

8:00AM- 5:30 PM

Room: WHITEHALL ROOM

POSTER SESSION 1 (SATURDAY)

27785

Bronchoscopy in Pediatric Patient

WHOLE LUNG LAVAGE IN ALVEOLAR PROTEINOSIS IN A 12 YEAR OLD GIRL

Mohankumar Thekkinkattil¹, Menon Narendra¹

¹*Institute of Pulmonary Medicine & Research, SRI Ramakrishna Hospital, Coimbatore, India*

Alveolar proteinosis is a rare disease in children as the rare cause of severe respiratory failure. In 2002 report at least 410 cases were reported world-wide. The estimated annual incidence is 0.36 and the prevalence 3.76 cases/million population. In neonates the mortality is 100% Lung transplantation improves survival. In adults, PAP is mainly seen in males at the age of 40-55. In female children PAP is rare. PAP is characterized by intra-alveolar accumulation of proteinaceous material. It is not associated with inflammation and lung architecture is preserved. Case study: A 12 year girl was admitted with breathlessness, cough, with two weeks duration. She was referred from a private hospital in Salem with X-ray and CT features of? Alveolar Proteinosis. O/E patient restless, Sao2 83% ,tachypneic and tachycardia present. CT scan repeated showed features of alveolar proteinosis. After stabilizing her with o2 , bronchodilators and antibiotics she was taken up for whole lung lavage on the right side. Since the double lumen catheter of 26 size could not permit insertion of bronchoscope , through 6.5 ET tube under general anaesthesia Right lung was lavaged with about 1700 ml of normal saline .The child tolerated the procedure well. She was kept in the ventilator for one day and extubated. The saturation went up to 90%. The left lung was washed after one week. The saturation and clinical signs and symptoms improved. She is again admitted on 22/12/2011 for the next lavage session. Post lavage shows good response clinically and saturation wise. The treatment for alveolar proteinosis is whole lung lavage in adults. We report the case in a young girl (rarely reported) treated with whole lung lavage using ET tube (rarely tried).

32917

Endobronchial Management of Obstructive Lung Diseases

USING VIRTUAL BRONCHOSCOPY FOR EMPHYSEMA EVALUATION AND TREATMENT PLANNING

Hugo Goulart de Oliveira¹, Amarilio Macedo-Neto¹, Enio do Valle¹, Lisa Dorado², Rafael Ramos Rambo³, Silvia Oliveira¹

¹*Hospital Moinhos de Vento , Porto Alegre, Brazil;* ²*Vida Diagnostics , Mountain View, United States;* ³*Hospital de Clínicas de Porto Alegre , Porto Alegre, Brazil*

Background: Multi-detector row computerized tomography (MDCT) imaging of the trachea-bronchial tree measured and reconstructed with targeted post-processing software greatly improves the quality and reliability of bronchoscopic tests and treatments. Virtual bronchoscopy is a non-invasive tool that is extremely advantageous for the management of severely impaired patients. We present two cases in which virtual bronchoscopy yielded positive clinical outcomes. Case 1 - DYNAMIC AIRWAY COLLAPSE A 78-year old male, current smoker (49 pack-years), with severe emphysema, presented with pCO₂ 65mmHg, pO₂ 59mmHg, SpO₂ 89.3,

requiring continuous oxygen at 3L/min. Six-minute walk test (6MWT) was 180m, FVC 1.17 L (34.7% of predicted) and FEV1 0.45 L (17.1% of predicted). MDCT at maximal inspiration and expiration showed crescent-shaped tracheomalacia at the intermediate bronchus. After evaluation of CT reconstructed anatomy, a 13x30 Dumon-like silicon stent (HCPA-1) was placed in the intermediate bronchus. The procedure was performed using a rigid bronchoscope and lasted 20 minutes. The patient was discharged from the hospital after 5 days with an oxygen requirement of 1L/min. Blood gases improved to pCO₂ 51mmHg, pO₂ 70mmHg and SpO₂ 93.1 with 1L/min continuous oxygen. An increase of 70m was noted in 6MWT (to 250m), 0.80 L in FVC (to 2.06 L, 61.1%) and 0.24 L in FEV1 (to 0.69 L, 22.3%). Quality of life (St. George respiratory questionnaire) also improved.

Case 2 - SEVERELY ILL PATIENT WITH ATYPICAL HETEROGENEOUS EMPHYSEMA PRESENTATION A 57-year old male, former smoker (47 pack-years), was selected for treatment with endobronchial valves (EBV). The patient was bound to a wheelchair and had been on continuous oxygen therapy (3L/min) for more than 18 months. pCO₂ was 89mmHg. Interpretation of the tomographic images was extremely difficult, as shown in Figure 1. After evaluation of the bronchoscopic anatomy with targeted pulmonary imaging software (PW2® VIDA Diagnostics, Coralville, IA), the findings were interpreted as marked hyperinflation of the LLL with atelectasis of LUL. Since the patient would not easily tolerate a regular bronchoscopic procedure, PW2 was used to study the anatomic details. The patient was treated with LLL exclusion using one Zephyr 5.5 valve at basal segments and another Zephyr 4.0 at LB6 segment. The procedure lasted 4 minutes under light conscious sedation (Figure 2). The patient was discharged on day 11 with 1L/min oxygen therapy, pO₂ 54mmHg, pCO₂ 44mmHg, TLC 8.54L (125.6%), RV 5.88L (248.2%), FVC 2.67L (61%), FEV1 0.72L (21.3%) and DLCOc 4.86mmol/kg/min (18.4%).

Conclusion: MDCT-derived, pulmonary imaging software optimized for bronchoscopically-guided pulmonary procedures enables fast and accurate assessment of airway and parenchymal anatomy in patients with airway disease. Bronchoscopic CT images can be evaluated in patients with airway disease, like COPD, for stent sizing or therapeutic response. Finally, bronchoscopically reconstructed images can be used for guiding diagnostic tests or treatments to the peripheral lung to evaluate lung nodules, or region of lung emphysema. Quantitative pulmonary image analysis used alone or with routine bronchoscopy can enhance the value and accuracy of the procedure and should be an essential component of the interventional bronchoscopic suite.

33220

Endobronchial Management of Obstructive Lung Diseases

DIAGNOSTIC CONTRIBUTION OF BRONCHOSCOPY IN PULMONARY TUBERCULOSIS

Marioara Simon¹, Milena Man¹, Monica Pop¹, Petrut Vremaroiu¹, Ruxandra Rajnoveanu²

¹*Pneumology Hospital Cluj-Napoca, Cluj-Napoca, Romania;* ²*Pneumology Hospital Cluj-Napoca, Cluj-Napoca, Romania*

Aims: The diagnosis assessment of bronchial lavage and/or bronchial biopsy role in pulmonary tuberculosis. Frequency evaluation and lesion profile of bronchial tuberculosis in correlation with radiological and clinical findings, illustrating the peculiarities and endobronchial aspects of some cases we encountered.

Materials and Method: From a total of 3810 examined patients in the Bronchology Department of Pneumology Hospital Cluj-Napoca between 2010-2011, a number of 108 patients (2,83%) had clinical and radiological aspects of pulmonary tuberculosis but with negative sputum or unable to expectorate. BL was performed for Mycobacterium tuberculosis (MTB) detection in all patients. Infiltrative-ulcerative and vegetant endobronchial lesions were biopsied.

Results:

Results: Bacteriological exam of BL confirmed tuberculosis in 78 patients with a 72,2% confirmation rate: 37 patients(47,4%) with positive MTB culture and positive acid fast bacilli (AFB) microscopy, 41 patients (52,5%) only with positive MTB culture. Endoscopic macroscopic aspects: hyperemic edematous forms: 43 cases (55,1%), infiltrative ulcerative: 25 cases(32%), vegetant forms: 10 cases(7,8%), normal aspects: 30 cases (38,4%). Out of 35 biopsies performed, histological diagnosis of TBC was possible in 22 cases with 62.85% confirmation rate. We found correlation between endoscopic and radiologic aspects: hyperemic edematous forms and infiltrative tuberculosis, respectively between infiltrative ulcerative forms and cavitary / ulcerative tuberculosis.

Conclusions: Bronchoscopy with BL and bronchial biopsy can improve the diagnosis of pulmonary tuberculosis and should be used in suggestive clinical and radiological cases of tuberculosis.

33280

Endobronchial Management of Obstructive Lung Diseases

BRONCHIAL THERMOPLASTY (BT) BENEFITS PATIENTS WITH SEVERE PERSISTENT ASTHMA REQUIRING OMALIZUMAB: INITIAL EXPERIENCE

Ken Yomer Yoneda

University of California, Davis Medical Center , Sacramento, United States

Introduction: The United States Food and Drug Administration approved BT for severe asthmatics who remain symptomatic despite standard-of-care controller medications. Omalizumab (anti IGE) is an effective asthma controller therapy, but requires frequent and ongoing clinic based treatment. The safety and efficacy of BT for patients who require omalizumab therapy, and in particular the potential to withdraw this medication after BT, has not previously been described.

Methods: Retrospective chart review of patients on maintenance omalizumab who have undergone BT.

Results:

Results: Three patients underwent 3 bronchoscopic BT procedures, each separated by at least 3

weeks. Spirometry was performed before and after each procedure. Patients completed the Asthma Control Test at pre and follow-up evaluations. Medications were also assessed. The patients' history for the 12 months prior to BT treatment and post-BT treatment starting from three weeks after completion of the third BT procedure is presented in the Table below. BT procedures were uneventful with an average procedure time of 46 (Procedure 1), 43 (Procedure 2), and 55 minutes (Procedure 3). Patient 2 was hospitalized overnight following Procedures #1 and #2 for failing to meet the FEV1 requirement of >80% of the pre-procedure FEV1. All 3 patients have benefitted from BT and remain extremely positive about their BT procedure. Two of the 3 patients were able to discontinue Omalizumab. Despite the variable length of follow-up for each of the 3 patients, the number of steroid pulses for exacerbations has decreased in all 3 patients and there have been no hospitalizations for respiratory problems to date, post completion of BT.

Conclusions: Patients with severe asthma who remain poorly controlled despite standard-of-care therapies now have BT as a new treatment option. Our limited initial experience with patients who are receiving omalizumab as maintenance controller therapy has been positive, with patients experiencing improved asthma control as reflected by a decrease in their severe asthma exacerbations post-BT. Two of three patients were able to discontinue omalizumab therapy.

33501

Endobronchial Management of Obstructive Lung Diseases

EFFICACY OF LVRC(R) TREATMENT ON SEVERE EMPHYSEMA PATIENTS

Felix Herth

Thoraxklinik Heidelberg , Heidelberg, Germany

Background: The Lung Volume Reduction Coil (LVRC) is a memory-retaining nitinol wire device designed to compress diseased lung tissue, shifting preferential filling to healthier regions, and to reduce air trapping and hyperinflation while maintaining airway patency. A previous single center pilot study showed safety and effectiveness in severe upper-lobe emphysema. Further safety and effectiveness data have been collected by multiple treatment centers as part of ongoing studies, and are now presented through 6-month post treatment follow-up.

Objectives: To present safety and effectiveness results for 71 treated patients (142 procedures) at 6-months post treatment, including evaluation of upper vs. lower-lobe response, as well as influence of collateral ventilation.

Methods: 71 patients [62yrs ($\pm 6.4\%$), FEV1 29% pred ($\pm 6.4\%$) and RV 250% pred ($\pm 52\%$)] were bronchoscopically treated under general anesthesia using fluoroscopy. LVRCs were implanted in two lungs (in two sequential procedures) in 11 European Centers. Effectiveness measures (PFT, 6MWT, SGRQ) continue to be assessed through 12 months for all patients.

Results:

Results: The LVRC treatment provides clinically significant and sustained benefit through the 6-month follow-up period, with an acceptable safety profile. There was no meaningful difference between upper and lower-lobe response, and results are independent of whether patients have collateral ventilation into the treated lobe.

Conclusion: The RePneu LVRC demonstrates acceptable safety and sustained efficacy in selected patients with severe emphysema. The LVRC works independently of collateral ventilation, and both upper and lower lobes respond to LVRC treatment.

33524

Endobronchial Management of Obstructive Lung Diseases

ENDOBRONCHIAL MANAGEMENT OF PROLONGED AIR LEAK - - BRONCHIAL OCCLUSION WITH SILICONE SPIGOT (EWS®) -

Yoichi Watanabe¹, Makoto Sakugawa²

¹*Japanese Red Cross Okayama Hospital , Okayama City, Japan;* ²

Background: We made the first report of bronchial occlusion with silicone spigot in 1991 and developed EWS®, a silicone made bronchial filler, in 2000. This procedure provides a surer and longer bronchial blockade than conventional bronchial occlusion method.

Purpose: The aim of this study is to evaluate the clinical effectiveness and the safety of endoscopic bronchial occlusion with silicone spigot (EWS®) for management of prolonged air leak. **Patients and**

Methods: Between April 2000 and November 2011, 72 cases with intractable secondary pneumothorax and prolonged air leak after pulmonary surgery underwent bronchial occlusion with EWS®. As a rule, this procedure was performed with fiberoptic bronchoscope under local anesthesia.

Results:

Results: Drainage tube could be removed in 43/58 cases (74.1%) of intractable pneumothorax and 5/5 cases (100%) of air leak after pulmonary surgery. With this procedure, air leak was stopped or reduced and clinical symptom was improved in 45/58 cases (77.6%) of intractable pneumothorax and in 5/5 cases (100%) of air leak after pulmonary surgery. In both group, period of tube drainage after EWS® was significantly shorter than that of before EWS®. As a complication related this procedure, 3 cases (4.2%) of pulmonary infection were observed, but they improved by administration of antibiotics. This procedure was also effective on 9 cases of thoracic empyema with bronchial fistula, 6 cases of prolonged bronchial bleeding, and 2 cases of bronchial fistula with other organ. Multi-center clinical study of Endoscopic lung volume reduction (ELVR) with EWS® is going on. ELVR with EWS® has been performed with acceptable safety and worthwhile clinical effect, until now.

Conclusion: Bronchial occlusion with EWS® is thought to be very useful and safe

bronchoscopic management method of prolonged air leak. In the future, this procedure may be very useful for ELVR on severe COPD and for primary spontaneous pneumothorax of younger cases.

26455

Functional Bronchoscopy

A CURIOUS CASE OF BRONCHESOPHAGEAL FISTULA IN A PATIENT WITH METASTATIC LUNG CANCER

Aleksander Shalshin

Plainview Hospital, North Shore - LIJ Health System , Greenval, United States

Bronchoesophageal Fistulas (BEF) are rare in clinical practice. The occurrence of BEF may be secondary to congenital or acquired causes. In the majority of adult patients BEF is the result of malignancy, iatrogenic trauma or instrumentation. In our clinical case report we present a patient with metastatic lung cancer undergoing treatment with Bevacizumab who was found to have a Bronchoesophageal Fistula on Bronchoscopic examination. Bevacizumab (Avastin) recently attracted great deal of attention when FDA revoked agency's approval for its use in patients with Breast cancer concluding that the drug has not been shown to be safe and effective for that use. In the past Bevacizumab has been documented to cause intestinal perforation, epistaxis, hemoptysis, and Tracheoesophageal Fistula formation. 74 year old male with past medical history of anemia of chronic disease, Benign Prostatic Hypertrophy, Hypertension, Hyperlipidemia and Metastatic Lung Cancer was admitted for symptoms of lower respiratory tract infection. His symptoms on presentation were significant for productive cough, fever and shortness of breath at rest and on exertion. During his initial stay patient was treated with antibiotics, bronchodilators and supplemental oxygen support which alleviated his symptoms. However, on day 4 of patient's stay he showed signs of deteriorating respiratory status and was initiated on mechanical ventilation for imminent respiratory arrest. Despite Intensive Care Unit therapy, antibiotic regimen and mechanical ventilator support the patient continued to deteriorate from respiratory distress. After a repeat evaluation with plain radiograph, Computerized Tomography Scan of the chest was obtained which showed persistent Left Lower consolidation. Bronchoscopic evaluation for persistent left lung infiltrate showed a gross defect in left mainstem bronchus and a distal tip of nasogastric tube previously confirmed to be in the gastro-esophageal tract. The diagnosis of bronchoesophageal fistula was made consistent with likely complication from use of Bevaizumab. Bevacizumab is a monoclonal antibody chemotherapy agent that acts via inhibition of vascular endothelial growth factor. It is approved by FDA for use in metastatic cancer and its initial success was noted in patients with advanced colon cancer. Numerous side effects reported from the use of Bevacizumab are septal perforation, intestinal perforation, increased risk of bleeding, and impaired wound healing. The etiology of Bronchoesophageal fistula in adults almost always points to an acquired cause. In a short list of published literature review malignancy almost always tops the list, followed by rare but potentially relevant causes Tuberculosis, Syphilis, Crohn's Disease, Broncholithiasis and Erosive ingestion. The symptoms and signs of BEF are often overlooked and treatment is delayed. BEF is manifested by recurrent Pneumonias, hemoptysis, respiratory failure and intractable cough. While Bevacizumab is well documented and implicated in cases of intestinal, septal and tracheal perforations our case demonstrates a unique occurrence of Bronchial - Esophageal perforation

established on the basis of clinical history and direct bronchoscopic visualization. This clinical vignette serves as an important reminder of the potential dangers and risks associated with the use of VEGF inhibitors, especially in patient with recurrent symptoms after standard therapy.

33108

Functional Bronchoscopy

PHASE DIFFERENCE BY HIGH-SPEED IMAGING OF VOCAL FOLDS IN CASES WITHOUT PHONETIC DISORDER

Tomoyuki Takane¹, Hirotaka Suzuki¹, Hirotaka Tomomatsu¹, Hiroyuki Kishi¹, Itsuhiro Kudo¹, Kiyoshi Makiyama¹, Minoru Ikeda¹, Ryoji Hirai¹, Tomoyuki Takane¹

¹*Surugadai Nihon University, Tokyo, Japan*

Objectives: A phase difference, as well as amplitude and presence or absence of waves and a glottal gap, is important for evaluation of vocal fold vibration. Conventionally, intervals of opening and closure of the glottis and presence or absence of a glottal gap were examined by electroglottography (EGG) and color Doppler imaging (CDI) for evaluation of a phase difference, but development of visualization technique has enabled more direct evaluation. Furthermore, video analyzing technology has enabled objective evaluation. We constructed software to measure a phase difference by high-speed imaging and have been committed to investigating evaluation methods and improving programs. Although it is known that there is a phase difference, to a different degree, in patients with phonetic disorder, few reports have investigated a phase difference in subjects without phonetic disorder. In this study, we investigated a phase difference in subjects without phonetic disorder.

Methods: The subjects of this study comprised 45 healthy volunteers (20 males and 25 females) without awareness of vocal impairment or history of phonetic disorder. As objective evaluation, the GRBAS scale revealed a score of zero and laryngoscopy demonstrated no abnormality in laryngeal structure. Continuous vowel voicing at the pitch and sound volume most comfortable for the subjects was recorded for eight seconds and a video of steady voicing as long as one second was subjected to analysis. FATCAM-PCI (Photoron) was used for high-speed image recording and a video was recorded at 2,000 frames/sec. A Kay Xenon 300 watt light source and rigid laryngoscope Kay SN2025, 10 mm in outer diameter, were used. Kay's image processing software (KIPS) and software that we developed were employed, and phase differences between the two sides at the front, middle, and back positions of vocal folds and between the above and below each vocal fold were measured. A phase difference was expressed in rad and the average and standard deviation were calculated.

Results:

Results: The tendency for the width of distribution of male phase difference to be narrow compared with a woman, and for a deviation to be also small was seen. The significant difference was accepted with the right-and-left difference front of vocal folds ($p=0.04$), and the above and below difference of left vocal folds.

Conclusions: It was confirmed that there was a certain level of a phase difference in subjects without phonetic disorder.

33147

Functional Bronchoscopy

ALTERNATIVE SITUATIONS FOR DEPLOYMENT OF IBV VALVE SYSTEM IN PATIENTS WITH BRONCHOPLEURAL FISTULAS

Jimmy Suvatne¹, Daniel P Harley², Stephen Selinger², Sy Sarkar², William Krimsky²

¹Walter Reed National Military Medical Center , Bethesda, United States; ²Medstar Franklin Square Medical Center , Baltimore, United States

Background: The IBV valve system is an endobronchial one-way valve which is deployed bronchoscopically. While it has been investigated for use in severe emphysema for lung volume reduction, it is also available for use as a humanitarian device in patients with persistent air leaks as a consequence of surgery due to bronchopleural and alveolar pleural fistulas (BPF).(1,2)

Objectives: Alternative situations in patients with persistent air leaks where IBV devices were deployed are evaluated.

Methods: Case series

Results:

Results: Case 1: A 46 year old woman with the acute respiratory distress developed a persistent air leak secondary to gross barotrauma. Chest tubes were placed without resolution. Her situation deteriorated further culminating in cardiopulmonary arrest. An endobronchial valve was placed in one of the segmental bronchus of the right lower lobe with immediate resolution of the air leak. She was discharged from the hospital 4 weeks later and one year post IBV placement, she underwent removal of the device and continues to do well. Case 2: A 75 year old man status post completion pneumonectomy after recurrence of a previously diagnosed NSCLC developed a BPF at the stump site. This was further complicated by empyema for which an Eloesser flap was placed. Over the course of next 8 months, multiple surgical and bronchoscopic interventions were attempted for closure without success. Subsequently, an IBV valve was deployed into the area in conjunction with placement of a biologic matrix for tissue engraftment. The fistula was easily visualized and noted to be at least 8mm in its widest diameter. The fistula was first packed with Surgisis 4-layer tissue graft followed by a placement of a 7mm IBV valve to anchor and secure the matrix in place. The patient tolerated the procedure well and his post procedure course has been uncomplicated with resolution of the fistula to date.

Conclusion: We evaluate and describe two alternative settings for deployment of the IBV valve

in patients with bronchopleural/alveolarpleural fistulas.

References:

- 1) Gillespie CT, Sterman DH, Cerfolio RJ, et al. Endobronchial valve treatment for prolonged air leaks of the lung: a case series. *Ann Thorac Surg* 2011; 91: 270-3.
- 2) Travaline JM, McKenna RJ, De Giacomo T, et al. Treatment of persistent pulmonary air leaks using endobronchial valves. *Chest* 2009; 136: 355-60.

33307

Functional Bronchoscopy

A CASE OF MASSIVE HEMOPTYSIS IN CARDIOGENIC SHOCK

Rachel M Taliercio¹, Dileep Raman¹, Francisco Almeida¹, Samar Farha¹

¹*Cleveland Clinic , Cleveland, United States*

Bronchial mucosal manifestations of heart failure are not well described. We present a case of severe hemoptysis in a 54-year-old man with ischemic cardiomyopathy. Bronchoscopic findings demonstrated prominent bronchial mucosal vasculature which we believe to be a consequence of elevated pulmonary venous pressure.

Case Report: Our patient is a 54-year-old man with a past medical history of ischemic cardiomyopathy (ejection fraction 20%), rheumatoid arthritis, and hypertension who presented with a history of life-threatening hemoptysis. Physical exam was notable for normal oxygen saturation on room air, the presence of elevated jugular venous pressure, and bibasilar rales. His extremities were cool to touch and there was no peripheral edema. Chest computed tomography demonstrated subcentimeter mediastinal adenopathy and scattered ground glass opacities located predominantly in the right upper and right middle lobes. The patient subsequently underwent flexible bronchoscopy under general anesthesia (See Figures). There was submucosal erythema and prominent engorged vasculature throughout the main airways without evidence of active bleeding. A few small, raised lesions were noted (See Figures). These areas were ablated with argon plasma coagulation. Biopsy of one lesion revealed superficial squamous epithelium. To optimize his heart failure management, a right heart catheterization was performed showing an elevated pulmonary artery occlusion pressure of 40 mmHg and a Fick cardiac index of 1.59 l/min/m² (Table 1). The patient was transferred to the heart failure intensive care unit where he received swan-ganz catheter guided vasodilator therapy and diuresis. On outpatient follow up one month later, the patient described complete resolution of hemoptysis. He is currently undergoing heart transplant evaluation.

Discussion: Overall, cardiogenic hemoptysis is uncommon. However, it can be a life-threatening complication. We present a case of large-volume hemoptysis in the setting of severe pulmonary venous hypertension. As opposed to an alveolar source, the engorged and tortuous mucosal blood vessels seen on bronchoscopy are presumed to be the source of bleeding in our case. Additionally, the lesions visualized on bronchoscopy may represent vascular malformations. Cessation of bleeding was likely a result of both argon plasma coagulation therapy and optimal management of heart failure. It has been hypothesized that the rise of left-sided heart pressure, and subsequently pulmonary venous hypertension, causes bronchial vascular dilatations. We believe this case is an illustration of bronchial mucosal bleeding as a manifestation of severe left-

sided heart failure.

33490

Functional Bronchoscopy

ENDOBRONCHIAL ULTRASOUND-GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION (EBUS-TBNA) FOR THE DIAGNOSIS OF INTRATHORACIC LYMPHADENOPATHY IN PATIENTS WITH EXTRATHORACIC MALIGNANCY: A STUDY IN A TUBERCULOSIS-ENDEMIC COUNTRY.

Erdogan Cetinkaya¹, Güler Özgül¹, Hilal Onaran¹, Mehmet Akif Ozgul¹, Nuri Tutar², Semra Bilaceroglu³

¹Istanbul, Turkey; ², Kayseri, Turkey; ³Izmir, Turkey

Background: Mediastinal lymphadenopathy in patients with malignancy is a common clinical problem in tuberculosis-endemic countries. The recently developed endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) procedure enables direct and real-time aspiration of mediastinal and hilar lymph nodes and is a less invasive alternative to mediastinoscopy.

Aim: To determine the efficacy of EBUS-TBNA results in the evaluation of mediastinal lymph nodes in patients with extrathoracic malignancy.

Methods: Retrospective analysis was performed in 40 patients with proven (n=38) or suspected metastasis of unknown origin (n=2) who underwent EBUS-TBNA between July 2007 and August 2011.

Results: All 40 patients successfully underwent EBUS-TBNA and no complications were observed. In 16 (40%) patients, EBUS-TBNA demonstrated metastasis of extrathoracic malignancy. Two (5%) patients were diagnosed as new lung cancer with EBUS-TBNA. The diagnostic sensitivity, accuracy, and negative predicted value (NPV) of EBUS-TBNA per patient were 90.0%, 95.0%, and 90.9%, respectively. Data about FDG PET/CT scans were available in 33 patients. The diagnostic sensitivity, specificity, positive predictive value (PPV), NPV and accuracy of PET/CT scan per patients were 94.7%, 35.7%, 66.6%, 83.3%, and 69.6% respectively. The association between lymph node size in EBUS and malignant lymphadenopathy was statistically significant (p=0.018).

Conclusion: EBUS-TBNA is a sensitive, specific, minimally invasive and safe procedure for the diagnosis of mediastinal and hilar metastasis from extrapulmonary malignancy.

33517

Functional Bronchoscopy

MALT-LYMPHOMA OF THE TRACHEA: CASE REPORT

Isabel C Mira-Avendano¹, Gustavo Cumbo-Nachelli²

¹Cleveland Clinic , Westlake, United States; ²Cleveland Clinic , Cleveland, United States

Mucosa associated lymphoid tissue (MALT) lymphoma arises in the context of pre-existing prolonged lymphoid proliferation in mucosal sites. We report a case of a 60 year old woman with a tracheal MALT lymphoma. Presenting symptoms included dyspnea, wheeze and cough for two years. Antibiotics, bronchodilators and corticosteroids did not improve symptoms. Physical exam and laboratory studies were unremarkable. Spirometry demonstrated an obstructed process with a flow-volume loop suggestive of intrathoracic, variable airway obstruction. Chest computed tomography demonstrated a 1 cm x 1.8 cm soft tissue mass present along the right lateral aspect of the trachea, at the level of the aortic, bronchoscopic examination was consistent with a large polypoid mass occluding 80% of the distal trachea. Laser ablation was performed resulting in near complete opening and visualization of the right mainstem bronchus. Histopathologic study of the resected material was consistent with MALT lymphoma of the trachea. Analysis of the literature indicates that MALT lymphoma affects more frequently female patients, ages 40 to 80 years old and a key spirometric finding consists of a variable obstructive component in the flow-volume loop. This last finding may prompt the physician to include endotracheal lesions in the differential diagnosis of when a variable degree of obstruction is seen on pulmonary function testing.

33531

Functional Bronchoscopy

A CASE OF PULMONARY ASPERGILLOSIS DIAGNOSED BY NEW VIRTUAL BRONCHOSCOPIC NAVIGATION SYSTEM AND GUIDE SHEATH

Tomokazu Omori¹, Hidetoshi Honda¹, Hisashi Saji¹, Jitsuo Usuda², Kentaro Iwasaki¹, Norihiko Ikeda³, Tatsuo Ohira³, Tomokazu Omori¹

¹Tokyo Medical University Hospital , Tokyo, Japan; ²Tokyo Medical University , Shinjuku-ku, Japan; ³Tokyo Medical University , Tokyo, Japan

The case is 43-year-old man. He was pointed out the abnormal shadow in right upper lung field in chest X ray in 2011 by medical examination in his ward, so he admitted to the department of internal medicine of Respiratory in our hospital. Chest CT showed that the tumor was located in a right lung upper lobe, the size was about 40mm. In CT image, it was suspected the primary lung cancer that was closed against a pulmonary cyst, so, he referred to our department for the purpose of operation. For the lesion, we planned to perform Transbronchial lung biopsy with the New Virtual Bronchoscopic Navigation System and guide sheath to make a decision of preoperative diagnosis at first. Transbronchial lung biopsy was performed very safely and quickly, and we could prevent a dangerous bleeding by using a guide sheath. Biopsy samples for the H&E staining, a fungus-like structure was observed and suggested a fungal infectious disease. and it was diagnosed pulmonary aspergillosis for Grocott staining. At the lesion, we performed Right upper lobectomy by Video Assisted Thoracoscopic Surgery. Pulmonary aspergillosis is the disease that comes to occasionally have difficulty in correspondence including a diagnosis, the treatment and may suffer from differentiation with the lung cancer. And it was suggested that Transbronchial lung biopsy with the New Virtual Bronchoscopic Navigation System and guide sheath was the one of the methods that could reduce the patient's examination time.

