± 0.49 (0.75-0.96)	1.0 5.4 ± 3.9 (0.7-19.0)	245 (82) 41
CTR	2.70 ± 2.0 (0.8-10.0)	72 (14) 13 (4) 34 (11) 39 (13)	<0.001 0.30
Operative procedure Lobectomy, bilobectomy Segmentectomy	2 (2) 3 (3) 70 (74) 17 (18) 2 (2) 2 (2)	178 (59) 41 (14) 33 (11) 6 (2) 37 (12) 5 (2) 118 (39) 123 (41) 80 (27) 26 (9) 19 (6) 35 (12)	<0.001 <0.001 <0.001 <0.001 <0.001 <0.001
Wedge Pathological node N1 N2	72 (77) 18 (19) 4 (4) 2 (2) 3 (3)		0.004 <0.01
III A III B Lymphatic invasion	2 (2) 3 (3) 0 (0) 14 (15) 10 (11) 5 (5) 1 (1) 1 (1) 3 (3)		<0.001 <0.001 <0.001
Vascular invasion Postoperative recurrence			<0.001
Locoregional Distant			<0.001
Locoregional and distant			

GGO = ground glass opacity; CEA = carcinoembryonic antigen; CTR = consolidation tumor ratio; SUV max = maximum standardized uptake value.

Conclusion:

Presence of a GGO component might have an impact on a favorable prognosis even in clinical stage IA solid dominant GGO tumor. However, neither maximum tumor dimension nor solid dimension predict survival in solid dominant GGO tumor. Thus, a detection of small amount of GGO is important to decide clinical stage in clinical stage IA lung cancer.

Disclosure: No significant relationships.

Keywords: ground glass opacity, solid dominant lung cancer, clinical stage IA



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