33571

Functional Bronchoscopy

BRONCHOSCOPY IN SILICONE EMBOLISM SYNDROME RELATED ARDS

Carmel Joseph ARMEL JOSEPH

Interventional Pulmonary Doctors Hospital , Augusta, United States

Background: The increased use of silicone in cosmetology has resulted in illegal use of injectable liquid silicone by unlicensed practitioners despite the well documented cases of silicone pulmonary embolism over the years. Common serious pulmonary side effects include alveolar hemorrhage, ALI, ARDS and death. Bronchoscopy early in the presentation with BAL and electron microscopy can make a rapid diagnosis in this lethal condition. We present a case diagnosed and treated by interventional pulmonology with a good outcome.

Objective: To alert the pulmonary and critical care community to the importance of early diagnosis and treatment of this potentially deadly condition. **Case:** A 34 yr old transexual who had been receiving hormone therapy for many months, presented with a history of receiving silicone injections to the breasts, hips and thighs every four weeks. The patient complained of shortness of breath, dry non-productive cough for two days with low grade fevers and chills. Patient admitted to recent injections in the breasts four days prior to admission. Physical exam was remarkable for a respiratory rate of 28 and well formed breasts (Figure 1) in a male with normal external genitalia. The patient was on no medications upon admission but lab data revealed a P02 of 69 on a 100% non-rebreather. Chest x-ray revealed diffuse bilateral interstitial infiltrates with a lower lobe predominance. The patient was started on broad spectrum antibiotics to cover CAP. The patient's care was transferred to the interventional pulmonologist who intubated the patient and performed flexible fiberoptic bronchoscopy. Multiple diagnostic and therapeutic BAL's were performed in the middle and lower lobes with good return of bloody fluid consistent with alveolar hemorrhage. The specimens were sent to the nearest academic institution where electron microscopy was used to diagnose silicon emboli as the cause for the ARDS. (Figure 2 & 3) Patient was treated with high dose methylprednisolone and three more therapeutic bronchoscopies were performed. Patient was weaned off the respirator in seven days. The FiO2 was weaned down and steroids were weaned off. The patient was discharged home after fourteen days admission and follow-up three weeks later revealed moderate restriction with and FVC of 50%. Prednisone was initiated at 60mg a day and tapered by 10mg every four days. Six weeks post discharge the patient had an FVC of 81% with no dyspnea.

Conclusion: 1. ARDS can result from subcutaneous silicone injections for cosmetic purposes. The mortality is up to 33%. 2. Aggressive bronchoscopic approach both for diagnostic and therapeutic purposes can alter the prognosis in patients with respiratory failure. 3. High dose steroids started in the ICU should be tapered over four to six weeks until normal PFT's are demonstrated. 4. Electron Microscopy to identify silicone within alveolar macrophages obtained during BAL clinches the diagnosis.

33159

Lung Transplantation

MANAGEMENT OF ANASTOMOTIC COMPLICATIONS FOLLOWING LUNG TRANSPLANTATION: A REVIEW OF 169 LUNG TRANSPLANTS

Olivier Bylicki¹, Bastien Orsini², Herve Dutau³, Martine Reynaud Gaubert², Pascal Alexandre Thomas⁴, Philippe Astoul¹, Sophie Laroumagne¹, Thomas Vandemoortele²

¹Hopital Nord , Marseille, France; ²Hopital Nord , Marseille, France; ³Hopital Nord; ⁴hopital Nord , Marseille, France

Background : Anastomotic complications remain a significant cause of morbidity and mortality after lung transplantation (LT). They occur in up to 27% of cases including inflammatory and fibrotic stenosis, ischemia/necrosis, and dehiscence. Treatment depends on the type of complication.

Objectives : To analyze the incidence, treatment and endoscopic follow-up of airway complications after LT.

Methods : Data of adult LT recipients who had procedures performed between January 2005 and December 2011 at our institution were reviewed retrospectively. Patients who died within 24 hours were excluded from our analysis.

Results : During that period 168 LT were performed, with a total of 283 anastomoses. The mean age was 41 years [range 17 to 67] with a sex ratio of 1:1. Cystic fibrosis was the most frequent indication of LT with 66 patients (pts) (39%) followed by emphysema with 45 pts (27%) and 29 idiopathic pulmonary fibrosis pts (17%). Twelve pts died within 24 hours postoperative without bronchoscopies. Two hundred sixty two anastomoses were included in the study (44 single lung and 109 double lung). The median follow-up was 145 days [min 1, max 2197] with a mean of 7.2 bronchoscopies per patient. Sixty five of the 156 pts (41%) had airway complications after a median delay of 31 days. A total of 74 anastomoses proved pathological of 262 (28%). Twenty two patients required endoscopic surveillance and 43 underwent endoscopic management. One hundred nine complications were reported including 37 stenoses (34%), 34 dehiscences, 27 ischemia / necroses of the sutures, and 11 bronchomalacia. The endoscopic management included placement of forty-three stents (29 silicone stents and 14 metallic stents) for twenty-eight stenoses, six bronchomalacia, nine dehiscences. Ten stenoses were treated by dilation alone. No risk factors were found to be significant in this study. Operative time, age, etiology of LT were not associated with increased airway complications in this study.

Conclusion : Our bronchial anastomosis complication rate was comparable with what has been reported in the literature. Early complications are necroses, followed by stenoses. No risk factors were found. Because these complications importantly affect survival, improving efficacy of intervention strategies should improve outcome

33271

Lung Transplantation

RISK FACTORS FOR DEVELOPMENT OF ANASTOMOTIC BRONCHIAL STENOSIS AFTER LUNG TRANSPLANTATION

Abdul Hamid Alraiyes¹, Reinaldo Rampolla²

¹Tulane University , New Orleans, United States; ²Ochsner Medical Center , New Orleans, United States

Background: Anastomotic bronchial stenosis has major effects on morbidity and mortality following lung transplantation. Perfusion of the donor bronchi by the bronchial arteries is disrupted at the time of organ procurement. As a consequence, the donor bronchi now depends on bronchial circulation from the recipient and poorly oxygenated pulmonary artery circulation from the donor to provide oxygen and nutrients to the bronchial anastomosis. Therefore, the bronchial anastomosis will be more susceptible to ischemia.

Objectives: We conducted a retrospective chart review to compare the effect of type of suture used for airway anastomosis, and volume of preservation solution on the development of anastomotic bronchial stenosis following lung transplantation.

Methods: We reviewed all patients who underwent lung transplantation between February 2010 and August 2011 at Ochsner Medical Center. We recorded the number of anastomotic bronchial stenoses diagnosed in the six month period after transplant in each patient. We then compared the development of stenosis depending on the type of suture used (Prolene or Polydioxanone) and the volume of preservation solution (Perfadex) used for antegrade flush during procurement (3 liters or 4.5 liters).

Results: Prolene was used in 21 patients and Polydioxanone was used in 13 patients. There were 7/21 (33.3%) patients in which non-absorbable suture (Prolene) was used, and 1/13 (7.7 %) patients in which absorbable suture (Polydioxanone) was used who developed stenosis, respectively. The fisher's exact test gives a $p=0.11$ (figure 1). 22 of the patients had 3L of Perfadex for antegrade flush and 12 had 4.5L of Perfadex for antegrade flush. There were 8/22 (36.4%) patients who received 3L and 0/12 (0 %) patients who received 4.5L who developed stenosis, respectively. The fisher's exact test gives a $p=0.03$ (figure 2).

Conclusion: Our study shows decreased number of bronchial stenosis with the use of a larger volume of preservation solution (4.5 liters) as antegrade flush during procurement. No difference was found between the types of suture used.

33521

Lung Transplantation

UTILITY OF BRONCHOSCOPY AMONG LUNG TRANSPLANT RECIPIENTS ADMITTED TO THE MEDICAL ICU

Manish Mohanka¹, Amit Banga², Michael Shawn Machuzak², Thomas Gildea²

¹Cleveland Clinic Foundation , Lakewood, United States; ²Cleveland Clinic Foundation , Cleveland, United States

We retrospectively reviewed the charts of lung transplant recipients who underwent bronchoscopy while admitted to the medical intensive care unit (MICU) between January 1,

2010 and December 31, 2011 at the Cleveland Clinic Foundation. The patients were identified from the billing database. This study was approved by the Cleveland Clinic IRB.

We studied the reasons for MICU admission, indications for bronchoscopy, various diagnostic and therapeutic techniques employed, results and complications among these patients.

Results: A total of 82 bronchoscopies were performed among the 51 lung transplant recipients admitted to the MICU. COPD and UIP/ IPF were the most common reasons for lung transplantation (Table 1). The average age at the time of transplant was 53.3 years. Thirty patients received bilateral lung transplant, while 21 received unilateral lung transplant (13 left and 8 right). The mean duration between lung transplantation and bronchoscopy was 20 months. Bronchoscopy was performed 5.4 days after the MICU admission on the average. Respiratory failure followed by sepsis accounted for the majority of admissions into the MICU (Table 2). Indications for bronchoscopy included presence of infiltrates (62%) on chest imaging by computed tomography (CT) or X-ray (CXR). Evaluation for airway problems such as stenosis, anastomotic dehiscence and mucus plugging with associated atelectasis were other common indications (Table 3). The diagnostic and therapeutic techniques commonly employed are described in Table 4. Airway examination revealed stenosis or dehiscence among nearly 35% patients. Mucus plugging was frequently found to contribute to atelectasis and hypoxia. The bronchial washings and bronchoalveolar lavage helped in tailoring antimicrobial therapy among approximately 35% patients. All transbronchial biopsies (TBBX) were performed among patients with lung infiltrates. Of the 12 TBBX, 10 were performed with patient on ventilator support and 5 with fluoroscopic guidance. Of the total 80 biopsy forceps passes, 50 diagnostic pieces were obtained. Mild rejection was found among 3 patients, of which 1 was managed with pulsed steroids and others with augmented immunosuppression therapy. Acute lung injury was found in 7 of the 12 biopsy procedures. Four patients required 8 interventional bronchoscopy procedures with ablation, airway dilation and/ or stenting (Table 4). Hypoxia and hypotension were the most common complications. Pneumothorax was observed in one patient after TBBX while on mechanical ventilator, despite use of fluoroscopy.

Summary: Bronchoscopy can assist in work up of hypoxic and hypercarbic respiratory failure among lung transplant recipients. Bronchoscopy is a useful tool for critically-ill and immunosuppressed lung transplant recipients and can assist with microbiology data to support decision making and antimicrobial therapy.

Transbronchial biopsies appear to be a higher risk of pneumothorax among mechanically ventilated patients.

33542

Lung Transplantation

ECMO AND ANASTOMOTIC AIRWAY COMPLICATIONS IN LUNG TRANSPLANTATION

Sweetheart Ador-Dionisio¹, Ashish Prakash Maskey², Atul C. Mehta¹, Charles Lane¹, David Mason¹, Gosta Pettersson¹, Kenneth McCurry¹, Marie Budev¹, Michael Shawn Machuzak¹, Olufemi Akindipe¹, Sudish Murthy¹, Thomas Gildea¹

¹Cleveland Clinic , Cleveland, United States; ²Cleveland Clinic Foundation , Cleveland, United States

Background: Lung transplantation, although a viable treatment for end stage lung disease still has limited long term survival due to multiple factors including the development of bronchiolitis obliterans, infectious complications and other issues including airway complications¹. One-fifth of patients develop anastomotic airway complications after lung transplantation². The main risk factor has been predominantly attributed to ischemia of the donor bronchus in the immediate post-transplant period¹. There is evidence that ECMO is a viable option for bridging advanced lung disease patients awaiting transplantation^{3 4}. Several articles describe airway complications after lung transplantation but no studies to date address the impact of ECMO either before or after transplantation on airway complications.

Objectives: To determine if patients on ECMO prior to lung transplantation had increased incidence of anastomotic airway complications.

Methods: From January 2002 until March 2012, 830 lung transplantations were performed at our center. Twenty-two (2.65%) of these patients were bridged to transplant with ECMO and 17 of 22 were lung transplantations only (5 were heart-lung excluded due to tracheal anastomosis). These seventeen cases were reviewed for anastomotic airway complications, which were categorized as necrosis, stenosis, malacia, granulation tissue formation, bronchial fistula, and anastomotic infection. Airway complications were assessed by follow-up bronchoscopy and associated variables were analyzed using multivariate and descriptive analysis.

Results: Summary Table above describes the demographics of the cohort, including LAS scores, and ECMO days. The co-morbidities among the cohort were the same, 13/17 were on chronic steroids before transplantation, 4/17 had diabetes prior to transplant, 15/17 underwent cardiopulmonary bypass with mean duration 191 minutes (range 60-270) during implantation, mean PGD score at 24 hours Grade 1 and all had post-transplant infections identified as a positive culture either on the donor or recipient bronchus swab. Necrosis was found in 10/17 (58%) and stenosis in 5/17 (29%) patients. At 3 months, A1B0 rejection was found in 1/11 and A2B0 rejection in 2/11 patients, 2 of which had necrosis and 1 had both necrosis and stenosis. Evidence of necrosis was found in 10/17 patients with higher LAS score and 10/15 with higher BMI but these were not found to be statistically significant (p-value = 0.077 and 0.95 respectively). Higher PGD score at 24 hours was also not found to be statistically significant (p-value 0.99). Moreover, 7/17 patients utilized ECMO for >5 days prior to lung transplant and this was not associated with increased incidence of necrosis (p-value 0.99). Furthermore, no statistically significant difference was found between use of VV versus VA ECMO either prior to or after lung transplantation (p-value = 0.58 and 0.99 respectively).

Conclusion: Airway necrosis is a common finding early after transplantation in patients bridged with ECMO to transplant. Patients with higher LAS scores who utilized ECMO as a bridge to transplantation though did not have a statistically significant increased incidence of

necrosis and ischemia. A prospective study would be recommended to determine the true incidence of airway complications in patients bridged with ECMO to lung transplantation.

33515

Nursing Assistance During Bronchoscopy

INTERNATIONAL EDUCATIONAL PLATFORM FOR INTERVENTIONAL PULMONOLOGY ASSISTANTS

Linda M Penninx¹, Cielito Caneja², Myles A Mckinnon³

¹*VU University Medical Center , Amsterdam, Netherlands;* ²*Chelsea and Westminster Hospital NHS Foundation Trust , London, United Kingdom;* ³*BC Cancer Agency , Vancouver, Canada*

Current practice in interventional pulmonology (IP) encompasses complex procedures that require a solid teamwork among team members including the IP nurse assistants (IPNA) and IP respiratory therapist assistants (IPRTA) to ensure a smooth and efficient workflow for optimizing patients' safety. However, there is currently no professional teaching platform that focus on enforcing professionalism for specialized IPNA and IPRTA personnel, unlike e.g in the field of minimally invasive surgery, gastrointestinal endoscopy, and interventional cardiology. A collaborative effort by expert IP tutors from three institutions, under School of Respiriology, participated in a new endeavor to benchmark and encourage IPNA / IPRTA for structurally modular training sets set-up in IP, to continuously safeguard and improve their competency level. Adherence to modern requirements of competency education has been enforced: Expert tutors and IPNA and IPRTA from different international large academic teaching institutions have supported this one day course event, to encourage open, interactive and non-coercive manner of crosstalk with support from the different optical industries and applicators' firms to minimize instrumental bias. The one day course program included concise background clinical instructions by the expert IP physicians. The emphasis (75%) of this one-day course was allocated for hands-on self-performance sessions by nurse course participants themselves forming teams, while assisting tutor IPs and each other, on simulation mannequins which included stop and go scenario performance e.g. in airway foreign body removal, transbronchial needle aspiration (TBNA) and management of massive hemoptysis. Assessment by the twenty nurse course participants showed that 80% approved this competency educational initiative as an excellent open platform with full adherence to the requirements of modern competency education they currently need. Twenty percent indicated that an integrative course together with mandatory participation of their own IP physicians should become institutionalized. Seventy percent agreed that mandatory passing of a theoretical examination before participation and post-course official examination audited by the international IP tutors, should be enforced. Official diplomas by the IP educational School of Respiriology would be much appreciated for their professional status. However, 80% also indicated that they fully realized that this one-day IP assistants course is insufficient for their level of competency. An additional twenty modular-related training sessions together with their own IP physicians were considered necessary including regular drills thereafter, to become and remain fully competent. In conclusion, current educational curriculum for IP assistants may be considered obsolete, and this incentive should be offered to fulfill the need and safeguard the competency of our IP assistants due to the many technical advancements and increasingly complex services offered to the high risk patients we currently encounter. The results shown seem to match the necessity for synchronizing

competency education with IP physicians, which should be organized by strong collaboration among the large academic teaching institutions to meet the modern requirements of competency education at all levels.

33511

Surgical Dysphagia and Dysphonia

SURGICAL MANAGEMENT OF EARLY UNILATERAL LARYNGEAL PARALYSIS AFTER PULMONARY RESECTION AND MEDIASTINAL LYMPHADENOMECTOMY FOR CANCER:

Redha Souilamas¹, David Malinvaud², Ollivier Laccoureye², Pierre Bonfils²

¹European Georges Pompidou Hospital Paris, Paris, France, Metropolitan; ²European Georges Pompidou Hospital, Paris, France, Metropolitan

Background : To document the symptoms, evolution, management and outcome in a large series of patients with an early unilateral laryngeal paralysis after mediastinal lymph node dissection and pulmonary resection for cancer.

Methods : A retrospective series of 69 patients. Treatment relied on isolated speech therapy in 18 patients and surgical medialization of the paralyzed vocal cord in 51 patients. Duration of follow-up varied from 2-109 months with a mean duration of 15 months. Treatment included isolated speech therapy and laryngeal medialization in 18 and 51 patients, respectively.

Results : Symptoms included swallowing impairment and dysphonia noted in 63.7 % and 98.5 % of patients, respectively. Recovery of motion of the paralyzed larynx varied from 2.8 % in patients in whom the operative report mentioned that the inferior laryngeal or Xth cranial nerve had been transected to 23.5 % in patients in whom the operative report did not mention nerve transection. Recovery of motion did not occur past the 9th month that followed thoracic surgery. When performed, medialization of the paralyzed larynx, resulted in an overall 95.4 % and 96 % improvement rate for swallowing impairment and dysphonia, respectively but one patient also died from aspiration related pneumoniae.

Conclusions: In patients with an early unilateral laryngeal paralysis after pulmonary resection with mediastinal lymph node dissection for cancer, laryngeal medialization has a beneficial impact on swallowing speech and voice resulting in a better quality of life. Persistent swallowing impairment after laryngeal medialization must be managed aggressively given the risk for delayed pneumonia and even death from aspiration.

33260

Tracheobronchomalacia

TRACHEOBRONCHIAL STENT AS BRIDGING THERAPY IN ADULT PATIENTS WITH SEVERE TRACHEOBRONCHOMALACIA UNDERGOING TRACHEOBRONCHOPLASTY

Abdul Hamid Alraiyes¹, Abbas Abbas²

¹Tulane University, New Orleans, United States; ²Ochsner Medical Center, New Orleans, United States

Background: Tracheobronchomalacia (TBM) is an abnormality in the tracheal and bronchial walls characterized by flaccidity of the supporting structures with significant reduction of the airway diameter on expiration. The incidence of TBM may represent 1% of all patients undergoing bronchoscopy. Frequent and prolonged endotracheal intubation is the most common cause for acquired focal tracheomalacia in adults. Other causes of TBM include blunt chest trauma, relapsing polychondritis and extrinsic compression of the airway. Functional bronchoscopy is the gold standard tool to diagnose TBM. The severity of TBM is graded by the degree of airway collapse during forced expiration; collapse of

Objectives: The aim of our study is to evaluate the value of using tracheobronchial stent implementation as a bridging procedure in patients with severe tracheobronchomalacia prior to tracheobronchoplasty.

Methods: Under IRB approval, we did a retrospective analysis of all patients with severe TBM who underwent tracheobronchial stenting prior to tracheobronchoplasty between March 2009 and March 2011 at Ochsner medical center. The primary end point was improvement in cough and dyspnea based on New York Heart Association (NYHA) functional classification after stent placement. Cough severity was divided into; 1= mild, 2= moderate, and 3= severe. Eventually, all patients underwent TBP. TBP were performed through right thoracotomy and plicating the membranous portion of the distal trachea and mainstem bronchi with a strip of prosthetic mesh.

Results: We identified 12 patients (mean age 64 ± 8 years) who underwent silicone Y stent prior to tracheobronchoplasty. Follow up period was (10 ± 4 weeks). Dyspnea score improved following silicone Y stent placement (mean NYHA changed from 3.25 to 1.66, $p=0.04$) (figure 1). However, the cough score did not improve after stent placement (mean cough severity 2.5 to 2.25, $p=0.76$). All 12 patients subsequently underwent tracheobronchoplasty. NYHA improved after TBP (mean NYHA changed from 3.25 to 1.33, $p=0.005$) (figure 1). Furthermore, cough was reduced but not statistically significant (mean cough severity 2.5 to 1.41, $p=0.14$). No mortality observed following stent placement or TBP.

Conclusion: In general tracheobronchoplasty is superior to airway stenting for management of severe tracheobronchomalacia. It improves symptoms, quality of life, and functional state and exercise capacity. However, TBP is more invasive procedure performed through right posterolateral thoracotomy which may be amendable with an operative risk. Our approach identifies the patients with severe TBM in whom symptoms improved with the implementation of tracheobronchial stents which can be used as an indicator for successful TBP procedure.

33546

Tracheobronchomalacia

CLOSED POSTERIOR TRACHEAL RUPTURE WITH ACQUIRED CAVERNOUS BRONCHOMALACIA AND TRACHEOBRONCHOMEGALY

Anu Ramaswamy¹, Anu Ramaswamy¹, Thomas R Gildea²

¹*Cleveland Clinic , Cleveland, United States;* ²*Cleveland Clinic Foundation , Cleveland, United States*

Background : Tracheal rupture is an uncommon complication of trauma, intubation, radiation or surgery and there are only isolated case reports of spontaneous rupture. Acquired tracheobronchomalacia can rarely occur in adults and is usually seen due to tracheal compression, cartilage abnormalities due to underlying connective tissue disorders, prolonged mechanical ventilation, tracheoesophageal fistulas, vascular rings, trauma, bronchial diseases or after lung transplantation. We report a rare case of posterior tracheal rupture with acquired bronchomalacia , likely due to steroid induced muscular atrophy and severe cough in a patient with underlying bronchiectasis, and characterized by unique bronchoscopy findings.

Methods: Report of one case referred to a tertiary medical center

Summary of results : A 72 year old female presented to the interventional pulmonary department of our hospital for evaluation. She was an ex-smoker and had a long standing history of severe bronchiectasis with history of recurrent sinopulmonary infections in the last 5-6 years. She had received multiple courses of antibiotics and steroids and continued to have daily productive cough with purulent mucous. She was also recently noted to have mild IgG subclass deficiency. She had diffuse wheezes and rales on bilateral lung exam with some rales in her left upper lobe. She had no other history of chronic illnesses or immunosuppression. A CT Chest done prior to evaluation showed a dramatic change in the caliber of the right main bronchus between inspiration (21.3mm) and expiration (5.4mm) along with known bronchiectasis and bilateral parenchymal and pleural scarring. On bronchoscopy, there was no evidence of tracheal ring abnormalities until the distal trachea and carina was reached. At the junction of the carina and mainstem bronchi, there was evidence of severe muscular atrophy with muscular separation of the tracheal and bronchial cartilages from their normal anatomic distribution. Cartilaginous rings were completely intact, but there was a complete loss of the posterior tracheal wall integrity with apparent spontaneous rupture of the airway with only thin mucosa approximating airway structures. There was evidence of diverticula mainly in the left mainstem bronchus, where the tracheal cartilage had pulled away from the posterior wall. There was diffuse evidence of bronchomegaly with dynamic airway collapse. Beyond the mainstem bronchi, the airways appeared to be normal except for copious amounts of purulent secretions. Patient was diagnosed to have posterior tracheal wall rupture due to severe mucosal and muscular atrophy of the posterior tracheal wall, resulting in cavernous bronchomalacia. This was thought to be due to combination of high dose steroid use and intense coughing. The bronchomalacia in turn contributed to further difficulty with secretion clearance, with worsening bronchiectasis.

Conclusion : Spontaneous tracheal rupture with acquired bronchomalacia and tracheobronchomegaly in adults is extremely rare. This case also highlights the potential complication of severe cough associated with longterm steroid use in the elderly population. Tracheobronchopexy was indicated for our patient and she was referred for airway surgery.

Endobronchial Management of Central Airway Obstruction

TRACHEAL CAPILLARY HEMANGIOMA IN ADULT TREATED WITH INTERVENTIONAL PULMONOLOGY

Hiroshi Haneda

Seirei Mikatahara General Hospital , Hamamatsu, Japan

We report a case of a tracheal capillary hemangioma in 47-year-old woman with hypertension, diabetes mellitus and cervical disc hernia. She had experienced an episode of hemoptysis and diagnosed bronchial asthma at a local hospital. One year later, she complained hemoptysis and cough. So she had medical examinations at the local hospital. The chest roentgenogram was negative, the chest CT-scan showed a small tumor at trachea, and the bronchoscopy showed tumor was polypoid and easily bleeding. She came to our institution for medical treatment. A single endobronchial resection was performed using an electrocautery snare and the resected tumor was removed using basket forceps under general anesthesia and tracheal intubation. We used a flexible bronchoscope because rigid bronchoscope may have made her cervical disc hernia worse. Pathological examination revealed a tracheal capillary hemangioma. The symptom such as hemoptysis and cough disappeared immediately. Capillary hemangioma of the tracheobronchial tree is extremely rare in adult and histologically benign tumor. Nevertheless, it is necessary to treat it because it is a cause of hemoptysis, cough, and dyspnea. An electrocautery snare resection for tracheobronchial capillary hemangioma is a useful method.

8:00AM- 5:30 PM

Room: WHITEHALL ROOM

POSTER SESSION 2 (SUNDAY)

30884

Bronchoscopy Training

FIBEROPTIC GUIDED INTUBATION FOR MANAGEMENT OF THE DIFFICULT AIRWAY

Ricardo H Bammann¹, Ana Cristina P. Castro¹, Angelo Fernandez¹, Augusto Ishy¹, Leticia L Lauricella¹, Pedro H X Nabuco¹, Ricardo M Terra¹

¹*Hospital 9 de Julho , Sao Paulo, Brazil*

Background: Access to difficult airway is a frequent concern among anaesthesiologists and intensivists. Bronchoscopy stands as the gold standard method for solving the problem.

Objectives: To compare outcomes of fiberoptic guided intubation in patients who had the difficult airway either previously diagnosed or not.

Methods: Retrospective review of 311 consecutive flexible bronchoscopies divided into two clinical situations: Group 1 (n = 232) - difficult airway previously recognized; and Group 2 (n =

79) - not predicted failed intubation. All procedures were performed by a senior bronchoscopist in the setting of a private general hospital with 310 beds, 70 of those in ICU, 1.400 surgeries/month.

Results: Patients' age varied from 5 to 88 years (median: 52). 276 procedures happened in the immediate pre-operative period at the OR, 32 at bedside in the ICU, 3 at the ER. Main reasons for difficult airway in Group 1 included prior history (88 cases), unstable cervical spine (27), temporomandibular disorders (25), obesity (20) and supraglottic tumors (17). It was not possible to mention any anatomical reason to justify a difficult airway in 64 (81,0%) cases from Group 2. Preservation of spontaneous ventilation was the chosen technique in Group 1, meanwhile 9 episodes of excessive sedation motivated an avoidable burden of transient hypoxia and stress. Intubation in Group 1 was 20 times naso-tracheal, 15 of them at the surgeon's request. Safe and well-succeeded access to the airway was achieved in all cases from Group 1 but twice (98,7%) - a 7 years old boy with multiple face fractures and a 52 years old lady with a large tongue tumor (both were tracheostomized without previous intubation). The unpredicted situation in Group 2 led to an urgent call for the presence of a bronchoscopist - waiting time ranged between 5 minutes and 2 hours (median: 25 minutes). Seventeen operations (not included in this study) were cancelled because of this delay. Drug reversion was the chosen strategy in 63 patients from Group 2, while bronchoscopy associated to a standard curved blade laryngoscope lifting the collapsed larynx was used in the other 16 cases. Naso-tracheal intubation was necessary in 4 patients. Bronchoscopic intubation in Group 2 failed five times (6,3%), forcing the surgeon to carry out an urgent tracheostomy (three times) or to cancel the operation (twice). Other adverse outcomes observed in Group 2 were associated with the multiple ineffective intubation attempts prior to a successful fiberoptic guided intubation, including serious brain injury (one case), upper airway bleeding (two cases), damage to teeth (three cases) and postoperative sore throat (seven times).

Conclusion: Difficulties in intubation have been associated with serious complications, particularly when failed intubation has occurred. Bronchoscopy as well as an adequately trained team are not always available, therefore awareness and prediction of a difficult airway is essential. A preplanned strategy including the endoscopic approach should be scheduled leading to an enhanced outcome and minimal risks. Better results rely on preservation of spontaneous ventilation.

33023

Bronchoscopy Training

TRAINING FOR ENDOBRONCHIAL ULTRASOUND AMONG US PULMONARY/CRITICAL CARE FELLOWSHIPS: A SURVEY OF FELLOWSHIP DIRECTORS

Nichole Tanner¹, Clayton Joel Shamblin², Gerard Silvestri², Nicholas Pastis¹

¹Medical University of South Carolina , Charleston, United States; ²Medical University of South Carolina , Mount Pleasant, United States

Background: The past decade has witnessed a vast improvement in technology available for diagnostic and therapeutic bronchoscopy. Endobronchial ultrasound (EBUS) is one such technology that has revolutionized the ability of bronchoscopists to visualize and sample

structures surrounding the tracheobronchial tree. It has repeatedly been shown to be safe, minimally invasive, and highly accurate in staging and diagnosing diseases including lung cancer, lymphoma, and sarcoidosis. A prior survey of pulmonary fellowship program directors conducted in 2004 after the publication of the American College of Chest Physicians guidelines for procedure competency showed that only 2% of programs offered EBUS training and none met the recommended threshold number for competency.

Objectives: Within this context and after 7 years and a robust body of literature supporting EBUS technology, we sought to determine what training is being offered to pulmonary fellows, how competency is being assessed, and whether the recommended threshold numbers of EBUS are being met. The collection of this data has implications in the design of technical skill training curriculum for future pulmonary and critical care fellows.

Methods: Surveys were mailed to 154 pulmonary/critical care fellowship directors in the United States and Puerto Rico. Demographics of the fellowship, the availability of EBUS equipment, the presence of a formal EBUS competency program, and the average number of EBUS bronchoscopies performed were recorded. The presence of an identifiable interventional pulmonologist (IP) was determined and EBUS volume was compared with programs that did not have an IP.

Results: The survey response rate was 71%. EBUS equipment was available at 89% of the programs. Of those without EBUS, 100% expressed the goal of obtaining equipment within the year. In 70% of programs, there was an identifiable IP. This was associated with an increased number of EBUS procedures performed by trainees ($p < 0.01$). Only 30% of programs have a formal protocol in place to evaluate EBUS competency. In addition, only 6 of the programs surveyed reported EBUS numbers required to meet the guidelines for competency. Conventional transbronchial needle aspiration (TBNA) is routinely taught in 89% of fellowship programs.

Conclusions: EBUS exposure has rapidly disseminated into fellowship training programs, and programs with an identifiable IP are more likely to provide fellows with more EBUS procedures. However, the recommended numbers for competency are rarely met. The findings of this survey point out the need to develop a standardized protocol for EBUS competency that includes current recommendations and may require training in simulation.

33157

Bronchoscopy Training

TECHNICAL GUIDING INTERVENTION FOR EBUS-TBNA TRAINING

Shinji Sasada¹, Hisao Asamura¹, Norio Okamoto², Takaaki Tsuchida¹, Takehiro Izumo¹, Tomonori Hirashima², Yukiko Nakamura¹

¹National Cancer Center Hospital, Tokyo, Japan; ²Osaka Prefectural Medical Center for Respiratory and Allergic Diseases, Osaka, Japan

Background: Endobronchial ultrasound guided transbronchial needle aspiration (EBUS-TBNA), which enables real-time aspiration of paratracheal and peribronchial lesions, has been widespread. Some meta-analysis with controlled prospectively monitored cohort reported a

pooled sensitivity of 88 to 93% (Adams K et al. Thorax 2009, Varela-Lema L et al. Eur Respir J 2009). EBUS-TBNA is currently available over 170 hospitals in Japan, but the most of the hospitals, numbers of case is less than 50 a year. A retrospective review of clinical practice with first 100 patients on trainee showed low sensitivity of 67.4% (Kemp SV et al. Thorax 2010). These suggest that EBUS-TBNA competence is currently problematic and there are few centers with an established EBUS service to provide training to more than a handful of beginner trainees.

Objectives: The aim of our study was to evaluate an improvement of EBUS-TBNA technique in beginner trainees before and after technical guiding intervention (TGI).

Methods: As TGI, supervisor guided to beginner trainees as follows. At first, operators must learn quick manipulation of the needle and adjusting the length of the puncture stroke to obtain core tissues. Moreover, if operators cannot obtain sufficient tissues at the first puncture, increase the size of the suction syringe (30 ml), or consider a large needle (21 gauge) use, especially in benign lesion (sarcoidosis) or malignant lymphoma. Four beginner trainees performed EBUS-TBNA alternating the operator and assistant. From Apr. to Dec. 2009 (First period), 25 patients underwent the procedure under usual guiding. On Jan. 2010, 4 trainees received TGI, and 20 patients underwent the procedure until Oct. 2010 (Second period). We retrospectively compared the sensitivity, accuracy, and complications between the sequential two periods.

Results: During the first period, the sensitivity and accuracy were 88.2% and 76%, respectively. During the second period, the sensitivity and accuracy were 100% and 95%, respectively. In the most of false negative cases could not be obtained sufficient tissue samples. The rate of successful obtained core tissues increased from 68% (First period) to 95% (Second period). There were no significant differences with complication in both periods.

Conclusion: Four beginner trainees could learn and share the EBUS-TBNA procedure after TGI, and enabled an early competence although the numbers of the case were few. An elevation of sensitivity and accuracy were due to improve core tissue sampling technique. We found that immediate TGI is required to provide accurate and appropriate training for the use of EBUS-TBNA.

33212

Bronchoscopy Training

INCONCLUSIVE BIOPSIES FROM ABNORMAL ENDOBRONCHIAL FINDINGS SUSPICIOUS FOR LUNG CANCER

Ricardo H Bammann¹, Ana Cristina P. Castro¹, Angelo Fernandez¹, Augusto Ishy¹, Leticia L Lauricella¹, Pedro H X Nabuco¹, Ricardo M Terra¹

¹Hospital 9 de Julho, Sao Paulo, Brazil

Background: The decision about whether to pursue a diagnostic bronchoscopy for a lesion that is suspicious for lung cancer largely depends on the location of the lesion. Direct forceps biopsy of visible central lesions is the most available and frequently used technique.

Objectives: To describe abnormal endoscopic findings and evaluate the diagnostic yield of endobronchial biopsies performed on patients under investigation of central lesions suspicious for malignancy.

Methods: Retrospective analysis of 99 consecutive bronchoscopies with endobronchial biopsies, all of them with abnormal endoscopic findings, only including inpatients with clinical symptoms and/or radiological signs suggesting the diagnosis of a primary lung cancer. We defined three categories of endoscopic findings: 1) Exophytic lesions protrude into the bronchial lumen. Their borders are precise and easy to differentiate from the normal wall. Exophytic lesions include polypoid tumors and obstructive masses; 2) Infiltrations are lesions on the surface of the tracheobronchial wall, ranging from localized redness, edema and engorgement of blood vessels to an irregular surface or abnormal relief patterns. Infiltrations may induce stenosis and the borders separating them from normal mucosa are somehow difficult to distinguish; 3) Extrabronchial findings include any form of extrinsic compression, deformation and narrowing of bronchi with a well-preserved mucosa. If multiple abnormalities were occasionally present, patients were preferably included in the lowest category of the 1-2-3 sequence. All procedures were performed by a senior bronchoscopist in the setting of a private general hospital with 310 beds.

Results: Main results are presented in the Table. In 81 patients (81,8%), endobronchial forceps biopsies (under direct view) achieved a definite diagnosis. Histology revealed 70 primary carcinomas (19 adenocarcinomas, 18 squamous cell, 17 small cell, 15 large cell, one neuroendocrine) and two breast cancer metastasis. Non-malignant diagnosis were established nine times - three cases of tuberculosis, two of aspergillosis, one case of Wegener disease, one of sarcoidosis, one of amyloidosis and a mucosal enlarged anthracotic lymph node. Eighteen (18,2%) biopsies were not diagnostic - in this particular outcome, not only extrabronchial lesions with normal mucosa were included but also exophytic lesions and infiltrations. There were seven endoscopic reports that macroscopically described necrotic areas and blood clots in this series, however all of them achieved a conclusive biopsy.

Conclusion: Central lesions are obviously easy to biopsy but diagnostic yield can not be taken for granted. It is the bronchoscopist duty to obtain as many adequate samples as needed - for extrabronchial lesions and submucosal spread, other sampling techniques (mainly transbronchial needle aspiration) should always be available and considered as a possibly better alternative.

33218

Bronchoscopy Training

BRONCHOALVEOLAR LAVAGE, TRANSBRONCHIAL BIOPSY AND POST-BRONCHOSCOPY SPUTUM IN PATIENTS SUSPICIOUS FOR TUBERCULOSIS

Marcia Jacomelli¹, Ascedio J Rodrigues¹, Laura F Queiroz¹, Priscilla Araujo¹, Ricardo H Bammann¹, Sergio E Demarzo¹, Viviane R Figueiredo¹

¹University of Sao Paulo School of Medicine, Hospital das Clinicas, Heart Institute, Sao Paulo, Brazil

Background: Sputum analysis turns out to be negative in 30 to 50% of patients, mostly due to their inability to produce sputum. In such patients, a diagnosis can be obtained either by induced sputum or by bronchoscopy.

Objectives: To evaluate the diagnostic accuracy of bronchoscopic procedures in patients with clinical or radiological suspicion of tuberculosis who were unable to expectorate or with already negative sputum smears.

Methods: A cross-sectional study of 286 consecutive patients under investigation for

tuberculosis, all of them enrolled to a prospective protocol including a bronchoscopy with bronchoalveolar lavage (BAL), transbronchial biopsy (TBB) and a post-bronchoscopy sampling of sputum. BAL and sputum samples were forwarded to microbiologic assays (direct smear and culture) while TBB specimens were submitted to histopathological examination.

Results: Pulmonary tuberculosis was diagnosed in 127/286 patients (44,4%). Direct stains from BAL were positive in 31/269 samples (11,5%); *M. tuberculosis* growth was observed in 68/262 (25,9%) cultures; overall diagnostic yield related exclusively to BAL was 63,8% (81 out of 127 tuberculosis cases). TBB was contraindicated in 54/286 (18,9%) patients; typical granulomas with central necrosis were found in 57/232 (24,6%) biopsies. TBB associated to BAL (considering any or both positive results) achieved the diagnosis of tuberculosis in 114 patients. Other diagnosis based on TBB (facing a negative BAL result) were nonspecific chronic inflammation in 51/232 patients (22,0%); pneumocystosis, fungal infections, or nocardiosis in 20 (8,6%); bronchiolitis obliterans organizing pneumonia (BOOP), alveolitis and pneumoconiosis in 14 (6,0%); lung or metastatic neoplasms in 7 (3,0%). Non-tuberculosis mycobacteria grew from 7/262 patients (2,7%). Post-bronchoscopy sputum was sampled from 169 patients - 57 of those (33,7%) were positive (direct smear and/or culture). Post-bronchoscopy sputum exclusively achieved the diagnosis of tuberculosis in 13/127 patients (10,2%). Sensitivity, specificity and predictive values related to BAL and TBB (whether isolated or associated) are shown on the Table - any positive result (BAL, TBB and post-bronchoscopy sputum) was considered for the final diagnosis of tuberculosis, as well as other 8 positive surgical biopsies (out of 11 operations) performed after an inconclusive endoscopic exam.

Minor complications related to bronchoscopy occurred in 5.9% of all patients, including a 3,4% post-TBB pneumothorax rate.

Conclusions: Bronchoscopy is a reliable method for the diagnosis of pulmonary tuberculosis in patients with negative sputum smear results, with low complication rates. TBB should always be associated to BAL because both methods are complementary, with a corresponding higher sensitivity rate. TBB also facilitates the differential diagnosis with other diseases. Post-bronchoscopy sputum sampling stands as a simple, harmless and useful diagnostic tool increasing the overall diagnostic yield.

33284

Bronchoscopy Training

PARTICIPANT KNOWLEDGE AND TECHNICAL SKILL ACQUISITION FOLLOWING ONE DAY EBUS COURSE. TWO YEAR EXPERIENCE AT LAHEY CLINIC.

Nikolaos Koufos¹, Carla Lamb¹, Nha Voduc¹

¹*Lahey Clinic , Burlington, United States*

Introduction: Many practicing pulmonologists have not received formal training in endobronchial ultrasound bronchoscopy transbronchial needle aspiration (EBUS TBNA). A number of institutions offer EBUS training courses dedicated to teaching these skills. These have not been standardized, although most include a combination of didactic teaching and a hands-on laboratory. The effectiveness of these courses is unknown. **Objectives:** The primary objective of this study was to assess the effectiveness of a one-day EBUS course in improving knowledge and technical competency. The secondary objectives included assessment of any relationship

between participant experience, acquisition of knowledge and basic technical proficiency.

Methods: We reviewed the performance of all participants in the Lahey Clinic EBUS courses in 2010 and 2011. The course included didactic lectures as well as workshops with simulators. After demographic information was collected, participants were asked to complete a multiple-choice test before and after the lectures. Each participant's technical ability was assessed during the hands-on workshop. Participants were designated as "technically competent" if they correctly performed all required tasks within two attempts. Statistical and correlational analysis assessed for possible relationships between participant experience defined as years in practice and previous EBUS experience relative to scores on post-course tests and attainment of technical proficiency.

Results: Ninety participants were enrolled in the 2010-2011 courses. Complete data was available for 68 participants. Participant experience varied from fellows in training to those with up to twenty years of independent practice. The majority of participants performed over 200 conventional bronchoscopies; however only 32/88=36 % had previous EBUS experience. Median performance in the pre-test was 5(range 1-10) for N=88 participants. Median performance in the post-test was 8 (range 3-10) for N=82 participants ($p<0.0001$). Twenty percent of participants demonstrated basic technical competency with EBUS TBNA on simulators. Participants achieving basic technical competency also scored higher on post test. We found no relationship between years in practice or self-reported procedural experience with knowledge acquisition demonstrated by performance on tests nor attainment of basic technical competency.

Discussion: This represents an assessment of the effectiveness of a one-day EBUS course in teaching EBUS-related knowledge and skills. We demonstrated that the course is effective in improving knowledge and providing technical competency. We acknowledge several important limitations: We assessed only short-term knowledge and skills. Longterm retention is unknown. The tests and technical assessments were not based on validated scoring systems; however these were developed by expert faculty with extensive experience in teaching EBUS TBNA. Distinguishing variables among those who were able to perform well on both cognitive and technical skills is ongoing.

Conclusions: A one-day EBUS course demonstrates a significant improvement in post-test scores. Those who scored higher in the post-test were more likely to achieve basic technical competency. Some participants were able to acquire acceptable basic skills of EBUS. It remains to be seen if this will extend into long term practice, specifically if participants do not initiate actual clinical application in a timely manner.

33478

Bronchoscopy Training

SERENDIPITY: DIAGNOSIS OF PULMONARY EMBOLISM WITH ENDOBRONCHIAL ULTRASOUND

Humberto kukhyun Choi

Cleveland Clinic Foundation , Cleveland, United States

Background: Endobronchial ultrasound guided bronchoscopy is a minimally invasive procedure used for diagnosis and staging in lung cancer. Careful examination is required as different

mediastinal structures are visualized by ultrasound.

Case report: A 63-year-old woman presented with weight loss, cough, and dyspnea on exertion. She had a history of stage IIIA adenosquamous carcinoma in the right lower lobe of the lung. Treatment consisted of right lower lobectomy and received adjuvant radiation therapy. Subsequent Positron Emission Tomography scan 18 months after her initial diagnosis revealed a hypermetabolic consolidation in the right upper lobe. Transbronchial biopsy showed adenocarcinoma with epidermal growth factor receptor (EGFR) mutation. Stereotactic radiotherapy would be considered if there was no metastatic lymph node involvement. Therefore, we performed a systematic evaluation of mediastinal and hilar lymph nodes with bronchoscopy with endobronchial ultrasound (EBUS) with transbronchial needle aspiration. During the procedure, a round hypoechoic structure with sharp margins that resembled a lymph node was seen at the level of station 10R (Figure 1). However, it seemed to be in the lumen of the right pulmonary artery. A Computed Tomography (CT) chest angiogram showed a 19 x 12 mm filling defect in the right interlobar pulmonary artery, consistent with thrombus. The lymph node at station 7 showed microscopic involvement with adenocarcinoma and she was referred for palliative chemotherapy. She was also started on anticoagulation. The thrombus visualized in the pulmonary artery with EBUS appeared to be a lymph node and could have been aspirated erroneously.

Conclusion: EBUS is becoming standard of care for diagnosis and staging in lung cancer. Different structures may appear like a lymph node by ultrasound. Thorough knowledge of the mediastinal anatomy and its landmarks is essential for a proper and safe staging of thoracic lymph nodes.

33494

Bronchoscopy Training

SURVEY OF OPINIONS AND PRACTICES OF BASIC AND ADVANCED PULMONARY PROCEDURES AMONG TRAINEE PHYSICIANS

Colleen Keyes¹, Adnan Majid¹, Erik Folch¹, Jorge Guerrero²

¹*Beth Israel Deaconess Medical Center , Boston, United States*; ²*Harvard Medical School/Beth Israel Deaconess Medical Center , Boston, United States*

Interventional pulmonology, while continuing to gain interest in the medical and surgical communities, remains a non-ACGME (Accreditation Council for Graduate Medical Education) accredited field. A minimum number of procedures to demonstrate competence was published by the ACCP (American College of Chest Physicians) in 2003, and the ACGME currently requires at least basic bronchoscopy and pleural drainage techniques for pulmonary fellowship program accreditation. A survey of fellowship directors in 2005 conducted by the ACCP Interventional Chest/Diagnostic Procedures Network Steering Committee revealed that training in a number of pulmonary procedures fell short of the guidelines suggested, but some ambiguity existed in the desire to have an additional year of interventional pulmonology training. A paper survey was distributed at an annual pulmonary fellows' day-long course for introduction to interventional pulmonology with 35 attendees. All attendees were trainees of US accredited pulmonary and critical care programs. A total of 32 surveys were returned. Only 2 respondents came from a hospital with a formal interventional pulmonary fellowship. A number of years in training were represented, with a majority at 59% in the third year of pulmonary and critical care fellowship.

We inquired about a variety of procedures familiar to most, with limited numbers reported for even basic procedures. The most common procedures with which the participants felt most comfortable included flexible bronchoscopy with lavage and brushings, and thoracentesis. All participants felt that linear endobronchial ultrasound technique should be included in general pulmonary fellowship curriculum. However, their prior exposure was generally limited, and only 1 fellow met the current standards proposed by published guidelines by ACCP, ATS (American Thoracic Society) and ERS (European Respiratory Society). In contrast, only 56% believed that electromagnetic navigational bronchoscopy was important to learn as a pulmonary fellow. There was a strong interest for an additional 12 month interventional fellowship in this pre-selected population. The most common reason for not pursuing a formal interventional fellowship was the concern over available job opportunities. However, no one saw the field of interventional pulmonology disappearing, with the vast majority expecting it to become an ACGME-accredited specialty at some point in the future. Despite its limitations, the survey identified the need for continued expansion of the general pulmonary curriculum towards increased exposure to the interventional pulmonology field, and raised concerns about the expectation of trainees to progress to more advanced procedures when basic procedures had not been mastered.

33549

Bronchoscopy Training

STRATEGIES IN THE REMOVAL OF VARIOUS FOREIGN OBJECTS IN THE RESPIRATORY TRACT

Mark Rumbak¹, Elsa Garza¹

¹*University of South Florida , Tampa, United States*

Background: The first bronchoscopy performed in 1897 by Gustav Killian was for removing a foreign body (a pork bone) from a German farmer's trachea.¹ Medical technology has advanced significantly since then but bronchoscopy still remains an invaluable method for removal of foreign objects (FBA) from the airway and is the gold standard for diagnosis and treatment of these FBA. Most cases of FBA occur in children 2 years of age or adults after the age of 60. Most other adults with FBA have either neurological dysfunction, trauma, alcohol abuse, or psychological disorders.

Objectives: This is to present some novel ways to remove 5 different foreign bodies from the lower respiratory tract.

Methods: The records of all our patients who had aspirated foreign bodies from January 1985 to January 2012 were retrospectively reviewed. The unusual cases of foreign body aspiration were documented and their methods of removal are presented.

Results: The mechanisms of extraction are described: 1. A Y-Stent had turned 180 degrees and caused severe pain and hemoptysis. On bronchoscopy it was difficult to grab, as the soft underbelly of the stent was the only part accessible and the forceps pulled loose. The reinforced anterior part was now pushed tightly against the posterior wall of the trachea. A bronchial balloon was inserted through the stent so that, when blown up, the balloon was distal to the distal opening of the stent. The balloon was then used to pull the stent out of the lungs. 2. A fishhook was aspirated into the right main-stem bronchus. A large "T" scope was inserted into the right main-stem and a rats-toothed forceps was inserted through the bronchoscope closed around the

shaft of the fishhook, and the forceps pulled tightly against the bronchoscope. Using this as a unit, the fishhook was pulled away from the bronchial wall. Once the fishhook was pulled free, the endotracheal tube was then pushed over the sharp edge of the hook and the tube-hook and bronch-forceps were pulled out as a unit. 3. Chewing gum was aspirated into the right lower lobe and was retrieved using a cryo-probe, which caused it to harden enough to be extracted. d. 4. A dental crown as aspirated and landed into the left lower lobe with the smooth enamel part upwards. A Fogerty balloon was inserted past the crown and blown up. On pulling back the catheter, the crown rotated and the rough side was exposed to the forceps, which enabled it to be grabbed and removed. 5. An apple was aspirated into and had jammed in the airway. A laser was used to drill a hole through the apple so that the forceps could be inserted through, opened and the entire apple removed.

Conclusion: Occasionally the usual methods of removal of foreign bodies are not adequate. We described 5 cases where unusual methods were successfully employed to remove the offending foreign body.

26246

Cost Effectiveness of Bronchoscopy

APPLICATION OF THE RECOMMENDATIONS AND PARAMETERS OF

Alex Gustavo Tamayo¹, Xavier Boca², Xavier Boca³

¹*Hospital Italiano , Argentina, Argentina;* ²*Monte Gran Clinic , Monte Grande, Argentina;*

³*Monte Grande Clinic , Monte Grande, Argentina*

Introduction: Presentation of the (Acute Respiratory Distress Syndrome (ARDS) complicating to pulmonary and extrapulmonary illnesses, require confirmation or not of infectious processes, here the Fiberoptic Bronchoscopy (FOB) offers its diagnostic and therapeutic utility in critically ill patients including in Mechanical Ventilation (MV), with high Positive end-expiratory pressure (PEEP) and other medical conditions. Medical must understands the associate physiopathological consequences with the FOB in a patient ventilated on the respiratory mechanics, gaseous interchange and hemodynamic, to take the precautions necessary to avoid and/or to resolve these problems, besides knows the recommendations and programation the MV.

Hypothesis: Objective: Evaluation of prevention of the complications endoscopic periprocedure of the collected data following the recommendations and parameters of the Mechanical Ventilator (MV) of the American Thoracic Society (ATS), European Respiratory Society (ERS), British Thoracic Society (BTS), Sociedad española de Medicina Intensiva, Crítica y Unidades Coronarias (SEMICYUC) and Sociedad Argentina de Broncoesofagología (SABE) on the patients with ARDS.

Material and methods: Prospective study of a period of 2 years (19/06/09 to the 25/05/11) in the service of Intensive Care Unit (ICU), with criteria of inclusion: ARDS (American-European Consensus Conference -AECC-1994) in MV. Technique of the Bronchoalveolar lavage (BAL) by FOB (Anexo1) according guidelines of the ATS, ERS and BTS.

Results: We register 30 patients. 18 (60%) men and 12 (40%) women, 89% (17) were smaller of 65 years in the group of patients with high suspicion of Influenza A H1 N1. The patients presented APACHE II: 20, LILY (Lung Injury Score)

(MURRAY) > 2.5, with refractory hypoxaemia in all the cases, Pa O₂ < 60 cs SpO₂ < 80%. The FOB was realised in 28 patients (93%), in ARM, with a protective strategy in modalities Volume Control Ventilation (VCV) or Pressure Control Ventilation (PCV) with Tidal Volume Vt - 6ml/Kg. -) and high PEEP > 10 cm H₂O according to protocol Net Work trying to maintain a plateau pressure < to 30 cm H₂O, and with maneuvers of recruitment according to handling of ARDS, some patients required pharmacological support temporarily to maintain the Blood Pressure (BP). Existed like complication (7%), an iatrogenic pneumothorax solved with drainage, in the group A H1 N1 (12) and one barotrauma after 72 hours of the Flexible Fiberoptic Bronchoscopy (FFB) in patient with ARDS

Conclusions: Major complications related to the study did not appear observing the recommendations and parameters of the mechanical ventilator in general form by the ATS, ERS, BTS, SEMICYUC, SABE and specific of the National Heart Lung Blood Institute (NHLBI) Network in patients with ARDS

26259

Cost Effectiveness of Bronchoscopy

ASSOCIATE GERMS IN THE INFLUENZA A (H1 N1) BY BRONCHOALVEOLAR LAVAGE

Alex Gustavo Tamayo¹, Alex Gustavo Tamayo¹, Xavier Boca²

¹Hospital Italiano , Argentina, Argentina; ²Monde Grande Clinic , Monte Grande, Argentina

Introduction: Influenza pig is a infectious disease caused by a virus Ribonucleic acid (RNA) of the family of orthomyxoviridae, being responsible for the pandemic the variable of the H1 N1. His complication takes to appearance of infeccion of the pulmonary parenchyma with respiratory insufficiency, Acute respiratory Distress Syndrome (ARDS) and necessity of Mechanical Ventilation . We realize the bronchoalveolar lavage (BAL) by fiberoptic bronchoscopy (FOB) for isolation of germs in this serious infeccion in our Intensive Care Unit (ICU) during pandemic 2009 Objective: Evaluation of periodo from June 19 - August 25 of the data of the cultures of the germs obtained by BAL associates to suspicious cases of pig influenza in our room of ICU.

Material and métodos: Prospective study of period of 8 weeks in the service of ICU. Criteria of inclusion: age = or > 18 years; acute febril respiratory illness + SaO₂ = or < 91% + Chest radiograph with infiltrated interstice alveolar bilateral multilobares average bases and middle fields especially with requirements of mechanical ventilation invasive or no. Only returned a result of Inmunofluorescencia Indirecta (IFI) (+) and another one real-time Polymerase Chain Reaction(rRT-PCR)(-) of the samples sent to external laboratories. We use a bronchoscope STORZ to realize the BAL. Perform a decriptive análisis of each one of the studied variables.

Results: We register 19 patients, 10 (53%) men and 9 (47%) women, 89% (17) were smaller of 65 years, and the 11% (2) majors of this age. With comorbidities (53%). To the entrance the patients presented APACHE II: 20. The Flexible Fiberoptic Bronchoscopy (FFB) to carry out in 12 patients (64%), 10 in ARM and 2 with espontaneous ventilation , with 8 (67 %) positive cultures (+) and 4 (33%) negative ones (-), with common isolate germs in sequence of frequency: staphylococcus aureus 3 (33%), to acinetobacter sp. 2 (22%), and 45% (4) rest distributed in Pseudomona A., E. coli, klebsiella and streptococcus pn.) 11% each. Mortality in a 48% (10), with 6 discharges (33%), one transferred to another Institucion and two that still remains in ICU

at the end of the study.

Conclusions: Majority of the germs isolated at the time of the BAL belongs to the group of Nosocomial pneumonias (NP) and of the ventilator-associated pneumonia (VAP) (> 4 days) with antibiotics previous : SMA/ claritromicina also oseltamivir.

26406

Cost Effectiveness of Bronchoscopy

COMPARATIVE DIAGNOSTIC STUDY OF THE PATHOGENS ASSOCIATED TO THE INFLUENZA A H1 N1 BY TA AND BAL

Alex Gustavo Tamayo¹, Alex Gustavo Tamayo¹, Xavier Boca²

¹Hospital Italiano , Argentina, Argentina; ²Monte Grande Sanatory , Monte Grande, Argentina

Introduction: The pneumonia related to the suspicious cases of Influenza is a frequent complication. In the last years it has increased the controversy about diagnostic method is more appropriate for this affection. We realise Tracheal Aspirate(TA) and Bronchoalveolar Lavage (BAL) by Fiberoptic bronchoscopy (FOB) for isolation of germs in this serious infection in our Intensive Care Unit (ICU) of the H. Prov. Of Moreno during pandemic 2009.

Objective: To study the validity of the tracheal aspired one (TA) with quantitative cultures and to compare it with the to BAL in the etiologic diagnosis of the associated pathogens common to the suspicious cases of the influenza A H1 N1 in our room of ICU. Material and methods: Studies prospective of a period of 8 weeks (19/06/09 to the 25/08/09) in the service of ICU. Criteria of inclusion: equal age or > 18 años; clinical picture of compatible acute febrile disease respiratory more equal SaO₂ or < 91% more x-ray of thorax with infiltrated interstice/alveolar basal predominantly. They were realised TA and BAL later. To all the samples them perform a quantitative culture. Choose as one of cuts for the equal TA > to 10⁶ Colony-forming Units (CFU)/ml and for the BAL evaluate with 10⁴ ufc/ml We use a bronchoscope STORZ to be realised the BAL. A descriptive analysis of each one of the studied variables takes place.

Results: We register 19 patients, 10 (53%) men and 9 (47%) women, 89% (17) were smaller of 65 años. The comorbidities (53%) more frequent were: Obesity, Arterial Hypertension (AH), Chronic Obstructive Pulmonary Disease (COPD) and asthma. To the entrance the patients presented APACHE II: 20. The FOB and at were realised in 12 patients (64%), 10 in ARM. The results of the BAL were 8 (67%) positive cultures (+), with more common isolate germs, in sequence of frequency: staphylococcus aureus MR 3 (33%), Acinetobacter sp.2 (22%), and 45%, (4) rest distributed in P. aeruginosa, Escherichia coli, Klebsiella and streptococcus pneumoniae) 11% each. The results of at were of 7 (58%) positive cultures (+), with isolation of SAMR 3 (33%), P. a. sp. y neumococo 2 (22%) each and 22% rest distributed in acinetobacter and H. influenzae 11% each. Mortality in UTI was 48% (10), with 6 discharges (33%), a derivation to another Institution and 2 that still remained in our service to end of the present study.

Conclusions: The use of the quantitative culture of invasive samples against at, is not associated to differences in the clinic outcomes, use of antibiotics.morbidity and mortality, stay or permanence in ICU, etc.

33298

Cost Effectiveness of Bronchoscopy

COMPARATIVE STUDY BETWEEN BRONCHOSCOPIC AND NON

BRONCHOSCOPIC BRONCHOALVEOLAR LAVAGE IN DIAGNOSIS OF VENTILATOR ASSOCIATED PNEUMONIA IN TRAUMA PATIENTS

Emad Ibrahim¹, Emad Ibrahim¹

¹*Alexandria Faculty of Medicine , Alexandria, Egypt*

Background: Ventilator-Associated Pneumonia (VAP) continues to be the most common nosocomial infection in the ICU, making up almost one third of the total nosocomial infections, Patients who acquire VAP have worse outcomes and have longer ICU and hospital stays. Ten to twenty percent of patients who require mechanical ventilation for > 48 h will acquire VAP, with mortality rates of 15 to 50%. Ventilator-associated pneumonia (VAP) is defined as nosocomial pneumonia in a patient on mechanical ventilatory support (by endotracheal tube or tracheostomy) for greater than or equal to 48 hours.

Aim of the Work: This study is designed to compare between bronchoscopic bronchoalveolar lavage and bronchoalveolar lavage obtained without use of bronchoscope (mini BAL) in diagnosis of VAP.

Methods: All patients who were mechanically ventilated for > 48 hours and suffered from trauma were clinically examined and investigated to fulfill the criteria of inclusion in the present study and these include: Full history taken, Complete physical examination, Plain X ray chest to detect lung infiltrate, Daily complete blood picture, Temperature measurement, Examination of sputum amount and color. Informed consent was taken from the relatives or the patients who were diagnosed and fulfilling the criteria of VAP. Also approval of local ethical committee was obtained.

Results: This study was conducted on 20 patients admitted to the Critical Care Medicine Department in Alexandria Main University Hospital. The 20 patients suffered from trauma and were mechanically ventilated. They fulfilled the clinical criteria of ventilator associated pneumonia. The 20 patients were divided into 2 groups according to duration of mechanical ventilation, early onset VAP group and late onset VAP group. All patients in order to diagnose VAP underwent both BAL and Mini BAL.

Conclusions: Mini BAL can easily be learned by trainee residents, provide easy and cost-effective modality for the diagnosis of VAP. By using sterile - single use catheters, potential risk of bronchoscopy associated cross-infection between patients is also eliminated. The other major advantage of this technique was the minimal time required as compared to B-BAL as no special equipment or technician was needed to assist the physician.

29103

Early Diagnosis of Lung Cancer

COMPARISON BETWEEN BRONCHIAL WASHINGS, BRONCHIAL BRUSHINGS AND BL

Kizhakkepeedika Davis Rennis¹, Kizhakkepeedika Davis Rennis¹

¹*Amala Medical College , Thrissur, India*

Bronchogenic carcinoma with spread along the mucosal plane presents as an exophytic mass, which is documented to have high success rate of diagnosis by standard diagnostic procedures (bronchial washing, brushing and forceps biopsy). However, the predominantly submucosal and

peribronchial patterns of the disease are harder to detect by these techniques. We sought to investigate the utility of transbronchial needle aspiration in the diagnosis of bronchogenic carcinoma without intraluminal mass, through prospective analysis of routine diagnostic bronchoscopies performed in a 24-month period, at a tertiary care hospital in south India. Of the 42 patients assessed, 29 had malignancy confirmed by endobronchial biopsy or Computed Tomography (CT) guided Fine Needle Aspiration Cytology (FNAC) or Biopsy (FNAB) and bronchoscopy. Among them, 17 cases were detected by a combination of the results of bronchial washing, brushing and transbronchial needle aspiration. The individual sensitivities (n = no. of cases detected) amounted to 3.4% (n=1), 51.72% (n=15) and 27.6% (n=8) respectively. There were no false positive results. Concerning different bronchoscopic sampling techniques, 9 cases were diagnosed solely by bronchial brushings and 2 cases by transbronchial needle aspiration alone. No periprocedural complications were encountered. We conclude that the value of bronchial brushing in the diagnosis of bronchogenic carcinoma without bronchoscopically visible intraluminal mass is above that of blind transbronchial needle aspiration. Addition of bronchial washings, to bronchial brushings and transbronchial needle aspirate has an insignificant impact on the diagnosis. Yet, owing to its cost-effectiveness and simplicity, it is recommended to be performed routinely for diagnosing these patients.

Key words: Bronchogenic carcinoma; peribronchial disease; submucosal disease; bronchial washing; bronchial brushing; transbronchial needle aspiration

33152

Early Diagnosis of Lung Cancer

EXPERIMENTAL MODEL OF HIGHLY INVASIVE PHENOTYPES FROM CULTURED CARCINOMA CELL LINE OF HEAD AND NECK

Hiroaki Kanaya

Dokkyo Medical University , Tochigi, Japan

Background: Squamous cell carcinomas of the head and neck (SCCHN) possess invasive potential. When SCCHN infiltrate into the adjacent tissue (i.e. fibroadipose tissue) and form secondary tumors, the cells in the secondary lesion are similar those in the primary tumor, however, the malignancy of tumor cells tends to increase.

Objective: The aim of this study is to clarify the process that the grade of malignancy of SCCHN increases during invasion.

Methods: In order to represent experimental model, we performed in vitro sequential selection by using BioCoat (TM) Matrigel (TM) invasion chamber (BD Biosciences). Human SCCHN cell line (DHN1 cell) was suspended into those chambers accompanied with matrix-treated membrane. Invasive SCCHN cells are able to migrate through those membranes, and only invaded cells are harvested from the bottom of the membrane for expansion. To establish highly invasive phenotypes of SCCHN cell, same procedure was conducted 5 times, and finally five phenotypes were obtained. Morphological observation, immunostaining and proliferation assays of parental DHN1 cell and each phenotype were performed.

Results: Parental DHN1 cell revealed typical epithelial formation in morphology. In contrast, invasive phenotypes showed mesenchymal pattern with scarce cell-to-cell attachment. Each phenotype had high mitotic activity and shortened doubling time. Cell clusters resembling sphere

formation were observed in several areas. Stem cell markers i.e. epithelial cell adhesion molecule and CD133 were positive in each phenotype.

Conclusions: Compared with parental DHN1 cell, selected highly invasive phenotypes indicated undifferentiated or immature characteristics which may suggest cancer stem cell properties in vitro.

33181

Early Diagnosis of Lung Cancer

FEASIBILITY OF ICG FLUORESCENCE-GUIDED SENTINEL NODE BIOPSY FOR HEAD AND NECK SQUAMOUS CELL CARCINOMA PATIENTS USING THE HYPEREYE MEDICAL SYSTEM

Naoyuki Kohno

Kyorin University, Mitaka, Japan

In head and neck squamous cell carcinoma (SCC), the lymph node status of the neck is the most important prognostic factor. The presence of cervical metastases cannot always be detected either clinically or pathologically by current routine clinical and histopathological methods. Ultrasound-guided fine needle aspiration cytology, which is currently the optimal procedure, still has a sensitivity of only 42-73 %. The sentinel lymph node (SLN) is the first lymph node to receive drainage from the primary tumor site. The ultimate goal of SLN study is to avoid unnecessary elective neck-node dissection. Now we doing Indocyanine green (ICG) fluorescence-guided sentinel node biopsy using the HyperEye Medical System (HEMS). The HEMS can visualize ICG-enhanced structures with vivid color. It consists of a combination of custom-made optical filters and an ultra-high-sensitive CCD image sensor with non-Bayer color filter arrays, which can detect visible and near infrared (NIR) rays from 380-1200 nm without a bias in color balance at 30 frames per second. We can obtain better visualization to detect SLNs, and it allows transcutaneous real-time lymphography for intraoperative identification of SLNs. Color TV monitor images are better than monochrome images, which can contribute to faster and easier finding of SLNs. Furthermore, the radioisotope method is not convenient and safe because of exposure to radioactive substances, and many institutes have prohibited SLN biopsy using the radioisotope method. ICG and indigo carmine were injected into the tongue, larynx, or hypopharynx, and ICG fluorescence detection was evaluated using both transcutaneous visualization of lymphatic vessels and intraoperative identification of SLNs. The SLNs appeared as shining fluorescent spots with HEMS transcutaneously. So we concluded that HEMS could become useful for predicting lymph node metastasis during surgery for head and neck cancer.

33190

Early Diagnosis of Lung Cancer

A NOVEL GENE FOR DISTINGUISHING ORO-DIGESTIVE TRACT MALIGNANCY AND AIRWAY TRACT MALIGNANCY - PTK7

Jong Ho Park

Korea Cancer Center Hospital , Seoul, South Korea

Purpose: Recent genetic profiling techniques are revealing many novel genes related with tumorigenesis. Each gene has tumor-specific regulation pattern and genetic profile. Among them, we tried to find genes that can distinguish the origins of malignancies with the same histology.

Methods: We used microarray using 14 human esophageal cancer specimen and their adjacent normal esophageal tissue, to find novel genes related with esophageal cancer. As a result, several genes are found to be related with esophageal squamous cell carcinoma (ESCC), and we examined the expression of these genes in lung cancer. PTK7, one of these genes has different regulation pattern in lung cancer. We validated these results with semi-quantitative RT-PCR using several lung cancer cell lines.

Results: From microarray data, we found PTK7 is 5-fold up-regulated in esophageal squamous cell carcinoma comparing with normal esophagus tissues ($p=1.8 \times 10^{-6}$). By semi-quantitative RT-PCR using 10 tissues samples of ESCC, we confirmed the over-expression of PTK7 in 80% of ESCCs. On the other hand, Semi-quantitative RT-PCR using 12 tissues samples of lung cancer revealed that the expression of PTK7 is down-regulated in 75% lung cancers. And we examined the expression level of PTK7 in several lung cancer cell lines and could validate the down-regulation of PTK7 also in cell lines.

Conclusion: Our results suggest that PTK7 plays different roles in tumorigenesis of ESCC and lung cancer. In addition, further study of PTK7 functions such as cell growth, migration and invasion can give us a clue to find out the concrete mechanism devoted to tumorigenesis of both cancers

33240

Early Diagnosis of Lung Cancer

ENDOBRONCHIAL METASTASES. BRONCHOSCOPIC MORPHOLOGY AND DIAGNOSIS.

Jorge Dionisio¹, Dina Matias¹, Jose Duro da Costa¹, Paula Ferreira¹, Paulo Mota¹, Teresa Almodovar¹

¹*IPOLFG, Lisbon, Portugal*

Compared to primary lung cancer endobronchial metastases (EM) from solid extrapulmonary tumours is said to be an infrequent situation. Although bronchoscopic features are similar to bronchial carcinoma, some endobronchial abnormalities suggest their primary tumour origin. From July 1990 to June 2010, 13.778 flexible bronchoscopies were performed, in our tertiary cancer center, 1.241 of which for suspected lung metastasis. Based on clinical and radiological grounds 638 patients were assumed to have lung metastases. From these 401 were excluded from the review due to absence of endobronchial involvement in 272 and in 129 patients pathologic diagnose could not be confirmed. Clinical and bronchoscopic files of 237 patients with confirmed endobronchial metastasis were reviewed along with all videotaped procedures. Primary index tumours are listed in the table 1. Symptoms and radiologic features were indistinguishable from those caused by bronchogenic carcinoma. Bronchoscopic abnormalities, however, showed some recurrent patterns most suggestive of their primary origin. Breast cancer shows in 80% of cases widened and oedematous bifurcations, extensive areas of tortuous congested vessels with irregular bronchial wall thickening, suggestive of widespread infiltration. In 65 % of cases, colon cancer metastasis appears as a single or polypoid lobulated

polypoid tumor, frequently with white necrotic surface. Soft tissue sarcoma arises as a long smooth polypoid tumor in 85% of the cases, varying from gray to reddish colour, sometimes growing along the bronchus axis with a deep seated pediculum. Although a very specific dark brown coloration is most frequent in metastatic melanoma, in our series, 50% of cases, single or multiple amelanotic lesions were found. This series suggests that endobronchial metastasis is not an infrequent phenomenon. Bronchoscopy allows identification and biopsy of all the endobronchial metastatic lesions, contributing to a more consistent and precise pathological diagnosis.

33244

Early Diagnosis of Lung Cancer

BRONCHOSCOPIC TREATMENT OF MULTIPLE CENTRAL PRIMARY EARLY-LUNG CANCERS

Jose Duro da Costa¹, Jorge Dionisio¹, Teresa Almodovar¹

¹*IPOLFG, Lisbon, Portugal*

Central early-stage lung cancer is an uncommon bronchoscopic finding, usually discovered by chance, either during a flexible bronchoscopy performed for different reasons, or as a synchronous primary lung tumor, or even as a secondary metachronous tumor. Management of multiple synchronous or metachronous central early-lung tumors continues a challenging task, due to limitations in surgical therapeutic options. Local bronchoscopic treatment is recognized as a useful solution that can be repeated as needed and with a correct staging, any kind of bronchoscopic technique seems to accomplish the desired therapeutic curative intent. Here we present a 57 year old male patient with three metachronous early central epidermoid carcinoma, the first one on the left lower lobe, another at left upper lobe and a third at the upper anterior tracheal wall. The patient presented with an obstructive right main-stem bronchus tumor and right lung atelectasis, staged IIIb (cT4;N2;M0). After Laser photocoagulation, debulking and stenting, chemotherapy followed by external-beam radiotherapy, achieved an almost complete response. The stent was removed four months later without radiologic or bronchoscopic evidence of tumor recurrence. On the follow-up bronchoscopy one month later a first early left lower lung metachronous micro-invasive tumor was found and treated with photodynamic therapy followed by brachytherapy, after recurrence three months later. No recurrence was observed on that location thereafter. Thirty four months after the diagnosis of the second primary tumor, a second early central early-lesion, ensued on the left upper lobe bronchus. Brachytherapy was again selected with complete response and no relapse on the follow-up bronchoscopy. Twenty eight months after the second metachronous tumor, a third metachronous early upper tracheal raised tumor was diagnosed, with no cartilaginous involvement documented with EBUS. Brachytherapy was once again selected with complete response but complicated by intense post-radiation tracheitis. Gradual improvement of the inflammatory process occurred after prolonged corticosteroid and hyperbaric oxygen therapy but with permanent stenosis and malacia. The patient ultimately deceased from massive haemoptysis, seven years after his first right late stage lung cancer. During this unexpected long survival a reasonable quality of life was maintained, despite multiple bronchoscopic treatments, which allowed a good control of first, second and third early-primary metachronous lung tumors, interspaced by long disease-free periods. Another patient with multiple synchronous "cis" is presented, for whom argon-plasma was employed, again with prolonged complete response,

confirming the usefulness of bronchoscopic treatment in these situations.

33532

Early Diagnosis of Lung Cancer

NASHVILLE EARLY DETECTION LUNG CANCER PROJECT: ESTABLISHING A COHORT TO VALIDATE CANDIDATE BIOMARKERS FOR EARLY DETECTION OF LUNG CANCER

Otis B Rickman¹, Anel Muterspaugh¹, Pierre Massion¹, Ronald Walker¹, Sanja Antic¹

¹*Vanderbilt University Medical Center , Nashville, United States*

Background: There will be 226,000 new lung cancers diagnosed in the United States in 2012. The NLST showed a reduction in lung cancer mortality with lung cancer screening. However, there were a high number of false positive nodules identified. A more specific test and well defined risk model would reduce the number of false positive work ups. **Objectives:** The objective of this study is to validate candidate biomarkers for the detection of lung cancer, to develop a high risk cohort and to determine whether a surveillance program will lead to early diagnosis and improved outcomes.

Methods: We plan to enroll a cohort of 480 high-risk subjects at three sites (160 participants/site) (Vanderbilt University Medical Center, Matthew Walker Comprehensive Health Center, and the Tennessee Valley VA Healthcare System) in a five year annual screening trial for lung cancer. At each screening visit participants complete: annual blood, urine, nasal, buccal cells and sputum collection; spirometry (year 0), a low dose chest CT (year 0,1,2,5), Helical CT, slice thickness 1.25, interval 1.25 mm, 128 slice Philips scanner, autofluorescence bronchoscopy (year 0,2,5) to collect bronchial brushings and endobronchial biopsies from three pre-determined areas (Fig 1). **Inclusion Criteria:** 10 year Bach risk model >2.5%, 55 - 74 years of age, at least 25 years of smoking, at least 10 cigarettes/day, current smoker or former smoker with at least 20 PKY history of cigarette smoking total, who quit 20 years ago or less. Plus one of the following: FEV1%

33548

Early Diagnosis of Lung Cancer

UNUSUAL AND UNEXPECTED DISEASES DIAGNOSED ON ENDOBRONCHIAL ULTRASOUND BIOPSY

Mark Rumbak¹, Frank Kaszuba¹, Mark Rumbak¹

¹*University of South Florida , Tampa, United States*

Background: Ultrasound uses high-frequency sound waves to create images of structures within the lung and lymph nodes in the chest. Endobronchial ultrasound (EBUS) is ultrasound combined with bronchoscopy to obtain images in and around the bronchial tree or the lungs. It can be used in the diagnosis of lung cancer, infections, inflammations and other diseases that cause enlarged lymph nodes in the chest, and to evaluate lesions, which cause airway invasion. EBUS is accepted as a less invasive alternative to diagnosing tumors in the lung and lymph nodes than open lung or lymph node biopsy.

Objectives: This was to document any unusual or unexpected or rare diseases diagnosed by

EBUS.

Methods: All the records of patients who had undergone an endobronchial ultrasound for the diagnosis of an abnormality on an chest X ray or computerized tomography of the chest. This study was performed at the Moffitt Cancer Center, Tampa General Hospital and the James A Haley Veterans Hospital in Tampa from January 2009 to December 2011.

Results: The records of 7 patients were chosen. The age ranged from 18 to 91 years old. There were 4 white and 3 African American patients. There were four cancers (mesothelioma, metastatic clear cell renal carcinoma, thyroid cancer in a patient with known adeno-squamous cell lung cancer and malignant fibrous histiocytoma). There were also three benign diseases (amyloid, tuberculosis and sinus hyperplasia and follicular hyperplasia compatible with *Streptococcus pneumoniae*). The last two grew on aspirate sent for culture. The bronchoalveolar lavage did not grow the two bacteria.

Conclusions: EBUS is capable of diagnosing a wide range of diseases both common and rare. The diagnoses are usually obtained via cytological or bacteriological method. Sometimes unusual, rare or unexpected diseases are diagnosed on endobronchial ultrasound.

26506

Endobronchial Staging of Lung Cancer

THORACIC FIDUCIAL PLACEMENT VIA FLEXIBLE BRONCHOSCOPY: THE FIRST 200 CASES AT GEORGETOWN UNIVERSITY

Silpa Kilaru¹, Brian Collins², Eric Anderson², Filip Banovac²

¹*Georgetown University Hospital Department of Pulmonary/Critical Care , Arlington, United States;* ²*Georgetown University Hospital , Washington, United States*

Introduction: Robotic radiosurgery is available for treatment of thoracic malignancies. Standard fiducial placement for peripheral lung tumors has been performed by CT guidance. However, this is associated with a pneumothorax rate of 40%, pulmonary hemorrhage 16%, and hemoptysis 4%. We report our first 200 cases of successful placement of fiducials by flexible bronchoscopy with a lower incidence of complications.

Methods: Retrospective review of the first 200 patients from 2004 to present who underwent thoracic fiducial insertion for both central and peripheral tumors by flexible bronchoscopy. Under fluoroscopic guidance, 3mm gold fiducials were placed using a 19/21 gauge TBNA needle. For select smaller peripheral tumors, electromagnetic navigation with superDimension was used to guide placement of gold fiducials or platinum VortX coils via a Renegade catheter.

Results: Of the 200 patients in this study, 126 (67%) had underlying NSCLC while 62 (33%) had metastatic disease. 341 fiducials were placed for central tumors. 341 (100%) were seen on post operative CXR and planning CT. There were no migrations, pneumothoraces, or embolizations. Complications included COPD exacerbation in 1 patient and bleeding in 1 patient. 443 gold fiducials were placed for peripheral tumors, 134 by electromagnetic navigation. 436 (98%) were seen on post operative CXR. 391 (88%) were seen on planning CT. 15 platinum vortex coils were also placed, all seen on CT. Complications included COPD exacerbation in 5 patients and pneumothoraces in 3 patients. Fiducial embolization via the

pulmonary artery occurred in 7 patients without consequence. 4 patients required additional fiducial placement by CT guidance.

Conclusions: Fiducial placement by flexible bronchoscopy is an accurate method for both central and peripheral tumor marking. It has a relatively low risk of complications compared to CT-guided placement.

32587

Endobronchial Staging of Lung Cancer

EBUS-TBNA IN A TERTIARY CARE CENTER : REAL LIFE EXPERIENCE AND QUALITY ASSESSMENT

Philippe Bao Nguyen¹, Michel A Gagnon¹, Thomas Vandemoortele¹

¹*Centre Hospitalier de l'Université de Montréal , Montreal, Canada*

Introduction: Lung cancer continues to be the leading cause of fatalities by cancer. Treatment options are determined by staging. Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) has emerged as the standard minimally invasive modalities for sampling mediastinal lymph nodes and providing diagnosis and staging. Because EBUS heavily relies on technical aspects and operator skills, we deemed it necessary to evaluate our performance and propose a methodology that can be used in other center. **Method:** included all EBUS-TBNA procedures performed in 2011 in our service. Data relating to demographics, clinical presentation, imaging, node characteristics, and clinical evolution were entered in our database. We proceeded to a thorough analysis of each case from a pragmatic perspective to evaluate in detail the regional node sampling yield as well as our ability to conclude the investigation in achieving diagnosis and staging when applicable, avoiding unnecessary surgery and allowing direction for management.

Results: EBUS-TBNA was performed in 53 consecutive patients. The indication was suspicion of malignant disease in 46 patients (87%) and benign in 7 patients (13%). In total, 117 nodes were sampled. The overall sensitivity ranged from 76 to 91% and the negative predictive from 78 to 92%. The median size of nodes was 15 mm and the average number of passes per node was 2.5. If malignant cells were discovered, histological precision was obtained in 68%. EBUS-TBNA was clinically sufficient in 43 of the 53 patients (diagnostic yield = 81%). Moreover, it prevented 18 out of 27 patients (67%) to undergo either therapeutic or diagnostic surgery. No major complications of the technique were reported.

Conclusion: The attained sensitivity and negative predictive value are similar to what has been published. We believe that thorough analysis of patient cases is key in order to improve performance with this technique. As the procedure becomes more and more disseminated, we encourage all centers to analyze their performance either periodically or constantly in order to maintain best quality standards. Finally, we have made it evident that, in our establishment, EBUS-TBNA offers clinicians an additional step to simplify healthcare and probably reduce the economic burden of such investigations.

32914

Endobronchial Staging of Lung Cancer

LYMPH NODE AVIDITY ON COMPUTED TOMOGRAPHY-POSITRON EMISSION TOMOGRAPHY (CT-PET) AFTER ENDOBRONCHIAL ULTRASOUND-GUIDED TRANSBRONCHIAL NODE SAMPLING.

Timothy Udoji¹, David Berkowitz¹, Parks Christopher¹, Rabih Bechara¹, Saghafi Ramin¹

¹Emory University, Atlanta, United States

Purpose: Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a minimal invasive procedure that allows sampling of mediastinal and hilar lymph nodes for histopathologic diagnosis and immunohistochemistry and gene mutation analyses. Multiple studies have reported high sensitivity, specificity and diagnostic accuracy of EBUS-TBNA. This procedure may be repeated during clinical follow-up in patients with lung malignancy after surgical, chemical or radiation therapy. The goal of our study was to determine if nodal sampling leads to increased PET avidity within two weeks after procedure. **Method(s):** A retrospective chart review of 243 patients who underwent EBUS-TBNA between April 2010 and December 2010.

Results: Nine patients (female n=5) with a mean age of 63 underwent sampling of fourteen mediastinal and hilar lymph nodes on EBUS-TBNA. The mean time after node sampling by EBUS and CT-PET was 5.7 days. All lymph nodes were PET-avid after nodal sampling. The short-axis diameter of all measured lymph nodes was ≥ 12 mm. Eight out of fourteen (57.1%) lymph nodes with an average SUV of 4.8 (range 2.5-11.9) on CT-PET contained benign lymphocytic cells. Six out of fourteen (42.9%) lymph nodes with an average SUV of 12.3 (range 6-18) on CT-PET contained malignant cells.

Conclusions: Lymph nodes may be PET-avid after EBUS-TBNA even if they do not contain malignant cells. The mean SUV values of mediastinal and hilar lymph node containing benign lymphocytes are lower than those containing malignant cells after EBUS-TBNA. The increased SUV values of lymph nodes containing benign cells may be related to inflammation from biopsy.

Clinical Implications: It is important to factor in the timing of EBUS-TBNA in scheduling and interpreting CT-PET scans for appropriate clinical staging since lymph node biopsy may lead to increased mean SUV values.

33041

Endobronchial Staging of Lung Cancer

DOTTED, TORTUOUS AND ABRUPT ENDING SUBMUCOSAL VASCULAR PATTERN VISUALIZED BY NARROW BAND IMAGING (NBI)

VIDEOBRONCHOSCOPY AND HISTOLOGICAL TYPE OF LUNG CANCER

Bojan Zaric¹, Branislav Perin¹, Goran Stojanovic¹, Nensi Lalic¹, Vladimir Carapic¹, Vladimir Stojisic¹

¹Institute for pulmonary Diseases of Vojvodina, Clinic for Pulmonary Oncology, Faculty of Medicine, University of Novi Sad, Sremska Kamenica, Serbia

Background: Narrow Band Imaging (NBI) videobronchoscopy is a new technique for visualization of microvascular changes in bronchial mucosa. It has shown to be efficient in lung cancer detection. **Objective:** The primary aim of this study was to evaluate relation between

vascular patterns visualized by NBI as described by Shibuya and histology of lung cancer. Patients and methods: The analysis was performed prospectively in 65 patients with suspected lung cancer scheduled for bronchoscopy. NBI followed conventional WL videobronchoscopy. After identification of endoscopically visible tumor NBI was used to determine predominant type of pathological vascular pattern (dotted, tortuous, abrupt-ending blood vessels - Shibuya descriptors). Once predominant type of pattern determined the site was biopsied and the tissue sent to the pathologist. Pearson's chi-square test was used to test statistical significance between vascular pattern and histological type of cancer.

Results: There was 81.5% male and 18.5% female patients evaluated in the study. Lung cancer was confirmed in all patients; 63.1% was diagnosed with squamous cell lung cancer (SCC), 24.6% had adenocarcinoma, 9.2% had small cell (SCLC) and 3.1% large cell lung cancer (LC). Dotted blood vessels were significantly ($p<0.000$) associated with adenocarcinoma, identified in 68.4% adenocarcinoma and 31.6% SCC. Tortuous blood vessels were identified in 72% SCC, 8% adenocarcinoma, 12% SCLC and 8% of LC. Tortuous blood vessels were significantly ($p<0.000$) associated with SCC. Abrupt ending vessels were identified in 81% SCC, 14.3% SCLC and 4.8% adenocarcinoma, this type of blood vessels was also significantly associated ($p<0.000$) with SCC.

Conclusions: Dotted visual pattern of blood vessels identified during NBI videobronchoscopy is highly suggesting adenocarcinoma histology of lung cancer. Tortuous and abrupt ending blood vessels visualized under NBI videobronchoscopy significantly suggest squamous cell histology of lung cancer. All three patterns are almost always present in lung cancer; determination of predominance is therefore completely subjective. Large scale studies should be designed in order to determine true relation between visual appearance and histology in lung cancer.

33131

Endobronchial Staging of Lung Cancer

COMBINED ENDOSONOGRAPHIC STAGING FOLLOWED BY CERVICAL MEDIASTINOSCOPY IN THE REAL WORLD, DO WE STILL NEED BOTH?

Erik HFM van der Heijden¹, Ad Verhagen¹, Ad HFM Verhagen¹, Olga Schuurbijs¹

¹*Radboud University Medical Center, Nijmegen, Netherlands*

Introduction: The combination of EUS-FNA and EBUS-TBNA is an accurate preoperative staging method in NSCLC, challenging the status of cervical mediastinoscopy (CM) as the gold standard. In a recent RCT combined endoscopic staging (CES) had greater sensitivity compared to CM. After negative CES, a CM had to be performed in 11 patients to find one positive result [Annema JAMA 2010]. Defranchi [ATS 2010] found a NNT of 3.6 and Tournoy [ERS 2011] presented a NNT near infinite in imaging negative and lymphocyte positive CES samples. Our goal was to assess the need to perform a CM after negative CES in our center.

Methods: Records of 100 consecutive patients with negative CES referred for CM or surgery between January 2009 and June 2011 were analyzed. All patients were treated in strict accordance with national guidelines: preoperative CES mediastinal staging is performed in all patients with potentially resectable NSCLC and mediastinal nodes with short axis ≥ 10 mm on CTscan, PET-positive mediastinal or hilar nodes and/or centrally located tumors. If found negative CES is followed by CM.

Results: Of 100 CES negative patients 82 underwent CM and 18 patients a thoracotomy as next

step procedure in which. Mediastinal N2 tumor positive nodes were found in 11/82 . and 3/18 patients respectively. After negative CM surgery was performed in 63 of 71 patients. Tumor positive mediastinal (N2) nodes were found in 7 of 63 patients. A total 21 patients were found N2 positive after negative CES. This results in a NPV of 79% for CES. The NPV of CM after negative CES was 89%.

Conclusion: Endosonographic mediastinal staging using strict guidelines is reliable and accurate. In our center one patient with tumor positive mediastinal nodes can be found by CM after 7 negative CES procedures in patients with (suspected) NSCLC.

33133

Endobronchial Staging of Lung Cancer

MEDIASTINAL ABSCESS FORMATION AFTER EUS-GUIDED FNA: ARE PATIENTS WITH SARCOIDOSIS AT INCREASED RISK?

Erik HFM van der Heijden¹, Bob MB von Bartheld², Jouke T Annema²

¹Radboud University Medical Center , Nijmegen, Netherlands; ²Leiden University Medical Center , Leiden, Netherlands

Introduction: Sarcoidosis is a disease of unknown etiology predominantly affecting the lungs and intrathoracic lymph nodes. To diagnose pulmonary sarcoidosis, endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) is increasingly used to confirm disease-associated non-caseating granulomas in mediastinal lymph nodes. In literature, severe complications of EUS-FNA are virtually absent. We report 5 sarcoidosis patients who developed a mediastinal abscess after EUS-FNA. **Material and methods:** Records of 252 patients with sarcoidosis stage I or II that had been investigated by EUS-FNA, between 1999 and 2011 in two university hospitals, were retrospectively evaluated. Immediate complications were assessed routinely, later complications were recorded after patients' complaints.

Results: 5 patients (2%) (3 female, 2 male, 30 to 57 year) developed a mediastinal abscess after EUS-guided aspiration of a subcarinal lymph node. Most presented with retrosternal discomfort and dysphagia 2-15 days after EUS. All patients recovered but required prolonged intravenous antibiotic treatment as well as thoracotomy in three and mediastinoscopy in one. In none, specific risk factors such as neutropenia, immunosuppressive therapy or relevant co-morbidities were identified. Cultured bacteria from the abscesses varied and included streptococcus milleri, enterococcus faecium and actinomyces.

Discussion: Mediastinal abscess formation after EUS-FNA in patients with sarcoidosis can occur. Whether esophageal sampling of mediastinal nodes is an actual risk factor for abscess formation needs to be further evaluated. Careful prospective monitoring of complications after EUS is indicated in sarcoidosis patients and complaints following EUS-FNA should be taken seriously.

33193

Endobronchial Staging of Lung Cancer

PREOPERATIVE VS. POSTOPERATIVE LYMPH NODE STAGE: A STUDY OF 112 CASES

Jernej Sitar¹, Nadja Triller²

¹University Hospital Golnik , Ljubljana, Slovenia; ²University Clinic Golnik , Golnik, Slovenia

Background: Appropriate diagnosis and staging of lung cancer are very important for selection of treatment strategies. Operation is for now considered as the only treatment method which is believed to completely cure the patient. Lymph node disease can be a turning point in the treatment strategy. Patients with N2 disease can be either operated or not depending on the number of affected N2 regions.

Objectives: One year retrospective analysis of the patients that were diagnosed with lung cancer in our institution and operated is presented in this paper. Preoperative and postoperative lymph node stages were compared.

Patients and methods: 112 patients with the diagnosis of lung cancer were referred for the operation in one year period. Invasive lymph node staging was performed after CT and/or PET CT scan. Positive lymph nodes (cut off SUV 4.2 on PET CT). was sampled using standard TBNA and/or EBUS. Preoperative and postoperative pathological lymph node staging was compared in the analysis.

Results: Preoperative staging: 82 patients (73%) were N0, 21 (19%) N1 and 9 (8%) N2. N2 stage was confirmed in total 9 patients: positive TBNA/EBUS in 4 patients of which 3 were PET CT positive and 1 negative. TBNA/EBUS were negative in 3 patients but positive on PET CT, 2 patients were only PET positive without cytological verification. Postoperative 84 (75%) patients were N0, 12 (11%) N1 and 9 (8%) N2. Postoperative pN2 stage was confirmed in 6 known patients out of 9 (2 received neoadjuvant chemotherapy and were pN0, 1 was pN1) and 3 new patients that were preoperatively N0 (2 patients) and N1 (1 patient). Out of the three that were postoperatively N2 positive 1 was PET CT and EBUS negative, 1 PET CT positive and EBUS negative and 1 PET CT negative.

Conclusions: Preoperative diagnosis of lymph node disease involvement using cytological sampling after accurate imaging procedures proved to be in very good correlation with postoperative pathological stage in our setting in majority of patients and did not affect the outcome of the disease.

33222

Endobronchial Staging of Lung Cancer

CLINICAL BENEFITS OF TRANSESOPHAGEAL APPROACH USING EBUS BRONCHOSCOPE

Kyung Jong Lee¹, Hojoong Kim¹, SANG-WON UM²

¹Samsung Medical Center, Seoul, South Korea; ²Samsung Medical Center, Seoul, South Korea

Background : Endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) combined with endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a useful method for mediastinal staging. However there is limited data regarding the diagnostic accuracy of mediastinal lymph node staging by transbronchial and transesophageal fine needle aspiration using the same EBUS bronchoscope in one session.

Objective: We evaluated the usefulness of transesophageal approach using EBUS bronchoscope (EUS-B-FNA) followed by EBUS-TBNA for the mediastinal staging of lung cancer.

Methods: The study subjects were 47 patients (median age 66, range 43-86 years) who were suspected or diagnosed with lung cancer between May 2010 to Feb 2012. F-18 fluorodeoxyglucose (FDG) Positron emission tomography was performed before EBUS-TBNA

and EUS-B-FNA procedures. EUS-B-TBNA was used for mediastinal lymph nodes located in stations which were inaccessible or difficult to obtain enough samples through EBUS-TBNA procedures. The accuracy and additional diagnostic yields of the combination of the two procedures were compared with those of EBUS-TBNA.

Results: Mediastinal nodal staging (N stage) was confirmed by EUS-B-FNA combined with EBUS-TBNA or surgery in 38 of 47 patients. Final N stage of N0/1, N2, N3 were 37.0%, 47.8% and 15.2% respectively in this study. When EUS-B-FNA was combined with EBUS-TBNA, the diagnostic accuracy was 100% and was significantly increased when compared with 81% of EBUS-TBNA. 6 cases (13%) of EBUS-TBNA N stage were shifted to higher nodal stages after the addition of the EUS-B-FNA procedure. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) of N stage using EBUS-TBNA were 76%, 100%, 100% and 53% respectively.

Conclusion: Transesophageal approach using EBUS bronchoscope (EUS-B-FNA) increased the diagnostic accuracy for mediastinal lymph node staging of lung cancer by EBUS TBNA in the presence of lymph nodes which were inaccessible or difficult to reach.

33258

Endobronchial Staging of Lung Cancer

ENDOBRONCHIAL METASTATIC COLON CANCER WITHOUT HEPATIC INVOLVEMENT

Harriet K. Kayanja¹, Benjamin Young²

¹University Hospitals Case Medical Center , North Ridgeville, United States; ²University Hospitals Case Medical Center , Cleveland, United States

Introduction: Pulmonary and pleural metastases are frequently observed in patients with non-primary pulmonary malignancies, however endobronchial involvement is rare. An endobronchial metastasis (EM) is defined as a lesion in the tracheobronchial tree with the same histological features as the primary tumor. Most common primary tumors are breast, renal and colorectal carcinomas. Endobronchial metastases from colon cancer without liver metastases are rare, only previously described in case series. Here we describe a case of metastatic endobronchial colorectal carcinoma.

Case Definition: 43-year-old female former smoker, with history of hypertension, presented with a 2 month history of constipation, and 20 pound weight loss. CT of the abdomen revealed an abdominal mass. She underwent exploratory laparotomy, total abdominal hysterectomy, bilateral salpingo-oophorectomy, and biopsy of the pelvic mass demonstrated a mucinous adenocarcinoma. She was diagnosed with stage IIC rectal adenocarcinoma (T4b N0 M0). Because of the extent of the tumor, it could not be completely excised at that surgery. She received continuous 5-FU combined with daily radiation therapy to a total of 50.4 Gy. She subsequently had pelvic exenteration, coloanal anastomosis, diverting loop ileostomy, ileal conduit, and intraoperative radiotherapy to 10 Gy. Postoperatively she received adjuvant chemotherapy with FOLFOX but only a total of 5 out of 8 planned cycles. CT chest at 14 month follow up revealed interbronchial hypo-attenuating material in the superior aspect of the left lower lobe consistent with mucous impaction and atelectasis, in close proximity to a previously seen nodule. There was no other mediastinal adenopathy or nodules. Fiberoptic bronchoscopy revealed a mucus plug in the superior segment of the left lower lobe. Clearance of the mucus

plug revealed an endobronchial lesion in one of the subsegmental airways of the superior segment of the left lower lobe. Pathology was consistent with adenocarcinoma with focal mucinous features consistent with metastatic colonic adenocarcinoma. PET scan was significant for FDG uptake only in the area of the EM; prompting surgical resection for oligometastatic disease. She had a left lower lobectomy, with the primary tumor, measuring 4.5 cm in diameter. Peribronchial and intrapulmonary lymph nodes were negative for metastases. Immunohistochemical stains, morphologic findings and immunoprofile were consistent with origin from colorectal primary disease.

Discussion: Endobronchial masses represent primary lung cancers with only 1 % being metastatic. Among patients with colon cancer, lung metastases have been reported in up to 20% of the patients. The liver is the most common site of hematogenous spread from colon tumors because of venous drainage of the intestinal tract via the portal system. Pulmonary metastases from colon cancer often result from hepatic metastases. Endobronchial metastases without hepatic involvement occur rarely, to our knowledge only reported in case series. In a case series, main symptoms were dyspnea. Radiologic findings included diffuse large nodular infiltrates without lymphnode or pleural involvement, and atelectasis. Bronchoscopy with biopsies is needed for the diagnosis. In 50-60% of cases, patients are asymptomatic. Interventional bronchoscopy should be considered for symptomatic relief. We have reported a rare case of endobronchial metastases without liver or mediastinal metastases representing oligometastatic disease.

33265

Endobronchial Staging of Lung Cancer

DIAGNOSTIC YIELD OF ROSE (RAPID ON-SITE EVALUATION) AND CELL BLOCK OBTAINED BY ENDOBRONCHIAL ULTRASONOGRAPHY (EBUS) IN PATIENTS WITH LUNG CANCER

Marizell Pari Espinoza¹, Antoni Rosell², Jordi Dorca³, Marizell Pari Espinoza¹, Melissa Masis⁴, Noelia Cubero⁵, Rosa López-Lisbona⁶

¹Hospital Universitari de Bellvitge , Barcelona, Spain; ²Hospital Universitari de Bellvitge , L'Hospitalet de Llobregat. Barcelona, Spain; ³Hospital de Bellvitge , L'Hospitalet de Llobregat. Barcelona, Spain; ⁴Hospital Rafael Ángel Calderón Guardia , San José, Costa Rica; ⁵Hospital Universitari Bellvitge , Barcelona, Spain; ⁶Hospital Universitari de Bellvitge , Barcelona, Spain

Introduction: The cytological diagnosis of lymph node (LN) metastases depends on many variables such as the number of passes made at each station, access to ROSE or type of sample processing, among others. Our objective was to analyze the diagnostic value of ROSE and cell block (CB) obtained for mediastinal staging by EBUS in lung cancer.

Methods: Selective EBUS sampling was performed to patients with lung cancer and mediastinal disease by chest CT or PET-CT. Surgical confirmation was required when EBUS results were negative. For each fine needle aspiration (FNA), we collected the results of ROSE, final cytology diagnosis and CB. The LN with the largest diameter in the station with worse prognosis was the first to be sampled. At least 3 FNA per LN were performed if ROSE did not show malignant cells. Diff-Quik TM staining was used for ROSE and haematoxylin-eosin and Pap cytology staining for definitive cytology smears and BC.

Results: We studied 148 patients from June 2010 to August 2011, of which 49 met the inclusion

criteria. 87.8% were male with a mean age of 62.7 years (42-78). A total of 130 FNA were performed, being unable to obtain a BC in 23.1% of them. The % of agreement between cytology and CB was 94.9%. BC added 3.1% of new diagnoses. ROSE avoided the need of obtaining 71 FNA, from a total of 134 63 (??) second and third passes (47%). The % of agreement between ROSE and the final cytology report was 82.6%, presenting a NPV and a PPV of 73% and 100%, respectively. Benignity was confirmed by surgical techniques in all patients with negative EBUS, which represents a NPV of 100% in the studied sample.

Conclusions: 1. CB has a high correlation with cytology (94.9%) but adds few new diagnoses (3.1%). It should be mainly used for immunohistochemical or molecular studies. 2. ROSE avoids 47% of FNA, based on its PPV of 100%. 3. The NPV of cytology after 3 passes with ROSE assessment is 100%. This approach can avoid further confirmatory surgical techniques.

33465

Endobronchial Staging of Lung Cancer

GUIDE SHEATH SUCTION FOR BRONCHOSCOPIC SPECIMEN SAMPLING FOR LUNG CANCER DIAGNOSIS

Satoko Sekine¹, Hiroshi Yokouchi¹, Hiroyuki Minemura¹, Kengo Oshima¹, Kenichiro Hirai¹, Kenya Kanazawa², Mitsuru Munakata¹, Takashi Ishida¹, Yoshinori Tanino¹

¹*Fukushima Medical University, Fukushima, Japan;* ²*Fukushima Medical University, Fukushima, Jarvis Island*

Background: Bronchoscopic bronchial brushing, forceps biopsy, and bronchial lavage are used to sample specimen from pulmonary lesions. Bronchoscopic specimen collection with suction by adding negative pressure with a syringe-attached thin catheter has been previously reported; however, the method is not commonly applied. Endobronchial ultrasound with guide sheaths (EBUS-GS) has been widely used recently. After sampling the specimen with EBUS-GS, a small amount of the specimen remains in the distal end of the guide sheath, which can contribute to diagnosis. Moreover, the guide sheath can be used for catheter suction.

Objectives: The efficacy and safety of the guide sheath suction procedure were assessed.

Methods: Medical records from between April 2011 and December 2011 were reviewed. Patients who were diagnosed as having peripheral lung cancer by bronchial brushing and/or forceps biopsy with EBUS-GS and who also underwent the suction procedure were identified. Catheter suction was performed by applying negative pressure for 20 seconds using a syringe attached to the proximal end of the guide sheath after bronchial brushing and/or forceps biopsy with EBUS. Specimens collected by suction were prepared for cytopathologic samples (alcohol-fixed, Papanicolaou-stained glass slides) and/or histopathologic samples (formalin-fixed, paraffin-embedded, and hematoxylin-eosin-stained thin sections). After suction and withdrawal of the guide sheath, bronchial washing was attempted with 20 mL of saline.

Results: Forty-one patients were included in the analysis (28 males and 13 females). The patients' mean age was 72.3 years. The tumor locations were: left upper lobe in 5 patients; left lower lobe in 7; right upper lobe in 11; right middle lobe in 6; and right lower lobe in 12. The size of the lesions ranged from 12-82 mm, with a mean of 32.3 mm (long axis). A definitive diagnosis was made for 39 of the 41 lesions (95.1%) by brushing cytology, for 35 of the 40 lesions (87.5%) by forceps biopsy, and for 19 of the 39 lesions (48.7%) by bronchial washing

cytology. In all cases, specimens were obtained by suction: 41 aspirate fluid smears for cytopathology and 8 tissue specimens for histopathology. On suction cytopathology, 32 of the 41 lesions (78.0%) were found to be malignant. On suction histopathology, 6 of 8 lesions (75.0%) were found to be malignant. The diagnostic yield of suction did not depend on tumor location or tumor size. There were no complications associated with suction.

Conclusions: Suction with a guide sheath is a simple and effective sampling technique. Further investigation of this technique is warranted.

33519

Endobronchial Staging of Lung Cancer

EBUS TBNA/EUS FNA HOW TO IMPROVE YOUR YIELD

Mark Krasnik

Rigshospitalet , Copenhagen, Denmark

EBUS TBNA in a few years proven to be a valuable tool for the diagnosis of hilar and mediastinal lesions, and its diagnostic yield is high in the hands of highly trained endoscopists. Complaints concerning the results seen in the hands of experts cannot be reproduced in daily routine. Rapid on-site evaluation (ROSE), which is proven successfully to increase the yield of bronchoscopic, nonbronchoscopic and extra thoracic fine-needle aspirations. The aim of the study: The goal was to assess the possibility to teach a surgeon to perform ROSE independent of a pathologist and to evaluate the impact of ROSE by a surgeon on the diagnostic yield.

Material and methods: After a one day intensive training of the surgeon by a trained cytologist, 100 consecutive patients either suspicious of or diagnosed with lung cancer were enrolled in a prospective study. 302 lymph nodes were biopsied. Cytological specimens obtained with trans bronchial aspirates were processed with the smear technique, as the material was collected and smeared on clean glass slides. The smears were stained in the operation room and the ROSE were performed after the staining process by the surgeon. The specimens were thereafter send to routine examination by a cytologist in another center the next day

Results: 5 lymph nodes were re-biopsied by the surgeon during the same procedure because he was satisfied with the results.

The cytologist concluded that the biopsy was not representative for lymphatic tissue in 6 lymph nodes, The yield was therefore 98% 2 lymph nodes was false negative one in station 4R and one in 12R)

Conclusion: It was easy to teach a surgeon to recognize if a TBNA biopsy were representative for lymphatic tissue. Because of the possibility of redo a biopsy during the procedure a high yield were obtained.

33540

Endobronchial Staging of Lung Cancer

THE IMPACT OF USING EBUS TBNA AND EUS FNA IN A NATIONAL POPULATION OF LUNG CNACER PATIENTS

Mark Krasnik

Rigshospitalet , Copenhagen, Denmark

Background: Danish Lung Cancer group (DLCG) was established in 1992 based on an initiative from the Danish Society of thoracic surgeons. The primary report from DLCG from 1994 showed significant differences in the use of diagnostic criteria's and therapeutic procedures. A need of a national guideline was documented and in 1996 national guidelines were published for visitation, diagnostics and treatment of patients with lung cancer. In 1998 it was made the official professional basis by the Danish Board of Health. These guidelines are currently being updated. The guidelines have been implemented both professionally and in the organisation because financial resources were supplied. Parallel with these activities a national database was developed. The primary aim of a uniform registration of all patients course through the system was to assure the quality of the professional activities in relation to the guidelines. It is also possible to document the extent and the contents of the activities in relation to geographic parts of the country. The clinical data is also available as a knowledge bank and documentation for clinical and scientific activities. The Danish Lung Cancer Register was established in 1999 financially supported by the Danish board of health The ministry of Health, the Danish Cancer Society and the registration started in January 2002 The aim of the study: Many publications have already shown the effectiveness in using EUS FNA and EBUS TBNA in diagnosing and staging of lung cancer. The aim of this study was to describe the impact of the use of EBUS TBNA and EUS FNA in a national population of lung cancer patients

Material: 39256 patients is registered in the Register of this 5136 have been operated. The diagnostic and the staging procedures for each patient is registered and as the cT, cN, cM and the pT, pN, pM were registered it was possible to assess the concordance for cN and pN for each operated patient and compare it with the staging procedures

Results: From the attached figures the connection between the use Endoscopic Ultrasound and concordance between cTNM and pTNM and the cN and pN shift in the different regions of Denmark. We are still working on the survival rates based on the results of preoperative staging.

33545

Endobronchial Staging of Lung Cancer

ENDOBRONCHIAL ULTRASOUND-GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION IN THE DIAGNOSIS AND STAGING OF MEDIASTINAL LYMPHADENOPATHY: LEARNING CURVES FOR ONE SURGEON IN SINGLE INSTITUTION.

Ozan Usluer¹, Ozgur Samancilar¹, Seyda Kaya¹

¹Izmir Dr Suat Seren Thoracic Disease Hospital , Izmir, Turkey

Objective: Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a non-invasive and highly diagnostic valuable method for the diagnosis and staging of mediastinal or hilar lymphadenopathy identified on CT of the chest. This study aimed was to evaluate the learning curve and the efficacy of EBUS-TBNA in the mediastinal or hilar lymphadenopathy.

Methods: In this study, we evaluated for lymph nodes, diagnosed with or suspected of having cancer or benign lung disease as sarcoidosis. The procedures were performed under sedation with diazepam. A success-adjusted Cumulative Sum (CUSUM) model was used for evaluating the learning curve for diagnostic rates. Confirmation of the lymph node sampling was obtained by cytology, surgical procedures, and clinical follow-up for at least 3 months.

Results: Medical records of the patients analyzed retrospectively. In 99 consecutive patients (77 men, 22 women), we performed 587 biopsies of 284 lymphadenopathy. The quantity of lymph node sampling was seen appropriate for histopathological examination in 96 from 99 patients (96.9%). Of 284 the histopathological analysis of lymph node samples, 22 (7%) were clearly diagnosed neoplastic disease, 5 (2%) suspicious for metastatic lymph nodes, 249 (88%) were reactive hyperplasia and 8 (3%) granulomatosis. Surgical procedures (mediastinoscopy, VATS or thoracotomy) were performed for 89 patients (87.8%). There were no deaths among the patients evaluated. The sensitivity, specificity, and positive and negative predictive values for EBUS-TBNA were 91.75%, 100%, 100% and 92.31% respectively.

Conclusion: EBUS-TBNA is a safe and accurate method for sampling mediastinal lymph nodes. More successful results are obtained after a certain learning curve like in every other invasive procedure.

33525

Head and Neck Cancer

THYROID CANCER WITH TRACHEAL INVASION : THE USE OF PREOPERATIVE CT

Kwang Hyun Kim

Seoul National University Hospital , Seoul, South Korea

Background: Extrathyroidal invasion into the trachea or larynx was noted in 3.6% to 22.9% of all patients undergoing thyroidectomy. The CT scan may be a valuable tool for evaluation of extrathyroidal invasion of thyroid cancer to the upper aerodigestive tract. **Objective :** This study aimed to evaluate the effect of preoperative CT findings to prognosis of trachea-invasive thyroid cancer. **Materials and**

Methods: From Jan. 1988 to Jul. 2010, we treated surgically 1877 patients with papillary thyroid carcinoma. All patients were diagnosed and evaluated with ultrasonography and CT scan, preoperatively. The retrospective chart and imaging review was performed and statistically evaluated using the SPSS 12.0.

Results: Thyroid cancer with tracheal invasion was found in 3.1% of patients. In these patients, we can review 36 patients with papillary thyroid cancer who had preoperative CT. They were treated with shaving in 18 patients, window resection in 8 patients, and trachea resection and end-to-end anastomosis were in 10 patient. The mean follow-up duration was 46.0 months and the average size of tumor was 2.6 cm. The CT grading of encircling the trachea was performed and all of the shaving cases showed below 90 degree of encirclement. The local recurrence rate was higher in patients with higher encirclement of the trachea, intraluminal involvement and longer involvement of the trachea. The previous thyroid surgery history had no relation with local recurrence rate, but in recurred case, the CT grading and involved length of the trachea were higher.

Conclusion: Preoperative CT scan could help making decision of the range of tracheal resection and higher grades in tracheal involvement in CT scan also showed significant local recurrence.

32827

Methods of Anesthesia during Therapeutic Bronchoscopy

SUGAMMADEX REVERSAL OF ROCURONIUM-INDUCED NEUROMUSCULAR

BLOCK IN INTERVENTIONAL BRONCHOSCOPY PROCEDURES : A COMPARISON WITH NEOSTIGMINE

Jana Kogler¹, Marko Jakopovic², Nabil Chalfe²

¹Clinical Hospital Rebro , ZAGREB, Croatia; ²Medical University Hospital Rebro , Zagreb, Croatia

Background: Prompt recovery of laryngeal reflexes and spontaneous respiration at the end of the interventional bronchoscopy procedures prevent adverse respiratory events. This prospective randomized study compared the efficacy of sugammadex for reversal of rocuronium-induced profound neuromuscular block with that of neostigmine. The safety of sugammadex and neostigmine was also evaluated.

Methods: Adult patients ASA class IV scheduled for procedures in interventional bronchoscopy were randomized to sugammadex group 2mg/kg or neostigmine 70µg/kg group for the reversal of block induced with rocuronium 0.6mg/kg. Anesthesia was induced with midazolam, propofol and sufentanil and maintained with increments of propofol. Neuromuscular function was monitored with acceleromyograph (TOF -Watch ®SX). Adequate muscle relaxation was obtained with bolus doses of rocuronium 0.15µg/kg upon reappearance of second twitch in TOF. Sugammadex or neostigmine was administered at the reappearance of 1-2 posttetanic counts. The primary efficacy parameter was time to recovery of TOF ratio to 0.9. We also measured the time from the beginning of anesthesia to the time of patient discharge to the PACU and blood gas analysis at the time of discharge.

Results: 31 patients were randomized, 16 of whom received sugammadex and 15 received neostigmine. After sugammadex, median recovery time of TOF to 0.9 was 1.1min vs. 10.13 min with neostigmine (p<0,001). Median time from beginning of anesthesia to patient discharge to the PACU was in sugammadex group 49.2min vs. 68.13min in neostigmine group (p<0,001). Median PaCO₂ value at the time of discharge was 46.19mmHg in sugammadex group vs. 57.20mmHg in neostigmine group (p<0,001). There were no adverse effects from either sugammadex or neostigmine.

Conclusions: Sugammadex provided significantly faster recovery time from rocuronium-induced profound neuromuscular block in comparison with neostigmine, shorter duration from the beginning of anesthesia to patient discharge to PACU with lower values of PaCO₂.

33204

Methods of Anesthesia during Therapeutic Bronchoscopy

ANAESTHESIA FOR TRACHEOBRONCHIAL STENTING

Milena Encheva¹, Alexandra Saltirova¹, Emil Karjin¹, Hristo Yordanov¹, Kosta Kostov¹, Nikolay Petrov¹

¹Military Medical Academy , Sofia, Bulgaria

Anaesthesia for tracheobronchial stenting requires close collaboration between the anaesthetist and bronchologist, who share a common and usually narrow and deformed space airway. Before the intervention it is always necessary to discuss the diagnostic-therapeutic algorithm (etiology of stenosis, comorbidity, therapeutic procedures) and possible complications. The anaesthesia

varies from mild sedation to general anaesthesia with muscle relaxation and controlled ventilation, depending on the difficulty and length of the interventional procedure.

Aims: To demonstrate our experience in preoperative evaluation, premedication, induction and anaesthesia for patients undergoing tracheal stenting and to assess the early recovery period in these patients.

Materials and methods: This is a prospective study, including 22 patients, average age 45 (18 μ 73). Etiology of stenosis: benign - 17; malignant - 5. A total number of placed stents --28: Dumon - 21, Montgomery - 7. All patients met the criteria for clinically significant tracheal stenosis: shortness of breath on exertion, cough, stridor, recurrent pulmonary infections with typical imaging, functional and endoscopic data. In all patients an assessment of anaesthetic risk ASA is made. The premedication depends on the degree of respiratory failure. In all patients induction with propofol and opioid is administered, followed by muscle relaxant and rigid bronchoscopic intubation. We used JET - ventilation as a suitable alternative to conventional ventilation. Post-operative monitoring until full recovery from anaesthesia is strictly carried out.

Results: In all patients, induction and anaesthesia during procedures have taken place according to pre-established algorithm. One patient had experienced postoperative monitoring in intensive care unit for 24 hours due to severe bronchospasme and respiratory failure. In the others postoperative monitoring and recovery were uncomplicated.

Conclusions: The special characteristics of jet ventilation make it an ideal method for guaranteeing adequate oxygenation during bronchoscopy, nevertheless the patient is breathing spontaneously or is under general anaesthesia. The role of jet ventilation in bronchoscopic anaesthesia is therefore very important. The anaesthesia for tracheobronchial stenting set a number of challenges and requires knowledge and experience with different ventilation and anaesthetic techniques.

Keywords: anaesthesia, bronchoscopy, jet, tracheobronchial stenting, ventilation

33534

Methods of Anesthesia during Therapeutic Bronchoscopy

RIGID BRONCHOSCOPY USING A TURBINE DRIVEN PORTABLE VENTILATOR UNDER INTRAVENOUS GENERAL ANAESTHESIA

Gerald M O'Brien

Christiana Healthcare System , Hockessin, United States

Several different options exist for ventilating patients during the performance of rigid bronchoscopy (RB). Closed circuit volume ventilation often requires packing the mouth with gauze in an effort to control air leakage which may be significant in patients with central airway obstruction (CAO) or obesity. We hypothesized that the Pulmonetics LTV 1200 (LTV), a turbine driven portable ventilator that delivers high flow and air leak compensation, would be an effective alternative ventilation strategy during RB. We retrospectively evaluated morbidity and mortality in 65 procedures performed on 54 patients at our hospital. Pts were 64 $\pm$ 16yrs (Mean $\pm$ SD) and had a BMI of 25 $\pm$ 9 All Pts underwent intravenous anesthesia with Propofol, Remifentanyl and Rocuronium during the procedure. Ventilation was accomplished through the

side port of the rigid scope without oral packing, using the LTV in a Pressure Control mode (PIP: 26.27±2.3 and RR: 16±2, I:E: 1:2, PEEP: 0) without adjunctive measures to limit oral air leaks . PIPs were adjusted based on adequacy of chest rise and SaO₂ monitoring. FiO₂ was lowered below 40% for the application of laser or electrocautery in 44 cases. The indications for RB included; unilateral CAO (34), bilateral CAO (4), lobar obstruction (7), tracheal obstruction (9), removal of foreign body (8) and other (3). The total procedure time was (53 ±26 min). There were no intraoperative respiratory complications. In 7 Pts that were ventilatory dependent prior to RB, 6 were subsequently extubated and discharged. In 5 Pts who experienced Post-op respiratory failure, 4 were subsequently extubated and discharged. There were two post operative hospital deaths (4%) unrelated to the procedure. In conclusion, the use of the Pulmonetics LTV 1200 portable ventilator is a safe alternative ventilation option for RB.

29834

Role of Bronchoscopy in the Management of Pulmonary Nodule

PREOPERATIVE PREDICTORS OF MEDIASTINAL LYMPH NODE METASTASIS IN PATIENTS WITH CLINICAL N0 LUNG CANCER

Taichiro Ishizumi¹, Hidetoshi Honda¹, Jitsuo Usuda¹, Masaru Hagiwara¹, Naohiro Kajiwara¹, Norihiko Ikeda¹, Tatsuo Ohira¹

¹*Tokyo Medical University , Tokyo, Japan*

Background and purpose: As mediastinal lymph node metastasis affects the decision regarding the surgical indication for lung cancer, preoperative staging requires an accurate diagnosis. However, pN2 is often found in patients with cN0 lung cancer. The aim of this study was to evaluate preoperative predictors of mediastinal lymph node metastasis (pN2) to determine the indication for preoperative endobronchial ultrasound with real-time guided transbronchial needle aspiration (EBUS-TBNA) in patients with cN0 lung cancer.

Objective and method: We retrospectively evaluated 789 patients with cN0 untreated lung cancer who underwent systematic mediastinal lymph node dissection (ND2a) from January 2005 to March 2011. We evaluated predictors of pN2, namely, gender, age, smoking history, tumor markers carcinoembryonic antigen (CEA) and cytokeratin 19 fragment (CYFRA), primary site (right/left, each lobe), maximum tumor diameter (> 3 cm), histological type, and pleural invasion.

Results: Among the patients with cN0 lung cancer who underwent operation, 10.5% had pN2 (83/789). On univariate analysis, tumor markers (CEA, CYFRA), maximum tumor diameter (> 3 cm), and pleural invasion were found to be significantly associated with pN2 ($p < 0.05$). On multivariate logistic regression analysis, maximum tumor diameter (> 3 cm) and pleural invasion were shown to be significantly associated with pN2 ($p < 0.05$). The rate of pN2 in patients with cN0 lung cancer having the above 2 predictive factors was 25.9% (29/112), which was significantly higher than the rate of pN2 in the other patients with cN0 lung cancer (8.0%; 54/677) ($p < 0.0001$).

Conclusions: In preoperative staging, the diagnosis of mediastinal lymph node metastasis only with diagnostic imaging remains inaccurate. To achieve accurate clinical staging, preoperative EBUS-TBNA should be considered even in patients with cN0 lung cancer based on the findings

of clinical imaging when the maximum tumor diameter is more than 3 cm and pleural invasion is suspected.

32605

Role of Bronchoscopy in the Management of Pulmonary Nodule

SERIAL LOBAR LUNG LAVAGE IN MANAGEMENT OF PULMONARY ALVEOLAR PROTEINOSIS WITH HYPOXIA "

Unmil Bhupesh Shah¹, Amita Athavale², Jairaj Nair³, Manju Sarkar², Milind Baldi³, Smita Diwate², Varun Gavali³

¹Seth GS Medical College & KEM Hospital , Mumbai(Bombay), India; ²Seth G S Medical College & KEM Hospital , Mumbai, India; ³Seth G S Medical College & KEM Hospital , Mumbai, India

Pulmonary alveolar proteinosis (PAP) is a syndrome characterized by the accumulation of surfactant in alveolar macrophages and alveoli resulting in respiratory insufficiency and, in severe cases, respiratory failure. It may result from mutations in surfactant proteins or granulocyte macrophage-colony stimulating factor (GM-CSF) receptor genes, it may be secondary to toxic inhalation or haematological disorders, or it may be auto-immune, with anti-GM-CSF antibodies blocking activation of alveolar macrophages. Therapeutic whole lung lavage is the standard treatment modality. We report a case of 38yr old male presenting with classical radiological picture of PAP. The certain diagnosis of PAP was made by Bronchoalveolar lavage(BAL) positive for Periodic-acid Schiff (PAS) stain.. Patient being hypoxic underwent Serial Bronchoscopic Lobar Lung Lavage which subsequently improved the PaO₂ levels from 45.7 to 63.8mmHg. Our experience suggests that Serial Bronchoscopic Lobar Lung Lavage is a good alternative to standard whole lung lavage especially in hypoxic patients. Key Words: Pulmonary Alveolar Proteinosis(PAP), Periodic-acid Schiff (PAS), Bronchoalveolar lavage (BAL).

32905

Role of Bronchoscopy in the Management of Pulmonary Nodule

INSERTION AND FIXATION OF GOLD MARKERS USING NEW DISPOSABLE INSERTION SYSTEM FOR REAL-TIME TUMOR-TRACKING RADIOTHERAPY AGAINST LUNG CANCER

Naofumi Shinagawa¹, Hajime Asahina¹, Hidenori Mizugaki¹, Hiroki Shirato¹, Iki Ogura¹, Jun Sakakibara-Konishi¹, Masaharu Nishimura¹, Noriyuki Yamada¹, Satoshi Oizumi¹, Taichi Takashina¹, Yasuyuki Ikezawa¹

¹Hokkaido University School of Medicine , Sapporo, Japan

Background and

Objectives: We have previously shown efficacy of real-time tumor tracking radiotherapy (RTRT) for inoperable patients with peripheral non-small cell lung cancer because of poor lung function and/or elderly. In this system, the location of a moving tumor can be detected by two sets of diagnostic fluoroscopes every 0.03 s with an accuracy of 1 mm, and the tumor is irradiated only when its location corresponds to the planned position. For this goal, we insert

round gold markers into the lung using bronchoscopy and the fixation of gold markers at target site is vital for success of this therapy. In this study, the fixation rate of markers was retrospectively analyzed, when we used the new insertion system commercially available since 2008 in Japan.

Patients and Methods: Between August 2008 and October 2011, gold markers were inserted into 104 patients with peripheral lung cancer using this new system. We analyzed the fixation rate of gold markers by Chest X-ray film. The distance between gold markers and chest wall were measured on Computed tomography images retrospectively.

Results: The average size of the lesions was 21.6 ± 9.1 (mean $\pm$ SD) mm. Of 104 lesions, 41 were in right upper lobe, 11 were in right middle lobe, 20 were in right lower lobe, 17 were in left upper lobe, and 15 were in left lower lobe. The median number of inserted markers for one lesion was 4. In 332 (83%) of the 398 inserted markers, the gold markers were fixed throughout the treatment period (median 15 days). The distance between the dropped-out markers and chest wall was longer than that of the fixed markers (17.1mm vs. 10.3mm; $p < 0.01$). The fixation rate of markers were 88% (138/157) in right upper lobe, 85% (36/44) in right middle lobe, 79% (62/78) in right lower lobe, 77% (49/64) in left upper lobe, 85% (47/55) in left lower lobe. In right lower lobe, 27 of 37 (73%) markers in S6 were fixed. The fixation rate in the left upper lobe or right S6 was significantly lower than that in the other lobes ($p < 0.01$). All the patients tolerated this procedure without any serious complications. Real-time tracking of the markers was successfully performed in all cases.

32939

Role of Bronchoscopy in the Management of Pulmonary Nodule

A 70 YEAR OLD WOMAN WITH ENDOBRONCHIAL LESION AND HEMOPTYSIS

Qammar Abbas¹, Arjomand Farhad², Saleem Shahzad², Sasikanth Nallagatla², Vasudevan Viswanath³

¹The Brooklyn Hospital center , Brooklyn, United States; ²TBHC , Brooklyn, United States; ³The Brooklyn Hospital Center , Brooklyn, United States

Case Presentation: A 70 year old African American woman with a known history of asthma has had recent worsening of asthma control. She presented with cough, productive sputum, and streaky hemoptysis of 3 days duration. She was a former smoker with a 5-pack-year history of smoking. Her medications included Fluticasone/salmeterol 500/50 I puff twice daily, albuterol HFA as needed, atrovent, and omalizumab. On examination, NAD, BP 125/80; HR, 68; respiratory rate, 22; T, 98oF and SaO2 of 98% on RA. Chest examination revealed scattered wheezes more so on the right lung field. Representative CT scan images of the chest are shown. Flexible bronchoscopy procedure revealed a polypoid lesion arising from the right bronchus intermedius close to secondary carina between RUL and Bronchus intermedius occluding 90% of the bronchial lumen. Multiple forceps biopsies and bronchial brushings of the endobronchial polypoid mass were negative for carcinoma. Bronchoalveolar lavage special stains were negative for acid fast bacilli and fungal elements and subsequently the cultures were negative for mycobacteria and fungi. She underwent rigid bronchoscopy and the pedunculated polypoid mass was removed from the stalk.

Introduction: Benign polypoid lesions are uncommon findings on bronchoscopic examination and present a diagnostic dilemma not only for the clinician, but also for the pathologist. Fiberoptic bronchoscopy and endobronchial biopsy are frequently not diagnostic because of insufficient tissue and difficulty in excluding malignancy due to sampling error. Rigid bronchoscopy and complete excisional biopsy of the polyp are required to make a definitive diagnosis. Etiology: The etiology of the tracheobronchial fibro epithelial polyp is unclear. The most accepted hypothesis is a chronic inflammatory origin because of chronic irritation, infection, or inflammatory disease. Histopathology: Histopathologically this polyp is fibro inflammatory and is lined with respiratory epithelium with edematous stroma. Clinical manifestations: The silent nature of benign endobronchial lesions often leads to a delayed diagnosis. Symptoms are often post-obstructive in nature depending upon the anatomical location of the intrabronchial lesion, such as chronic bronchitis and bronchiectasis, recurrent pneumonia, or incomplete radiological resolution of lung infiltrates. **Treatment:** The main principle of treatment is eradication of the lesion in order to relieve complications secondary to airway obstruction and conserve functioning lung parenchyma. For localized endobronchial lesions without extra luminal extension, a number of endoscopic treatment modalities are also available which avoid the morbidity and mortality associated with thoracotomy and pulmonary resection. These include bronchoscopic curettage, Nd-YAG laser, electrocautery and cryosurgery.

Conclusion: Benign polypoid lesions are an uncommon finding on bronchoscopic examination and present a diagnostic dilemma not only for the clinician, but also for the pathologist. Flexible Fiberoptic bronchoscopy and endobronchial biopsy are frequently not diagnostic because of insufficient tissue and difficulty in excluding malignancy because of sampling error. Rigid bronchoscopy and complete excisional biopsy of the polyp are required to make a definitive diagnosis. It is a slow growing tumor but can produce obstructive complications. Endobronchial excision is usually achieved by laser resection. Rarely, with lesions located in the main bronchus, surgical excision with bronchoplasty and lung preservation is required.

33165

Role of Bronchoscopy in the Management of Pulmonary Nodule

ENDOBRONCHIAL ULTRASONOGRAPHY WITH A GUIDE SHEATH (EBUS-GS) FOR THE DIAGNOSIS OF INTERSTITIAL LUNG DISEASE

Takehiro Izumo¹, Atsushi Nagai², Hisao Asamura³, Shinji Sasada³, Takaaki Tsuchida³, Yukiko Nakamura³

¹National Cancer Center Hospital , TOKYO, Japan; ²Tokyo Women's Medical University , Tokyo, Japan; ³National Cancer Center Hospital , Tokyo, Japan

Background: Tissue diagnosis is important for a diagnosis of interstitial lung disease (ILD). Although endobronchial ultrasonography with a guide sheath (EBUS-GS) has been reported for its usability to a diagnosis of peripheral pulmonary nodule, there is no report about the usability of EBUS-GS for the diagnosis of ILD.

Objective: Consideration of usability of EBUS-GS for ILD.

Methods: After performing bronchoalveolar lavage (BAL) with diffuse shadows appeared at chest CT (consolidation in 13 cases, ground-glass opacity in 13 cases, and small nodular opacity in 4 cases) from January 2010 to May 2011, we decided to subject 30 cases with lung biopsy by

using EBUS-GS. We used BF-1T260(Olympus)as bronchoscope. We examined whether EBUS signal could be confirmed as well as tissue diagnosis, the number of biopsy, and examination time.

Results: Although we could confirm EBUS signal in all cases for consolidation, we failed to confirm the signal in all cases for ground-glass opacity and confirmed the signal in only half of the cases for small nodular opacity. In the shadow with confirmed EBUS signal (15 cases), we could acquire tissue diagnosis in all cases and it was significantly higher tissue diagnosis yield in comparison with that of the shadow that we could not confirm the signal (15 cases) . For the identical case, we also failed to acquire tissue diagnosis in biopsy at a place where we could not confirm EBUS signal. The number of biopsy was 8.0 ± 2.4 times and the examination time was 32.3 ± 6.6 minutes. The final diagnosis for 30 cases was UIP/IPF in 4 cases, NSIP in 6 cases, COP in 10 cases, sarcoidosis in 5 cases, hypersensitivity pneumonia in 2 cases, lung cancer in 2 cases, and eosinophilic pneumonia in 1 case.

Conclusion: This is the first report of EBUS-GS in ILD. Biopsy with confirming EBUS signal in ILD would improve tissue diagnosis yield.

33221

Role of Bronchoscopy in the Management of Pulmonary Nodule

DIAGNOSTIC VALUE OF BLIND-TRANSBRONCHIAL LUNG BIOPSY OF PERIPHERAL OR DIFFUSE PULMONARY DISEASE

Marioara Simon¹, Milena Man², Monica Pop³, Petrut Vremaroiu², Ruxandra Rajnoveanu²

¹Pneumology Hospital , Cluj-Napoca, Romania; ²Pneumology Hospital Cluj-Napoca , Cluj-Napoca, Romania; ³Pneumology Hospital Cluj-Napoca , Cluj-Napoca, Romania

Aims: Transbronchial lung biopsy (TBLB) is a bronchoscopy related technique, a viable alternative to open lung biopsy in patients with interstitial lung disease or nodular pulmonary masses situated outside direct endoscopic view. We aimed to evaluate the diagnostic yield, risks and complications of TBLB procedure, performed in the Endoscopy Department of Pneumology Hospital Cluj-Napoca, from 2007 to 2011 and to present some representative cases as diagnostic value.

Materials and method: We analyzed retrospectively 9800 fibrobronhoscopies made in the Bronchology Department of the Pneumology Clinic Cluj-Napoca, between 2007-2011. The examinations were performed using Olympus fibrobronchoscope in local anesthesia with Lidocaine 2%, and premedication with midazolam or diazepam. Of all examinations, blind TBLB was performed in 194 patients, for diffuse interstitial disease or opacity beyond the direct endoscopic view.

Results: Out of 194 biopsies performed, in 174 cases, significant lung tissue was collected (90%), with a confirmation of diagnostic rate of 61.94% and 1% complications rate. We obtained histopathology confirmation of diagnosis for 107 patients as follows: 40 Neoplasm 22,9%, 10 Sarcoidosis 5,7%, 33 Interstitial Diffuse Fibrosis 18,9%, 24 Inflammation 13,7%

Conclusions: Blind TBLB is a safe, efficient, cheap, repeatable diagnostic procedure in interstitial diseases and peripheral opacities beyond direct endoscopic visualization.

33237

Role of Bronchoscopy in the Management of Pulmonary Nodule

DIAGNOSTIC YIELD OF NARROW BAND IMAGING GUIDED ENDOBRONCHIAL BIOPSY IN SARCOIDOSIS: A PRELIMINARY REPORT

Ergun Tozkoparan¹, Alper Gundogan², Ergun Ucar³, Hayati Bilgic³, Mehmet Aydogan², Omer Deniz³, Seyfettin Gumus³, Yildirim Karslioglu³

¹Department of Pulmonary Medicine, Gulhane Military Medical Academy, Ankara, Turkey , Ankara, Turkey; ²Gulhane Military Medical Academy, Ankara, Turkey , Ankara, Turkey;

³Gulhane Military Medical Academy , Ankara, Turkey

Background: Narrow band imaging (NBI) is a new bronchoscopic imaging technique that enables to visualize detailed structure of bronchial vessels and it has been mostly used to show dysplastic and pre-cancerous airway lesions in order to increase diagnostic yield of bronchoscopy in early bronchial cancer. Endobronchial biopsy (EBB) can be revealed sarcoid granulomas up to approximately 35 % of in patients with sarcoidosis even if bronchial mucosa is normal in white light bronchoscopy (WLB).

Objectives: We have aimed to investigate diagnostic yield of EBB in sarcoidosis sampled in guidance of NBI and its contribution to diagnostic efficacy to all bronchoscopic procedures.

Methods: Patients suspected with sarcoidosis were enrolled in to the study. Bronchoscopic examination started with NBI and then it switched to white light. EBBs were taken from bronchial mucosa with abnormal vasculature in NBI and from abnormal mucosa consisted with sarcoidosis and bilateral secondary carinae if the mucosa was normal in WLB. Other bronchoscopic procedure including transbronchial needle aspiration and transbronchial parenchymal biopsy were also performed.

Results: To the current time, 13 patients with sarcoidosis have been enrolled in the study and NBI guided EBB yielded granulomatous inflammation in four of them. In one patient, diagnosis was obtained only by NBI guided EBB.

Conclusion: NBI might improve diagnostic yield of bronchoscopy in patients with sarcoidosis

33272

Role of Bronchoscopy in the Management of Pulmonary Nodule

PLACEMENT OF FIDUCIAL MARKERS UNDER ELECTROMAGNETIC NAVIGATION BRONCHOSCOPY FOR STEREOTACTIC RADIOSURGERY IN POST-PNEUMONECTOMY PATIENTS

Erik Folch¹, Adnan Majid¹, Hazel Lupena², Jose F Santacruz³, Michael Kent¹, Sidhu P Gangadharan¹

¹Beth Israel Deaconess Medical Center, Harvard Medical School , Boston, United States; ²Beth Israel Deaconess Medical Center , Boston, United States; ³St. Luke's Episcopal Hospital , Houston, United States

The use of electromagnetic navigation (EMN) bronchoscopy for diagnosis and staging of lung cancer is well documented in the medical literature, and has proven to improve the yield of bronchoscopy. The use of EMN for placement of fiducial lung markers for guidance of stereotactic radiosurgery has shown to be a reliable method with small risk of pneumothorax. However, the history of prior lobectomy or pneumonectomy is considered a relative contraindication as this affects the accuracy of the system and the yield of biopsies. We report

two cases of patients with prior pneumonectomy who were found to have suspicious lung nodules and underwent EMN bronchoscopy for diagnosis and placement of fiducial markers for guidance and respiratory motion adjustment during radiation.

Case Series: We performed four EMN-guided bronchoscopies in two patients. Patient 1: 76 year-old man with history of non-small cell lung cancer diagnosed 10 years prior to presentation and treated with left pneumonectomy. He presented to the medical oncologist for follow up and a spiculated nodule of 26mm x 29mm was identified. PET-CT showed FDG uptake exclusively at the lung nodule. The patient was deemed high risk for surgery or percutaneous biopsy and the decision to undergo bronchoscopy with EMN was made in collaboration with oncology, radiology and thoracic surgery. EMN bronchoscopy and confirmatory radial EBUS were used, and the diagnosis of squamous cell carcinoma stage Ib was reached by transbronchial lung biopsy, peripheral TBNA and brushings. Given the limited options of treatment, and after informed consent, the patient underwent repeat EMN bronchoscopy with placement of 2 fiducial markers for guidance of stereotactic radiosurgery, and received a total dose of 600 Gy. He remained asymptomatic after 1 year. Patient 2: 51 year-old man with history of stage IIIa NSCLC diagnosed 9 years prior and treated with radiotherapy, chemotherapy and pneumonectomy. He was evaluated in multidisciplinary thoracic oncology clinic for a new FDG-positive 13mm x 8mm nodule, and was considered to have unacceptable risk for lobectomy or wedge resection given his COPD, and limited pulmonary reserve. There was no FDG uptake in the mediastinum. He underwent EMN bronchoscopy with fluoroscopic and radial ultrasound confirmation, resulting in squamous cell carcinoma diagnosed by transbronchial lung biopsy. After appropriate informed consent, he underwent a repeat EMN bronchoscopy with placement of a single fiducial marker. He received 58 Gy in 10 fractions, with good partial response on follow-up, and was able to carry out light work (ECOG 1) at 11 months.

Discussion: The presence of a suspicious lung nodule in a single lung patient is a diagnostic and therapeutic challenge. Bronchoscopy in this population has historically been considered dangerous due to the risk of respiratory failure and pneumothorax. Similarly, transthoracic needle biopsy has an associated risk of pneumothorax that varies on different studies from 5% to 40%. We describe two cases of malignant lung nodules that were successfully diagnosed and treated uneventfully. This preliminary data suggests that EMN-guided navigation bronchoscopy is useful in the diagnosis and placement of fiducial markers for stereotactic radiosurgery in post-pneumonectomy patients.

33312

Role of Bronchoscopy in the Management of Pulmonary Nodule

ENDOBONCHIAL ULTRASONOGRAPHY FOR PERIPHERAL PULMPNARY LESIONS

Noriaki Kurimoto¹, Teruomi Miyazawa¹

¹*St. Marianna University , Kawasaki, Japan*

EBUS uses high-frequency ultrasound (20 MHz) to create detailed images of the internal structure of peripheral pulmonary lesions. We reported the internal structure of peripheral pulmonary lesions by EBUS, correlate these findings with the histopathologic findings of the surgical specimen, and classified peripheral pulmonary lesions into three classes and six subclasses by EBUS images. We diagnose Type I as a benign lesion (23/25, 92%), and Type II

or III as a malignant lesion (98/99, 99%). Of the total of 24 Type II cases, 21 (88%) had well-differentiated adenocarcinoma. All the 22 Type III b cases had malignant tumor, including 18 cases (82%) of poorly differentiated adenocarcinoma. EBUS permits visualization of the internal structure of peripheral pulmonary lesions and this information suggests the histology of the lesion. EBUS clearly identifies which bronchus is most closely related to the lesion and which bronchus should be subjected to biopsy. We devised three times a technique of EBUS for the diagnosis of peripheral pulmonary lesions. In the procedure of EBUS using a Guide Sheath (EBUS-GS), the probe covered by a guide sheath is introduced into the lesion via the working channel of a bronchoscope. The probe is withdrawn, while the guide sheath is left in situ. A brush or biopsy forceps is introduced through the guide sheath into the lesion. 1st method: {EBUS using a thick guide sheath (2.5 mm in diameter)} One hundred sixteen (77%) of 150 EBUS-GS procedures were diagnostic. 2nd method: {EBUS using a thin guide sheath (2.0 mm in diameter)} Diagnostic rate was 88% with the thinner guide sheath. 3rd method: (EBUS-thin GS using navigation) Diagnostic rate was 89% I will show some techniques of EBUS-GS. I will show some tips for reaching to the peripheral lesions. The first technique for inserting the probe within the lesion is to select the bronchial branch by bronchoscopic findings. The second technique for inserting the probe within the lesion is to select the bronchial branch under fluoroscopy. The third technique is to select the bronchial branch using curettage. One advantage of EBUS-GS lies in the repeatability of access to the bronchial lesion for sampling. Another advantage of EBUS-GS lies in its ability to protect against bleeding into proximal bronchus from the biopsy site. The final advantage of EBUS-GS is the ability to obtain short-axis bronchial views of peripheral pulmonary lesions.

.

33512

Role of Bronchoscopy in the Management of Pulmonary Nodule

WHAT IS LATEST ON VIRTUAL BRONCHOSCOPIC NAVIGATION?

Fumihiro Asano

Gifu Prefectural General Medical Center , Gifu, Japan

Transbronchial biopsy for pulmonary peripheral lesions is associated with fewer complications than percutaneous biopsy. However, the diagnostic yield using transbronchial biopsy is inadequate, and depends on operator's skill. A particularly important problem with transbronchial biopsy is the difficulty in guiding the bronchoscope and biopsy instruments toward the lesion. To reach peripheral lesions, correct guidance of the bronchoscope and biopsy instruments to the bronchus is needed, and the instrument must pass many bronchial branching sites.

Virtual Bronchoscopic Navigation (VBN) is a method in which a bronchoscope is guided using VB images on the bronchial route to a peripheral lesion. VBN using conventional VB software involves the following problems. 1) Production of VB images on the route while a virtual bronchoscope is advanced to the target using flight-through display is time-consuming, and requires skill to select the threshold. 2) Rotation cannot be accommodated. VBN systems allowing automatic search for the route to the target, production of VB images, and display of them matched with real images have been developed. Manual navigation systems display VB images at each branching site, and show the bronchus for bronchoscope advancement on the route to the lesion as reference images. Automatic navigation systems automatically acquire

information on the position of the bronchoscope tip by a image registration method, and display the real-time position of the bronchoscope on CT images. Information on VB images such as the route and distance to the target lesion, bronchial names, and major blood vessels outside the bronchi can be superimposed on the live bronchoscopic view captured. The clinical applications of VBN include diagnosis of peripheral lesions, marker placement for surgery and radiotherapy, and educational training. VBN is used in combination with CT-guided ultrathin bronchoscopy, EBUS-GS, and bronchoscopy with or without X-ray fluoroscopy. Based on previous prospective studies, the diagnostic yield was 74% for all pulmonary peripheral lesions and 67.5% for lesions < 2 cm. A randomized study showed that use of VBN in EBUS-GS increased the diagnostic yield for small lesions < 3 cm from 67% to 80.4%, and shortened the total examination time. Meta-analysis also revealed the usefulness of VBN. There are no special complications due to the VBN itself. As advantages of VBN, even beginners can readily guide the bronchoscope to the target in a short time, and the diagnostic yield improves. To increase the diagnostic yield using VBN, it is important to clarify the relationship between the lesion and extracted bronchi as a basis for VB images on CT images, and select appropriate bronchoscopic techniques, and combine them with VBN. CT should be performed under appropriate conditions. VBN is a useful method to support bronchoscopy, and its wider spread and further development of its systems are expected.

33541

Role of Bronchoscopy in the Management of Pulmonary Nodule

IMPORTANCE OF BRONCHEAL ENDOSCOPE FOR LUNG CANCER TREATMENT

Tatsuo Ohira¹, Hidetoshi Honda¹, Jitsuo Usuda², Kentaro Iwasaki¹, Koichi Yoshida¹, Masaharu Nomura¹, Masatoshi Kakihana¹, Naohiro Kajiwara³, Norihiko Ikeda¹, Taichiro Ishizumi¹, Yasufumi Kato¹

¹Tokyo Medical University, Tokyo, Japan; ²Tokyo Medical University, Shinjuku-ku, Japan;

³Tokyo Medical University, Tokyo, Japan

Lung cancer is one of the most malignant solid tumors, and its incidence and mortality rates are still increasing in Japan. Recently, molecular target therapy is one of most important therapy for lung cancer. Gefitinib (IRESSA), an epidermal growth factor receptor (EGFR) tyrosine kinase inhibitor, was approved in Japan in 2002 for the treatment of inoperable or recurrent non-small-cell lung cancer (NSCLC) patients. Increased sensitivity to gefitinib has been associated with EGFR mutations. In order to decide anticancer drug, not only histologic type of lung cancer and also mutation status of EGFR was important. We check mutation status of lung cancer after operation in case of operative patients. It is possible to get enough size of specimen. Previously we check EGFR mutation status by direct sequence method. To check EGFR mutation status by direct sequence, we need bigger specimen than recent method. Recently, we check EGFR mutation by PCR base method. So, we can check EGFR mutation status even small specimen compared to before. In case of inoperative patients, we check mutation status using small specimen getting by bronchial endoscope. Technology of bronchial endoscope was well developed. We diagnose and get specimen by not only conventional bronchoscopy. We use EBUS, navigation system and guide sheath and so on. This year ALK (anaplastic lymphoma kinase) inhibitor Crizotinib was approved in Japan. Before treatment using Crizotinib, we have to check ALK status. This targeting therapy will be developed in future. It should be important to

get specimen to choose appropriate anticancer drugs. Result and schema of diagnosis by bronchial endoscope will be shown.

33543

Role of Bronchoscopy in the Management of Pulmonary Nodule

MUCOSA-ASSOCIATED LYMPHOID TISSUE LYMPHOMA OF THE TRACHEA - CASE REPORT AND REVIEW OF LITERATURE

Nikolaos Koufos¹, Carla Lamb¹, Sara Shadchehr¹

¹*Lahey Clinic , Burlington, United States*

A 74-year old female patient presented for evaluation after noticing a painful pea-sized nodule at the left angle of her jaw. No fever, weight loss, cough, shortness of breath, chest pain, sore throat or rhinitis were present. Her past medical history was significant for hypertension, nephrolithiasis, basal cell carcinoma of the skin and depression. She had a 20 pack year tobacco history but had achieved complete abstinence over the past 2 decades. Her health maintenance including breast screening and gynecologic screening was unremarkable. Her family history was noncontributory. She demonstrated normal vital signs. Her physical examination revealed a rather firm lymph node about 1.5cm in size at the left angle of the jaw. No other adenopathy was noted. There were no oropharyngeal lesions. The lungs were normal as was the remainder of her physical exam. The laboratory investigation demonstrated a normal white blood cell count of 7,460/ μ L, as were the electrolytes, renal and liver function. A PA and lateral chest radiograph was normal. A CT scan of the neck was performed confirming a 7.4mm hypervascular, rounded, rim enhancing nodule in the superficial aspect of the left parotid gland and a smaller one of 4mm also rounded, superficially in the right parotid gland. The submandibular glands appeared normal. Limited views of the trachea identified a focal nodular 9 mm projection along the posterior wall of the proximal trachea. A CT of the chest further identified two tracheal lesions with a poorly defined posterior margin. There was no significant mediastinal adenopathy. Under general anesthesia, a combined procedure performed by interventional pulmonology and otolaryngology included a rigid bronchoscopy with endotracheal biopsies and NdYap laser ablation followed by parotid biopsy. Approximately 1.5cm below the true vocal cords along the posterior wall, the broad based polypoid tracheal lesions were detected. These were very smooth in contour with superficial vascularity obstructing approximately 50% of the proximal the trachea. Endotracheal biopsies and transtracheal needle aspirations of the lesions with a 19 Gauge needle were performed. Then Nd:YAP (neodymium-yttrium-aluminium-garnet) laser was used to provide hemostasis while debulking the lesions. Following this the surgical biopsy of the nodularity along the parotid gland was removed. The final pathologic diagnosis revealed an extranodal marginal zone B-cell lymphoma defined as mucosa-associated lymphoid tissue (MALT Lymphoma), with predominance of CD20 positive B cells, identified from both the tracheal tumors and the left parotid gland nodule. A multi-disciplinary approach with oncology, otolaryngology and interventional pulmonology has been utilized in her continued care plan. A followup CT scan of the chest and abdomen was normal. She remained asymptomatic until six months later she noticed a new small palpable lesion on her inner cheek which was biopsied and was consistent with recurrent MALT-lymphoma. Bronchoscopic inspection of the airways a focal area of mild raised mucosal change which was removed with NdYap laser. Given short term evidence of new lesions treatment with immunotherapy alone versus combination

chemoimmunotherapy was considered.

33552

Role of Bronchoscopy in the Management of Pulmonary Nodule

DIAGNOSTIC OUTCOMES OF PERIPHERAL LUNG LESIONS USING LUNGPOINT, A NEW VIRTUAL BRONCHOSCOPIC NAVIGATION SYSTEM

Hidetoshi Honda¹, Hisashi Saji¹, Jitsuo Usuda², Kentaro Iwasaki³, Koichi Yoshida¹, Naohiro Kajiwar¹, Norihiko Ikeda¹, Tatsuo Ohira¹, Tomokazu Omori¹, Wakako Hamanaka¹

¹Tokyo Medical University, Tokyo, Japan; ²Tokyo Medical University, Shinjuku-ku, Japan;

³Tokyo Medical University Hospital, Tokyo, Japan

Background: According to ACCP Guidelines, the accuracy of bronchoscopic diagnosis of peripheral lung lesions is 34% for lesions under 2 cm and 63% for larger lesions. These rates can not be considered sufficient, and may be attributed to the difficulty of guiding the bronchoscope and forceps to the lesion. Virtual bronchoscopic navigation (VBN) systems were developed to resolve this problem and aid bronchoscopy. The usefulness of VBN systems has been reported by many leading institutions in recent years. LungPoint, a new VBN system, was developed in 2010.

Objective: The diagnostic rate of peripheral lung lesions was investigated with and without the use of LungPoint. **Subjects:** Subjects were 195 patients (VBN use group, n=52; non-use group, n=143) given a definitive diagnosis from among the 236 patients (VBN use group, n=55; non-use group, n=181) who presented with lesions peripheral to the segmental bronchus during the 1-year period from June 2010 to May 2011.

Methods: Patients in the LungPoint use group underwent bronchoscopy after VBN creation. In all patients, the P260F bronchoscope with an external diameter of 4 mm was used with a guide sheath. In the non-use group, testing involved only CT imaging.

Results: The correct diagnosis was made for 18 of 24 patients in the VBN use group (75.0%) and 11 of 24 patients (45.8%) in the non-use group for lesions 2 cm, and 13 of 16 patients (81.3%) and 25 of 34 patients (73.5%), respectively, for lesions 3 cm.

Discussion: The use of LungPoint enabled the selection of the bronchus closest to the lesion in a short period of time. The new VBN system LungPoint was considered useful for diagnosing small peripheral lung lesions.

25829

Safety and Quality during Bronchoscopy

SAFETY OF ELECTROMAGNETIC NAVIGATION BRONCHOSCOPY IN PATIENTS WITH PACEMAKERS

Ahmed Yousuf Khan¹, David Berkowitz¹, Rabih Bechara¹

¹Emory University, Atlanta, United States

Introduction: Electromagnetic Navigation Bronchoscopy (Inreach System, SuperDimension, Minneapolis, MN) is a relatively new discipline with promising diagnostic and therapeutic applications in patients with lung lesions. Navigation is performed in a magnetic field, and

therefore has been considered relatively contra-indicated in patients with pacemakers. Potential risks include the projectile effect of a ferrous material in a static magnetic field, altering the function and shutting off the device, and potential overheating. Over the past decade, there has been extensive literature about the safety of Pacemakers in either the 1.5 or 3 tesla magnetic fields used in current MRI scanners. Though the magnetic field used in electromagnetic Navigation Endoscopy is significantly weaker, 0.001 tesla or approximately 1/3000 times the Earth's gravity, its safety in patients with pacemakers is yet to be elucidated. **Aim:** We present our initial experience with Electromagnetic Navigation Bronchoscopy in patients with pacemakers.

Methods: 26 procedures in twenty six patients with lung lesions and permanent pacemakers were performed. A Cardiac Electro-physiologist and Programmer were present during the procedure. At baseline, the pacers were interrogated, and EKG was recorded. Continuous cardiac monitoring was performed during the procedure, and at the end, the pacer settings and function was re-interrogated to check for any changes.

Results: The procedures were all successfully concluded. None of the patients suffered any arrhythmias or disruption to their pacemakers' function.

Conclusion: Electromagnetic Navigation Endoscopy appears to be safe when performed in patients with pacemakers. Larger multi-center studies are needed to prove the final safety in this patient population.

26258

Safety and Quality during Bronchoscopy

APPLICATION OF THE RECOMMENDATIONS AND PARAMETERS OF MECHANIC VENTILATOR USED DURING THE FIBEROPTIC BRONCHOSCOPY

Alex Gustavo Tamayo

Hospital Italiano , Argentina, Argentina

Introduction: The Fiberoptic Bronchoscopy (FOB) is a safe procedure in the majority of critical patients including in Mechanical Ventilation (MV), with value therapeutic and diagnosis in diverse conditions in this type of sick with high risk to develop major complications during the study (refractory or severe Hypoxaemia, malignant arrhythmias or presence of coagulation disturbance) and contributes to the decision making in the treatment. with its minimum morbidity and mortality. These ill patients are prone to complications especially if they are ventilated with Positive end-expiratory pressure (PEEP) and if they have other medical conditions. The understanding of the physiopathological consequences associated with the Fiberoptic Bronchoscopy (FOB) in a patient ventilated mechanically on the respiratory mechanics, gaseous interchange and hemodinamia, would have to alert to the endoscopista to take the precautions necessary and to solve these problems. We must know the recommendations and programming of the mechanical ventilator, during and after the endoscopic procedure especially in our type of patients. **Objective:** Evaluation of prevention of the complications endoscopic throughout procedure of the collected data following the recommendations and parameters of the mechanical ventilator during the endoscopic procedure of the American Thoracic Society (ATS), European Respiratory Society (ERS), British Thoracic Society (BTS) and Sociedad Argentina de Broncoesofagología (SABE) on the patients with suspicious cases of influenza A in our Intensive Care Unit (ICU).

Methods: Prospective study of a period of 19/06/09 to the 25/08/09) in the service of ICU of patients with Mechanical Ventilator(MV) requirement. We use a bronchoscope STORZ, of 5,8 of external diameter. Technique of the Bronchoalveolar Lavage (BAL) by Flexible Fiberoptic Bronchoscopy (FFB) (Ver Anexo) according the guides of the ATS, ERS and BTS.

Results: We register 19 patients. 10 (53%) men and 9 (47%) women, 89% (17) were smaller of 65 years. To the entrance the patients presented APACHE II: 20, LILY (Lung Injury Score) (MURRAY) > 2.5 and CURB.65 of 2, with refractory hypoxaemia in all the cases, Pa O₂ < 60 o SpO₂ < 80%. The FFB was realised in 12 patient (64%), 10 in ARM, with a protective strategy in low modalities Volume Control Ventilation (VCV) or Pressure Control ventilation (PCV) with Tidal Volumen (Vt) -6ml/Kg.-) and high PEEP > 10 cm H₂O- fit according to protocol Net Work trying to maintain a plateau pressure < to 30 cm H₂O, and with maneuvers of recruitment according to handling of Acute Respiratory Distress Syndrome (ARDS), the VCV with constant flow was the usual ventilatory way. Existed one complication (10%), a Pneumothorax solved with drainage, attributed to prick the pleura accidentally after position of Central Venous Catheterization (CVC).

Conclusions: Complications related to the study did not appear observing the recommendations and used parameters of the mechanical ventilator in general form by the ATS, ERS, BTS and SABA and specific of the National Heart Lung Blood Institute (NHLBI) Network in patients with ARDS.

32898

Safety and Quality during Bronchoscopy

THE FEASIBILITY OF USING A PROSPECTIVE MULTI-INSTITUTIONAL DATABASE TO MEASURE OUTCOMES FROM ADVANCED BRONCHOSCOPY.

Julien Legodec¹, Bruno Escarguel², Charles-Hugo Marquette³, Jean Michel Vergnon⁴, Philippe Astoul⁵

¹HIA Sainte Anne , Toulon, France, Metropolitan; ²Saint Joseph Hospital , Marseille, France, Metropolitan; ³Pasteur Hospital , Nice, France, Metropolitan; ⁴North Hospital , Saint Etienne, France, Metropolitan; ⁵North Hospital , Marseille, France

Background: Over the last decade, multiple new diagnostic and therapeutic bronchoscopy technologies have become available. These have had a major impact in diagnosis and staging of thoracic malignancies with minimal invasiveness. Currently, in France, there are no specific guidelines for these technologies and there is no prospective study in progress. Further more, there is no prospective registry to document national activity and outcomes of advanced bronchoscopy procedures.

Objective: In this paper we assessed the feasibility of a prospective multi-institutional outcomes database of advanced bronchoscopy.

Methods: The procedure reports from 5 French institutions over a 2-month period were interrogated. These documents reported the results of advanced diagnostic (EBUS, EBUS-Mini-Probe, Autofluorence/Chromoscopy) and therapeutic bronchoscopy procedures. Information on procedure type and lesion characteristics as well as complications were documented. Descriptive statistical analyses were performed.

Results:

Results: The data was extracted from five interventional pulmonology units (University Hospital of Marseille, University Hospital of Nice, General Hospital of Toulon, Military Hospital of Toulon and St Joseph's Hospital of Marseille). A total of 943 procedures were performed over the 2 month period, of which advanced diagnostic and therapeutic bronchoscopy represented close to 25% of all procedures, (23% of the University Hospitals activity, 23% of the General Hospital activity and 20% of the St Joseph's Hospital activity). The overall complication rate was 5.5%, with haemorrhage accounting for the vast majority of documented complications. The most related complication remains haemorrhage after biopsies, and completed technologies Autofluorescence/Chromoscopy followed by therapeutic bronchoscopy procedures. The EBUS specific complication was 3.2% in the University Hospitals, compared with a complication rate at 1.85% in the literature. The EBUS-Mini-Probe and Autofluorescence/Chromoscopy global complication rate was 6.66% and 11.3% respectively. The therapeutic bronchoscopy complication rate was 7.5% in the University Hospitals and 5.5% in St Joseph's Hospital, which compared favourably with the reported global complication rate of 7%.

Conclusions: Our reported complication rates are lower than in other similar studies. We believe that a registry can potentially be utilised for database collection, bench marking and quality improvement initiatives and for training purposes in the French fellowship programs. In summary, this paper-based prospective data analysis of bronchoscopy procedures is feasible and valuable, with the support of GELF, we plan to extend this database to other French centres and in time to develop a web based system which will minimise the percentage of missing data fields.

33214

Safety and Quality during Bronchoscopy

TRANSBRONCHIAL BIOPSIES IN RESPIRATORY FAILURE

Ricardo H Bammann¹, Ana Cristina P. Castro¹, Angelo Fernandez¹, Augusto Ishy¹, Ricardo M Terra¹

¹Hospital 9 de Julho, Sao Paulo, Brazil

Background: Patients with severe respiratory failure often require bronchoscopy and transbronchial biopsy (TBB) for etiologic diagnosis. Nevertheless, many of them are under invasive mechanical ventilation and performing TBB in such conditions is controversial due to safety concerns.

Objectives: To evaluate whether invasive mechanical ventilation increases complications related to TBB in patients with lung infiltrates and severe respiratory failure.

Methods: Retrospective review including all patients with severe respiratory failure that underwent TBB performed by our team from 1991 to 2011. Severe respiratory failure was defined as dyspnea and hypoxia typically caused by a ventilation/perfusion mismatch, with or without associated hypercapnia. We divided the patients in two groups: Group 1, those who were intubated under mechanical ventilation at the procedure; and Group 2, those who were not. Normal coagulation (including platelets count higher than 80.000) and oxygen saturation above 90% (with FiO₂ no higher than 80%) were the only demanded safety criteria. O₂ input in Group 1 was raised to 100% during the procedure and 30 minutes thereafter, as well as PEEP levels were lowered to 3 mmHg.

Results: 151 procedures were performed during the study period, 58 were included in Group 1 and 93 in Group 2. Mean age was 52, ranging from 18 to 86. 68 patients hadn't any known underlying disease at the moment of the procedure, whereas 58 were HIV-positive, 14 had malignancies and 11 other immunodeficiencies. PEEP levels in Group 1 varied from 3 to 18 mmHg and the lowest baseline FiO₂ was 30%. 53 patients from Group 2 have received intermittent non-invasive ventilation during at least 24 hours before the procedure. Main diagnosis obtained through TBB were pneumocystosis in 35 patients (23,2% of all 151), bronchopneumonia in 19 (12,6%), cryptogenic organizing pneumonia in 14 (9,3%), cytomegalovirus in 10 (6,6%), tuberculosis in 8 (5,3%), hypersensitivity pneumonitis (drug-induced) in 7 (4,6%). Diffuse alveolar damage was the final result in 14 patients (9,3%). Eleven cases of carcinomatous lymphangitis and three Kaposi sarcomas were the malignant results at both Groups (9,3%). TBB was inconclusive nine times (6,0%) due to no alveolar parenchyma represented on samples - three times in Group 1 (5,2%), six times (6,4%) in Group 2. There were six (11,3%) complications related to TBB in Group 1: pneumothorax in three patients (two of them required a chest tube), serious but self limited bleeding in other two, and one patient had bradycardia followed by cardiac arrest that was promptly reversed. In Group 2, nine (9,7%) complications occurred: bleeding in five patients and pneumothorax in four (all of them required a chest tube). Other four exams in Group 2 were interrupted due to desaturation and clinical instability; in addition, six patients coursed with respiratory deterioration culminating with orotracheal intubation and invasive mechanical ventilation less than 12 hours after the procedure.

Conclusion: Mechanical ventilation added no further risk of complications in patients with severe respiratory failure undergoing TBB. On the contrary, those who were not under mechanical ventilation at the procedure more frequently experienced a harmful worsening of clinical conditions.

33278

Safety and Quality during Bronchoscopy

FIDUCIAL MARKER PLACEMENT AND TISSUE SAMPLING IN ADVANCED LUNG DISEASE UNDER ELECTROMAGNETIC NAVIGATION GUIDANCE AND MODERATE SEDATION

Rana Hejal¹, Benjamin Young², Carsten Schroeder³, Philip Linden⁴

¹UH Case Medical Center , Cleveland, United States; ²University Hospitals Case Medical Center , Cleveland, United States; ³University Hospitals Case Medical Center , Cleveland, United States; ⁴University Hospitals Case Medical Center , Cleveland, United States

Background: Lung cancer is the leading cause of cancer-deaths in the United States. Surgical resection offers the best survival benefit for Stage I disease. For medically inoperable patients with Stage I lung cancer, stereotactic body radiotherapy offers an alternative curative option. Electromagnetic navigational bronchoscopy (ENB) is often used to guide placement of fiducial markers (FM) in, or in the vicinity of, the tumor. Several studies have shown this technique to be safe and effective. However, few combine diagnostic maneuvers with FM placement in one setting in patients with severe chronic obstructive lung disease (COPD). **Purpose:** The purpose of this study is to look at safety and efficacy of ENB guided tissue sampling, followed by FM placement in severe COPD. **Patients and**

Methods: Our lung cancer multidisciplinary tumor board refers medically inoperable patients to bronchoscopy for placement of FM. Patients without tissue diagnosis get additional diagnostic interventions to the FM placement. On average 4 FM are placed per lesion. All procedures are conducted in an out-patient setting. Local anesthesia is achieved with 2% lidocaine. Moderate sedation is reached using combination of 2 mg of midazolam and 50 mcg of fentanyl as an initial bolus, followed by smaller boluses every 5 to 10 minutes as needed. Retrospective review of our bronchoscopy database revealed a total of 165 patients referred for placement of fiducial markers. Severe COPD is defined by $FEV1 \leq 50\%$, $DLCO \leq 50\%$ or were on supplemental O2. We describe our experience with this population.

Results: A total of 126 patients with COPD were identified, 75 of whom met inclusion for severe disease. The average age was $73 \sim 9$. Women made up 56% of this cohort. Thirty eight patients (50%) required tissue sampling in addition to FM placement. Complications included one small pneumothorax and 2 self-limiting, short lived oxygen desaturations to 85%; thus, a complication rate of 4%. This population utilized $304 \sim 50$ mg of lidocaine, $3.7 \sim 1.8$ mg of midazolam as well as $79 \sim 39$ mcg of fentanyl. The duration of each procedure was $35 \sim 13$ minutes. When compared to patients with less severe COPD there was no difference in the amount of lidocaine, midazolam, or fentanyl used; nor any difference in the procedure duration. As expected, procedures with diagnostics were longer by 11 minutes, 30 seconds additional fluoroscopy time and almost 20 mcg of extra fentanyl were needed (table)

Conclusions: In conclusion, one single setting ENB for diagnosis and placement of FM is safe. Its longer duration and higher sedative use are clinically insignificant. One speculates that for this compromised population, this approach offers less risk than a two setting approach, for the same benefit at a lower cost.

33370

Safety and Quality during Bronchoscopy

SAFETY AND TOLERABILITY OF ADVANCED BRONCHOSCOPIC PROCEDURES UNDER MODERATE CONSCIOUS SEDATION.

Geetinder Goyal

Yale University and Yale New Haven Hospital , North Haven, United States

Background: The emergence of new technologies such as peripheral endobronchial ultrasound (pEBUS), convex probe endobronchial ultrasound (EBUS) and electromagnetic navigation (EMN) have added to the diagnostic yield of bronchoscopy in various lung parenchymal, mediastinal and hilar diseases. The use and demand of these advanced bronchoscopic procedures continues to grow among the medical community. The best practice guidelines for performing these procedures in a manner that is most comfortable and safe for patients also continue to evolve. We performed a prospective cohort study of all patients undergoing these procedures at a single institution to determine the patient tolerability of these advanced diagnostic bronchoscopic procedures under moderate conscious sedation.

Objectives: 1. Analysis of patient tolerability of advanced diagnostic bronchoscopic procedures under moderate conscious sedation. 2. Safety of advanced diagnostic bronchoscopic procedures under moderate conscious sedation.

Methods: This IRB-approved prospective study evaluated patients undergoing bronchoscopic procedures between December 2010 and December 2011 at Yale-New Haven Hospital. Self-

reported tolerability of the procedures was assessed by interviews conducted at one-day post-procedure. For subjective responses we combined the responses "very well" and "well" and "not well" and "poorly" for purposes of analysis. Total cumulative dose of sedating medications and topical anesthetic were calculated for the entire length of the procedure for each patient. Safety was determined by assessing complications of the procedure up to 72 hours post-procedure.

Results: A total of 206 diagnostic bronchoscopic procedures were performed over a one year period by a single interventional pulmonologist. Forty-three patients underwent flexible bronchoscopy with transbronchial biopsies for diagnosis of parenchymal lung disease. In 30 patients, peripheral EBUS or EMN was used in addition to the traditional bronchoscopy for obtaining transbronchial biopsies. Seventy-six patients underwent EBUS alone for mediastinal and hilar lymph node sampling and in 57 patients EBUS was used in combination with pEBUS and/or EMN for assessment of parenchyma and lymph nodes. The mean procedure time was 35 minutes with traditional bronchoscopy alone and 63 minutes with the use of advanced bronchoscopic techniques. The post procedure interview was completed in 97% of the patients. Most patients (89%) tolerated topical lidocaine application well or very well. Despite longer mean procedure time in the advanced bronchoscopic procedure groups, most patients tolerated scope insertion (96%) and the procedure itself (90%) very well or well. Rate of complications was low. Five patients developed pneumothoraces (3.8%), three of which were in the patients undergoing transbronchial biopsies with use of pEBUS or EMN (5.1%) and 2 were in the group undergoing transbronchial biopsies with traditional bronchoscopy (2.8%). There were no episodes of significant hemoptysis.

Conclusions: 1. Addition of advanced diagnostic bronchoscopic techniques adds to the total procedure time. 2. Satisfactory levels of conscious sedation for the entire length of procedure can be achieved with safe doses of commonly used agents like fentanyl, versed and lidocaine. 3. There is good subjective tolerance of advanced procedures under conscious sedation. 4. It is safe to use advanced diagnostic bronchoscopic techniques under conscious sedation.

26485

Transbronchial Needle Aspiration

HILAR SOFT TISSUE LESION MASQUERADING AS LYMPHADENOPATHY IN A PATIENT WITH PULMONARY VEIN STENOSIS DUE TO RADIOFREQUENCY ABLATION FOR REFRACTORY ATRIAL FIBRILLATION

Amanda R Hernandez¹, Amanda Hernandez¹, Ravindra Rajmane¹

¹New York Downtown Hospital , New York, United States

Introduction: Complications of radiofrequency ablation (RFA) for atrial fibrillation (AF) include tamponade, atrio-esophageal fistulas, vagal nerve injury, and pulmonary vein stenosis (PVS). PVS may present without symptoms or with dyspnea, cough, chest pain, hemoptysis, or rarely with X-ray infiltrates.⁷ We present a case of man with ground-glass opacities (GGOs) and left hilar soft tissue lesion masquerading as lymphadenopathy in a patient with recurrent PVS.

Case Presentation: The patient is a 44-year old man with AF, refractory to pharmacologic treatment, who required left atrial RFA x 2. Two months later, he developed a cough and dyspnea. Cardiac MRI and VQ scan showed severe narrowing/sub-total occlusion of the left inferior pulmonary vein (LIPV), as well as left lung hypoperfusion but normal ventilation. He

underwent balloon dilatation and stenting of the left superior pulmonary vein (LSPV). The LIPV was not amenable to stenting or dilatation due to near-total occlusion. Venous drainage of the left lower lung field was thought to occur via collateral circulation from the LSPV. Three months later, the patient's symptoms recurred. Cardiopulmonary exercise stress testing demonstrated increased pulmonary vascular resistance. Scattered GGOs and a left infrahilar soft tissue density were seen on Chest CT. PFTs revealed a restrictive defect with decreased DLCO. These findings were suggestive of sarcoidosis, hypersensitivity pneumonitis, and connective tissue-related pneumonitis. EBUS-FNA of the infrahilar lesion failed to show lymphatic tissue. Transbronchial biopsy revealed benign bronchial mucosa and mild chronic inflammation without granuloma or neoplasia. Repeat chest CT showed in-stent severe restenosis of the LSPV and no change in the soft tissue density.

Discussion: Symptoms of PVS include cough, chest pain, hemoptysis, and dyspnea. Patients may develop symptoms immediately, though most develop symptoms 1-3 months after RFA. Single PVS usually causes mild symptoms, which often subside due to collateral vessel formation.¹ Though treatment with pulmonary vein balloon dilatation is associated with immediate symptomatic relief, restenoses recur with a 47% restenosis rate by 11 months after the intervention, likely as a result of neointimal hyperplasia and fibrosis.³ The mediastinal soft tissue densities seen on imaging may reflect extension of mediastinal inflammation and fibrosis caused by thermal injury.

Conclusion: Pulmonary vein stenosis is a complication of RFA for AF. Long-term effects of pulmonary vein occlusion on adjacent structures in the mediastinum and lung are unknown. We recommend serial PFTs and as needed Chest CT imaging to exclude findings that may masquerade as connective tissue or neoplastic disorders.

32600

Transbronchial Needle Aspiration

MICROARRAY ANALYSIS OF MRNA AND MIRNA EXPRESSION IN EBUS-TBNA SAMPLES FROM METASTATIC LYMPH NODES IN PATIENTS WITH LUNG CANCER

Takahiro Nakajima¹, Hideki Kimura², Ichiro Yoshino³, Kazuhiro Yasufuku¹, Ricardo Zamel¹, Takashi Anayama¹

¹Toronto General Hospital, University Health Network, Toronto, Canada; ²Chiba Cancer Center, Chiba, Japan; ³Graduate School of Medicine, Chiba University, Chiba, Japan

Background: Molecular analysis of non-small cell lung cancer (NSCLC) has been mainly been evaluated using RNA extracted from surgical specimens. While biomarkers including gene expression of NSCLC in the surgical specimens can be analyzed in detail, patients often have advanced disease at the time of first presentation and are not eligible for surgery. Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) enables minimally invasive sampling of metastatic tumor cells within lymph nodes for molecular analysis in patients with locally advanced or metastatic NSCLC.

Objectives: The aim of this study was to evaluate the feasibility of using metastatic lymph node samples obtained by EBUS-TBNA for mRNA and miRNA expression microarray analysis. In addition, we wanted to examine the correlation of mRNA and miRNA expression patterns with each histological subtype of NSCLC.

Methods: We isolated total RNA from 24 archived clinical EBUS-TBNA samples of metastatic lymph node in patients with NSCLC. All samples were confirmed for the presence of cancer cells by an independent pathologist. Samples were stored at -80°C in a stabilizing solution (All protect tissue reagent; QIAGEN, Valencia, CA) at time of sample collection. After purification of total RNA using miRNeasy Mini kit (Qiagen), the amount, purity, and RNA integrity number (RIN) were measured using Bioanalyzer (Agilent Technologies, Santa Clara, CA). The purified RNA which met the quality threshold for microarray analysis (OD260 / OD280 > 1.8, RIN > 6.0) were used for two different kinds of microarray analyses: whole transcript-based (WT) array for gene expression (GeneChip® Human Gene 1.0 ST Array; Affymetrix, Santa Clara, CA) and miRNA expression array (GeneChip® miRNA Array; Affymetrix). The microarray data was analyzed using Partek Genomics Suite v6.5 (St. Louis, MO).

Results:

Results: RNA from 17 out of 24 samples (70.8%) met the quality threshold for microarray analysis (mean total RNA amount was 8.25 µg, OD260 / OD280 was 1.88, RIN was 6.4). These 17 samples were successfully analyzed on both WT and miRNA expression arrays. There were 12 adenocarcinoma, 3 squamous cell carcinoma and 2 poorly differentiated NSCLC. After performing a 1-way ANOVA on each of the WT and miRNA expression data sets, we found significant expression differences (using a cutoff of $p < 0.01$) between histological subtypes for both WT and miRNA arrays. After adjusting for multiple testing using the Benjamini-Hochberg False Discovery Rate (FDR) correction, there remained 16 WT genes and 4 miRNAs with a FDR < 5%. We also performed hierarchical clustering on those genes which had an unadjusted $p < 0.01$ in the ANOVA analyses. For both the WT and miRNA arrays, the samples clustered discretely according to their histological subtypes.

Conclusion: Samples obtained by EBUS-TBNA are applicable for comprehensive gene and miRNA expression analysis using microarray technology. Different histological subtypes exhibited differential mRNA and miRNA expression patterns as determined by microarray analysis. Analyzing genes expressed by metastatic cancer cells in advanced NSCLC may allow for a better understanding of patient's specific disease and, in turn, a more personalized approach to treatment.

32858

Transbronchial Needle Aspiration

BLIND TBNA: STILL WORTH TAKING A STAB?

Scott Twaddell¹, David Arnold²

¹Calvary Mater Newcastle, Waratah, Australia; ²John Hunter Hospital, New Lambton Heights, Australia

Blind transbronchial needle aspiration (B-TBNA) has waned since the introduction of endobronchial ultrasound guided transbronchial needle aspiration (EBUS-TBNA). Positive biopsy rates in B-TBNA are generally considered to be significantly less than can be achieved using the EBUS approach(1,2). Periods of limited access to EBUS led us to reconsider the use of B-TBNA. Both authors are trained in EBUS-TBNA. We conducted a prospective audit of B-TBNA procedures over twelve months to determine how B-TBNA would compare to previously published literature and that expected with EBUS-TBNA. A consecutive sample of 42 B-TBNAs

was used, performed between 1 January 2011 and 31 December 2011. Pathological diagnoses obtained at TBNA are outlined in Table 1. Six needle passes were made per node. All were sent for cytological analysis in liquid transport medium. Core biopsies were placed in formalin for histopathological examination if obtained. Presence of cancer cells, lymphocytes or a specific other diagnosis indicated a positive sample. There was no on site cytopathology. 36 of the 42 attempted lymph node biopsies contained lymphocytes, representing a lymph node "hit rate" of 85% (CI 71-95%). Six specimens containing no lymphocytes were considered missed biopsies ("miss rate" 15%). Lymph node size and successful B-TBNA were correlated. Mean lymph node size for successful biopsy was 22.9 +/- 6.8mm minimum diameter. Mean lymph node size for unsuccessful biopsy was 14.7 +/- 5.3mm; a difference of 8.3mm (p=0.0072). B-TBNA remains a practical alternative to EBUS-TBNA in centres where access to EBUS is limited or not available. "Hit rate" can compare to that achieved with EBUS. Our data suggest it is reasonable to use the B-TBNA technique to biopsy lymph nodes over approximately 20mm in minimum diameter. We believe the combination of knowledge of lymph node anatomy, access to detailed CT scans and experience with EBUS are likely to have contributed to the B-TBNA "hit rate". 1. Holty J-E C, Kuschner WG, Gould MK. Accuracy of transbronchial needle aspiration for mediastinal staging of non-small cell lung cancer: a meta-analysis. *Thorax* 2005; 60:949-955. 2. Medford ARL, Bennett JA, Free CM, Agrawal S. Mediastinal staging procedures in lung cancer: EBUS, TBNA and mediastinoscopy. *Curr Opin Pulm Med* 2009; 15: 334-342.

32934

Transbronchial Needle Aspiration

EX VIVO ANALYSIS OF MEDIASTINAL NODE METASTASIS PATTERNS - IMPLICATIONS FOR EBUS-TBNA

Joseph Cicensia¹, Carol Farver¹, Gregory Kotnis¹, Jordan Reynolds¹, Joseph Cicensia¹

¹*Cleveland Clinic , Cleveland, United States*

Background: Controversies exist over the ideal technique of needle aspiration during EBUS-TBNA for mediastinal staging in lung cancer. Of these, the ideal location within the lymph node to aspirate in order to afford the best yield is poorly understood and to date has not been studied. Specifically, disagreement exists whether the ideal location for TBNA is the center of the node (medullary region) or from the subcapsular area (cortical region). We attempt in this study to evaluate, ex vivo, patterns of metastasis within mediastinal nodes to best identify which region of the node will provide the highest yield.

Objective: To assess the pattern of metastases within thoracic lymph nodes in lung cancer and apply these findings to techniques of EBUS-TBNA.

Methods: A review was done of all lung cancer resections at the Cleveland Clinic from 2009-2011 for which there were N1 nodal metastases found in pathologic specimens obtained during lung resection and/or lymph node dissection. These nodes were then analyzed for the pattern of distribution of metastatic deposits. The pattern of metastatic distribution within the node was noted to be either complete effacement of the node, subcapsular (cortical) only or medullary only. Only those nodes that had malignant involvement were considered for analysis in the study. A Fisher's exact was used for statistics (JMP Pro, SAS)

Results:

Results: A total of 71 lymph nodes with metastatic involvement were analyzed. 34/71 nodes were effaced with tumor. 33/71 had subcortical nodal involvement only. 4/71 had medullary nodal involvement only. Overall, 67/71 lymph nodes had subcortical metastatic involvement by tumor ($p < 0.0001$).

Conclusion: The pattern of distribution of metastatic deposits within lymph nodes is either subcapsular or complete effacement in the vast majority of metastasis. This suggests the acquisition of tissue during EBUS-TBNA should ensure adequate subcapsular sampling in order to maximize yield.

32935

Transbronchial Needle Aspiration

GRANULOMATOUS INFLAMMATION DETECTED BY ENDOBRONCHIAL ULTRASOUND-GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION IN PATIENTS WITH A CONCURRENT DIAGNOSIS OF CANCER: A CLINICAL CONUNDRUM

Zachary S DePew¹, Aaron O Bungum¹, Anja C Roden¹, Fabien Maldonado¹, John J Mullan¹, Wilson I Gonsalves¹

¹Mayo Clinic , Rochester, United States

Background: Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is a useful staging procedure for evaluating mediastinal and/or hilar lymphadenopathy in patients with malignancy. Granulomatous inflammation is occasionally identified in this setting and has unclear clinical implications. **Objective:** We describe a cohort of patients found to have evidence of granulomatous inflammation during EBUS-TBNA done for staging of concurrent cancer.

Methods: A retrospective analysis of all EBUS-TBNA cases performed over 32 months at our institution was completed. Patients with evidence of granulomatous inflammation during EBUS-TBNA that was not attributable to an infectious etiology or prior sarcoidosis, and a concurrent diagnosis of cancer were included.

Results: Granulomatous inflammation was identified in 154/1275 (12.1%) patients, of which 12/154 (7.8%) had a concurrent diagnosis of cancer.

Primary cancer diagnoses varied but the primary site of malignancy was in or near the thorax in 10/12 (83.3%) cases. When available, 7/8 (87.5%) cases of granulomatous lymphadenopathy were detectable by positron emission tomography (PET). The most common histologic pattern consisted of well formed non-necrotizing granulomas without fibrosis in 6/12 (50%) patients.

Conclusions: Granulomatous inflammation is occasionally identified in mediastinal and/or hilar lymphadenopathy in patients with concurrent malignancy. While the clinical implications of this phenomenon remain to be clarified, these findings emphasize the importance of histologic confirmation of suspected lymph node involvement, and suggest that the presence of granulomatous inflammation on EBUS-TBNA may occasionally be consistent with active malignancy and prompt further investigations.

33099

Transbronchial Needle Aspiration

DETECTION OF PERIPHERAL PULMONARY LESIONS WITH OPTICAL FREQUENCY DOMAIN IMAGING

Alex Chee¹, Brett E Bouma², Khay Ming Tan², Lida Hariri², Matthew Applegate², Melissa J Suter²

¹*University of Calgary , Calgary, Canada;* ²*Massachusetts General Hospital , Boston, United States*

Lung cancer contributes more to cancer-related death than breast, colon and prostate cancer combined. Isolated lesions are more amenable to curable therapy and there has been an increasing trend to identify high-risk individuals with resectable pulmonary nodules. However, not all pulmonary nodules are malignant and without prior histology, patients with benign lesions could be subject to needless surgery. Patients who present with peripheral pulmonary lesions (PPLs) often require tissue confirmation to guide further management. Although recent advances have improved the clinician's capacity to bronchoscopically diagnose peripheral lesions, there remains a gap in the ability to successfully biopsy nodules. Optical Frequency Domain Imaging (OFDI) provides real-time, micrometer-resolution imaging of airway walls and lung parenchyma. We have developed an OFDI probe that will fit within a standard 21 gauge transbronchial needle aspiration (TBNA) needle and can confirm biopsy needle placement within a PPL in real-time. In this report we present the results of preliminary work using an in vivo porcine model with simulated pulmonary lesions using an agar/barium sulphate/microsphere phantom. Swine were intubated and mechanically ventilated for the procedure. Agar phantoms were placed via both transthoracic and transbronchial approaches with gross localization using multidetector computed tomography. The lesions were then identified bronchoscopically with radial-probe endobronchial ultrasound and guide sheath. Using a transbronchial OFDI probe within the TBNA needle lumen, images were obtained to confirm needle placement and characterise the lesion prior to sample aspiration. Images of normal lung parenchyma were also obtained for comparative purposes. We were able to successfully identify and contrast normal lung parenchyma from the agar nodule phantom using OFDI. Using the needle probe, Optical Frequency Domain Imaging can complement other bronchoscopic techniques in the identification and characterisation of peripheral pulmonary lesions.

33146

Transbronchial Needle Aspiration

RETENTION RATES OF PATIENTS WITH NEWLY-DIAGNOSED MALIGNANCY BY ENDOBRONCHIAL ULTRASOUND-TRANSBRONCHIAL NEEDLE ASPIRATION AT THE SAME MEDICAL CENTER.

Saghafi Ramin¹, David Berkowitz², Parks Christopher³, Rabih Bechara², Timothy Udoji²

¹*Internal Medicine , Atlanta, United States;* ²*Emory University , Atlanta, United States;*

³*University , Atlanta, United States*

Background:Patients are often referred to tertiary medical centers for advanced bronchoscopic techniques, including endobronchial ultrasound-transbronchial needle aspiration (EBUS-TBNA), to diagnose potential malignancy, but little is known about whether patients choose to follow at those medical centers after these procedures.

Objectives: To determine whether referral to a tertiary medical center for EBUS-TBNA leads to retention of patients at that medical center.

Methods: A retrospective chart review of consecutive patients that presented to our medical center for their initial EBUS-TBNA procedure.

Results: 23 patients without known malignancy and without ties to our medical center underwent EBUS-TBNA. Referral sources included pulmonologists, internists, and cardiothoracic surgeons. 15 of those patients had a malignancy diagnosed on biopsy. Of those, 13 (87%) established care with medical oncology at our center. Of the two patients who did not establish care, one patient chose to establish care at another facility and one patient was lost to follow-up. Patients with a new diagnosis of malignancy traveled a mean distance of 54.9 (range 6 - 303) miles to our center for their diagnosis. The patient who chose to follow-up at another facility traveled the farthest (303mi) for his procedure.

Conclusion: The majority of patients with a new diagnosis of malignancy diagnosed by EBUS-TBNA at our tertiary medical center continued to obtain their medical care at our center.

33150

Transbronchial Needle Aspiration

CELL-BLOCK PREPARATION OF EBUS-FNA SAMPLES INCREASES DIAGNOSTIC YIELD OF SARCOIDOSIS: RESULTS OF ONE HUNDRED CONSECUTIVE CASES

Tõnu Vanakesa¹, Ingemar Almre¹, Sirje Marran², Tõnu Vanakesa¹

¹North Estonian Medical Center , Tallinn, Estonia; ²North Estonia Regional Hospital , Tallinn, Estonia

Background: The role of endobronchial ultrasound-guided fine-needle aspiration (EBUS-FNA) of intrathoracic lymphnodes has recently acquired substantial importance in the diagnosis of sarcoidosis. EBUS-FNA can provide accurate diagnosis in cases of sarcoidosis, but the diagnostic yield could be limited, as intrathoracic lymph nodes aspirates smears are very often contaminated with blood elements and bronchial secretions, in conventional cytological examination. **Objective:** The objective of this study is to review our experience with EBUS-FNA in diagnosis of sarcoidosis and report the results of tissue sample cell-block preparation technique added to the conventional cytological examination in 100 consecutive patients with sarcoidosis.

Methods: In addition to Leishman-Giemsa staining technique for the cytological examination of EBUS-FNA aspirates, a simple cell block processing of samples was used routinely in patients with suspected sarcoidosis.

Results: From September 2008 to January 2011, 100 consecutive patients with suspected sarcoidosis underwent EBUS-FNA (mean age 38.0 yr, range 20-74 yr). The diameter of targeted lymph nodes varied from 1.0 to 4.0 cm with mean value of 2.2 cm. A total of 129 lymph nodes was sampled. The average number of needle passes was 4.2 per procedure. EBUS-TBNA demonstrated noncaseating granulomas in 86 patients. The specificity and sensitivity was 100% and 86% respectively. Cytological assesment by smears from aspiration samples was performed in all cases. Formalin fixed paraffin-embedded cell block for histopathological examination was available in 94 patients. The diagnosis of sarcoidosis was obtained from cell block analysis in 27

patients with negative cytology resulting in enhanced diagnostic accuracy in 27% of cases. In 12 patients the diagnosis of sarcoidosis was based only on conventional cytology smears. The diagnosis of sarcoidosis was verified both by cytology and histopathology in 52 patients. No EBUS-FNA related complications occurred. In 14 patients with unspecified morphology the sarcoidosis was diagnosed with applying minimally invasive surgical techniques.

Conclusion: EBUS-FNA is effective and safe minimally invasive procedure in the diagnosis of sarcoidosis. Cell block preparation of intrathoracic lymph nodes aspirates significantly increases the diagnostic yield of EBUS-TBNA in sarcoidosis. Formalin fixed paraffin-embedded cell block is highly recommended tissue processing method in addition to cytology in every EBUS-FNA procedure for the diagnosis of suspected sarcoidosis.

33154

Transbronchial Needle Aspiration

A COMBINATION OF EBUS AND EUS WITH TBNA+FNA FOR PRIMARY AND METASTATIC TUMORS OF CHEST ORGANS.

Larisa Valentinovna Telegina

P.A. Herzen Moscow Oncology Research Institute , Moscow, Russia

Background: Last years endobronchial (EBUS) and transesophageal (EUS) ultrasonography find more and more wide application in clinical oncology.

Objectives: Our work was aimed at identifying the indications for performing combined transbronchial and transesophageal ultrasonography and aspiration biopsy of patients with malignant tumors of chest organs. **Methods and materials:** In 2007 - 2011 the workers of "P.A. Herzen Moscow Oncology Research Institute" performed chest endosonography of 99 patients with preliminary diagnoses: peripheral (17) and central (28) lung cancer; tumor of the mediastinum (15); sarcoidosis (6); suspected metastases of cancer of other localizations in the mediastinum lymph nodes (33). The following apparatus were used for EBUS and EUS: 1) bronchovideoscope with 7.5 MHz convex probe; 2) gastrovideoscope with 7.5 MHz convex probe. EBUS+TBNA was performed on 73 patients and EUS+FNA on 17 patients; 9 patients were examined by EBUS+TBNA and EUS+FNA. The following groups of lymph nodes were punctured during transesophageal ultrasonography with transbronchial and transesophageal puncturing: bifurcation lymph nodes /N 7/ - in 36 patients, paratracheal lymph nodes /N 4 R&L/ - in 17 patients, broncho- pulmonary lymph nodes /N 10 R&L and N 11 R&L/ - in 22 patients. Two groups of lymph nodes /N 7 + N 4 R&L/ or /N 7 + N 11 R&L/ were punctured in 16 patients, and three to four groups of lymph nodes /N 7 + N 4 R&L + N 11 R&L/ were punctured in 8 patients. Where the mediastinum lymph nodes transbronchial puncturing was technically impossible, the transesophageal puncturing was performed.

Results: The transbronchial puncturing efficiency was 71%. The following was diagnosed after cytological examination of the material: lymph node metastases of squamous cell (9), small cell (4) and adenogenic (15) lung cancer; metastases of cancer of the kidney (4) and breast cancer (6); lymphosarcoma and fibrosarcoma of the mediastinum (5); sarcoidosis (6); neuroendocrinal tumor (2); malignant histiocytoma (1); post-tuberculosis alterations (4); lymph node hyperplasia (4). After the intrathoracic lymph nodes endosonography and puncturing the lung cancer stage N-index was changed from N1 to N2 - in 9 patients and from N2 to N3 - in 3 patients. There were no complications in the group of patients under study both in the process and after the

puncturing. Thus, EBUS+TBNA is indicated for lung cancer and systemic lymph nodes lesion of occult genesis. EUS+FNA is indicated for esophageal and mediastinal tumors. EBUS+TBNA and EUS+FNA combination is indicated for sarcoidosis, lung cancer with difficult puncturing and for metastases of a tumor of a different localization in the mediastinum lymph nodes.

Conclusion: Endoscopic EUS, as well as TBNA+ transesophageal FNA of the intrathoracic tumors and mediastinum lymph nodes, are highly informative and safe methods of precision diagnosis and stage determination of the tumoral process.

33183

Transbronchial Needle Aspiration

UNUSUAL DIAGNOSIS MADE BY CONVEX PROBE ENDOBRONCHIAL ULTRASOUND TBNA

Sebastian Fernandez-Bussy¹, Adnan Majid², Erik Folch², Ivan Caviedes¹, Yumay Pires³

¹*Clinica Alemana de Santiago/Universidad del Desarrollo , Santiago, Chile;* ²*Beth Israel Deaconess Medical Center/Harvard Medical School , Boston, United States;* ³*Clinica Alemana de Santiago/Universidad del Desarrollo , Santiago de Chile, United States*

Convex probe endobronchial ultrasound transbronchial needle aspiration (CP-EBUS/TBNA) is the procedure of choice in the evaluation of patients with mediastinal and hilar adenopathy. Differential diagnosis include: lung cancer, metastatic disease, lymphoma, sarcoidosis and endemic fungi. Here we report 6 cases where CP EBUS TBNA was used as the only procedure to acquire tissue for diagnosis. **Objective:** To describe patients with unusual diagnosis, where CP EBUS was used as the only procedure to acquire tissue. **Method:** A retrospective review of biopsies from EBUS-TBNA samples from July 2010 through December 2011. Those conditions considered rare for EBUS-TBNA diagnosis were identified and their medical records were retrospectively reviewed.

Results: From a total of 85 patients, 6 were selected for review. During this period of time, the following uncommon diagnoses were obtained: inflammatory pseudotumor (myofibroblastic tumor), amyloidosis, mesothelioma, Ewing sarcoma, pulmonary artery sarcoma and bronchogenic cyst. We describe in detail the imaging, histopathology and we also reviewed the medical literature for prior descriptions of these rare entities. (1) A 57 year old gentleman with a left hilar node aspiration showed fibrous tissue, fusate and ovoid cells, nuclear pleomorphism and lymphomasmocytic infiltrates, positive vimentin and smooth muscle actin confirmed an inflammatory myofibroblastic tumor. (2) A right peribronchial lesion from a 63 year old lady demonstrated amorphous eosinophilic material with positive Red Congo stain. Polarized light showed green-yellow dichroism without potassium permanganate, reflecting localized Amyloidosis type AA. (3) In a 78 year old male with a thickened pleura and enlarged mediastinal nodes, a subcarinal node revealed large epithelioid cells with moderate eosinophilic cytoplasm, central atypical nuclei, positive calretinin, thrombomodulin, and EMA, with negative CEA and TTF1, consistent with Mesothelioma. (4) A right interlobar node in a 25 year old male showed a partially necrotic tumor with medium size cells, round nuclei, high nucleus-cytoplasm ratio, fine chromatin, eosinophilic cytoplasm and PAS positive granules. Positive vimentin and CD99 with negative cytokeratin confirmed metastasis from an Ewing Sarcoma. (5) A 65 y/o male with h/o prostate ca, presented to clinic with chronic cough unresponsive to conventional therapy. He underwent a CT chest which revealed a lobulated low attenuation mass 8 mm distal to the

bifurcation of the left pulmonary artery measuring 45x62x33 mm and was referred for EBUS/TBNA. Cell block was positive for neoplastic cells, consistent with a spindle cell neoplasm with necrosis compatible with pulmonary artery sarcoma. (6) A 80 y/o male with cough and dysphagia. CT chest reveals a 6cm subcarinal mass. He was referred for bronchoscopy and EBUS/TBNA. Using a 21 gauge needle the lesion was punctured and 200 ml of thick mucus was drained. Specimen was sent for microbiology and cytology which revealed normal mesothelial cells and no evidence of infection.

Conclusions: We report 6 cases where convex probe EBUS / TBNA was useful as the only technique in the diagnosis of inflammatory myofibroblastic tumor, amyloidosis, mesothelioma, Ewing Sarcoma, pulmonary artery sarcoma and bronchogenic cyst. To our knowledge this has not been published in the literature.

33184

Transbronchial Needle Aspiration

MEDIASTINAL LYMPHANGIOMA TREATED USING EBUS-TBNA

Hae-Seong Nam¹, Changhwan Kim², Hong Lyeol Lee¹, Jae Hwa Cho¹, Jeong-Seon Ryu¹, Sang-Hoon Jeon¹, Seung Min Kwak¹

¹Inha University Hospital , Incheon, South Korea; ²Hallym University Kangdong Sacred Heart , Seoul, South Korea

Lymphangiomas are localized malformations of the lymphatic system that most commonly occur in the head and neck. Approximately 90% of lymphangiomas are detected before the age of 2 years, while less than 1% of all lymphangiomas are confined to the mediastinum. In general, mediastinal lymphangiomas in adulthood are found incidentally and remain difficult to treatment. This study reports the first case of safe, effective treatment of a very large mediastinal lymphangioma using endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) in a 29-year-old man. The mediastinal mass had a maximum transverse diameter of 13.7 cm and extended from the inferior aspect of the thyroid gland down to the carina. EBUS-TBNA was performed under mild conscious sedation, and approximately 700 mL of straw-colored fluid was aspirated. Follow-up chest computed tomography 3 months after treatment showed a marked decrease in the volume of the mediastinal lymphangioma, with no early or delayed complications.

33215

Transbronchial Needle Aspiration

PREDICTORS FOR EBUS-TBNA INADEQUATE SAMPLES

Viviane Rossi Figueiredo¹, Addy L. Mejia Palomino², Fabio B Jatene², Marcia Jacomelli², Ricardo H Bammann³, Ricardo M Terra⁴

¹University of Sao Paulo School of Medicine, Hospital das Clinicas, Heart Institute (INCOR) and State Cancer Institute (ICESP); Sirio Libanes Hospital , Sao Paulo, Brazil; ²University of Sao Paulo School of Medicine, Hospital das Clinicas, Heart Institute (INCOR) , Sao Paulo, Brazil; ³University of Sao Paulo School of Medicine, Hospital das Clinicas, Heart Institute (INCOR); Sirio Libanes Hospital , Sao Paulo, Brazil; ⁴University of Sao Paulo School of Medicine, Hospital das Clinicas, Heart Institute (INCOR) and State Cancer Institute (ICESP) , Sao Paulo, Brazil

Background: EBUS-TBNA inadequate samples are fairly common. Even high-standard EBUS centers report a considerable number of non-diagnostic samples. Thus, finding predictors for inadequate samples may help bronchoscopists to better perform and to select patients and puncture sites.

Objectives: The purpose of this study was to identify predictors for inadequate samples after EBUS-TBNA.

Methods: Transversal study including all patients who underwent EBUS-TBNA in our institution, a tertiary university-based referral center, between August 2011 and January 2012. We considered as adequate all samples that contained either normal lymphoid or abnormal pathologic tissue. Samples in which none of these figures was identified were considered as inadequate. A logistic regression model was built including gender, age, lymph node station, lymph node size (smaller than 1cm), concomitant lung mass or nodule(s) and ROSE as predictors.

Results: Seventy two procedures were performed during the study period, and the purposes of such exams were: lung cancer staging, mediastinal abnormalities diagnosis or both. Patients were 36 males and 36 females, age ranged from 30 to 84 (median 63 years). One hundred and seventy seven lymph nodes were sampled, 133 (75,14%) were considered adequate and 44 (24,86%) samples were considered inadequate.

Thirty six out of the 44 inadequate samples (81,8%) were obtained from lesions larger than 1cm in diameter, however sampling was surprisingly more adequate from smaller (83,0%) than larger (72,3%) lymph nodes. There was a concomitant lung mass or nodule(s) in 48 of the 72 patients - 105 of the 138 (76,1%) corresponding samples were considered adequate. On-site pathology (ROSE) was used in 111 of the 177 (62,7%) punctured lesions, potentially forcing more attempts to achieve better results. Lymph node station ($p=0,01$) and ROSE ($OR=17,5$ $p=0,001$) were the only individual predictors for adequate samples in this series. As a final outcome of clinical relevance, 11 (15,3%) EBUS-TBNA exams were completely inconclusive because all respective samples were inadequate. In six of those exams (54,5%) a single lesion was sampled.

Conclusions: A considerable number of EBUS-TBNA samples are inadequate, even from "easy" targets such as the subcarinal lymph nodes. The bronchoscopist / pathologist on-site interaction (besides experience) seems to be of paramount importance to avoid this undesirable outcome. Moreover, it's especially necessary to follow the recommendation that, whenever possible, more than one lesion (in lung cancer, more than one lymph node zone) be sampled, not only because of adequate staging but also in order to increase the method's diagnostic yield.

33226

Transbronchial Needle Aspiration

RETROSPECTIVE STUDY TO ASSESS THE YIELD AND SAFETY OF CONVENTIONAL TRANS-BRONCHIAL NEEDLE ASPIRATION (TBNA) IN A TERTIARY CARE HOSPITAL IN INDIA

Devasahayam Jesudason Christopher¹, Balamugesh Thangakunam², Barney Isaac Thomas², Prince James²

¹Christian Medical College, Vellore , Vellore, Tamil Nadu, India; ²Christian Medical College , Vellore, Tamil Nadu, India

Background: Trans-bronchial needle aspiration (TBNA) is the versatile procedure for the evaluation of mediastinal lesions. Endobronchial ultrasound (EBUS) guided TBNA is real time sampling of mediastinal lesions. It increases the yield but is very costly. Conventional or blind TBNA is cost effective in sampling mediastinal lesions. Although onsite cytology will result in increased yield for both techniques, most centres don't have this facility. We report our results of conventional TBNA, without onsite cytopathology.

Objectives: To assess the diagnostic yield and safety of conventional trans-bronchial needle aspiration (TBNA).

Methods: The data from patients who underwent conventional TBNA from 2009 to 2011 was retrospectively reviewed. Demographic data, indication, sites accessed, complications and the yield were extracted and analyzed.

Results: In all, 100 patients (63 males & 37 females) underwent conventional TBNA during the study period. The mean age of the study population was 47. The commonest site sampled was subcarinal (84%). Seventy four percent of the time, the sample was deemed to be adequate by the reporting cyto-pathologist. In those that had adequate sample, the commonest finding was granulomatous inflammation (53%), followed by carcinoma (28%). Overall, a definitive diagnosis was made on the basis of TBNA in 61% of the subjects. Only 3% had significant bleeding, which was controlled by instillation of ice cold saline.

Conclusion: Despite the advent of EBUS guided TBNA, conventional TBNA is an effective, safe and economic tool in the evaluation of mediastinal lesions. The addition of onsite cytopathology is likely to further enhance its yield.

33229

Transbronchial Needle Aspiration

OUTER SHEATH METHOD (OSM) FOR ENDOBRONCHIAL ULTRASONOGRAPHY GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION FOR IMPROVING THE DIAGNOSTIC YIELD IN PATIENTS WITH MEDIASTINAL AND/OR HILAR LYMPHADENOPATHY.

Takeo Inoue¹, Furuya Naoki², Hiroki Nishine², Hiroshi Handa³, Hirotaka Kida⁴, Masamichi Mineshita², Noriaki Kurimoto¹, Seiichi Nobuyama⁴, Teruomi Miyazawa⁴

¹St. Marianna University School of Medicine, Kawasaki, Japan; ²St. Marianna University School of Medicine, Kawasaki, Kanagawa, Japan; ³St. Marianna University School of Medicine, Kawasaki, Japan; ⁴St. Marianna University School of Medicine, Kawasaki, Japan

Introduction: EBUS-TBNA is useful for the pathological diagnosis in patients with mediastinal and/or hilar lymphadenopathy. However, a few cases could not be diagnosed due to the presence of bronchial cartilage. **Objectives and method:** A new technique, Outer Sheath Method (OSM) avoided puncturing the bronchial cartilage, using an outer plastic sheath of the needle pressed against to the bronchial wall. Then, the sheath is moved along the wall to locate the most suitable puncture site between the cartilaginous rings. After the suitable site was decided, adequate puncture was performed. We assessed this OSM contribute to the diagnostic yield of patients with mediastinal and/or hilar lymphadenopathy. Between May 2005 and July 2008, we

performed EBUS-TBNA without OSM in 169 patients; malignant 112 patients, benign 38 patients (group A). On the other hand, between August 2008 and December 2011 EBUS-TBNA was performed under the new technique in 171 different patients; malignant 101 patients, benign 52 patients (group B). Patients with enlarged mediastinal and/or hilar lymph nodes underwent EBUS-TBNA. The bronchoscope was equipped with a 7.5-MHz convex transducer at the tip of a flexible bronchoscope (BF-UC160F-OL8, Olympus, Tokyo, Japan).

Results: For group A, 160 of 169 patients were available for analysis. The sensitivity, specificity, and diagnostic accuracy rate of EBUS-TBNA for diagnosis were 90.2%, 100%, 92.5%, respectively in group A. In group B, 153 of 171 patients were analyzed. The sensitivity, specificity, and diagnostic accuracy rate were 95.0%, 100%, 96.7%, respectively. For group A, 4 cases specimens of bronchial cartilage was obtained. There was only one case in group B. The diagnostic yield of EBUS-TBNA was improved using this OSM.

Conclusion: This new technique of EBUS-TBNA (OSM) was useful for pathological diagnosis in patients with mediastinal and/or hilar lymphadenopathy.

33254

Transbronchial Needle Aspiration

DIAGNOSTIC YIELD OF ENDOBRONCHIAL ULTRASOUND GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION FOR THE EVALUATION OF LYMPHOPROLIFERATIVE DISORDERS

Seher Iqbal¹, Aaron Bungum¹, Anne-Marie Sykes¹, Fabien Maldonado¹, Geoffrey Johnson¹, Kay Ristow¹, Paul Kurtin¹, Thomas Habermann¹

¹Mayo Clinic Rochester, Rochester, United States

Background: Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) has been shown to be equivalent or superior to mediastinoscopy for the mediastinal staging of lung cancer. However, the utility of EBUS-TBNA for the diagnosis of lymphoproliferative disorders is unclear.

Methods: In order to determine the yield of EBUS-TBNA for the diagnosis of lymphoproliferative disorder (LPD), we retrospectively reviewed the medical records of patients diagnosed with a LPD within 3 months of an EBUS-TBNA procedure between June 2006 and August 2011 through the Mayo Clinic Lymphoma Data Base. Only lymph nodes (LN) ultimately considered highly suspicious for LPD were considered. The diagnosis of lymphoma on mediastinal and hilar nodes was established if an EBUS-TBNA sample was diagnostic, mediastinoscopy was diagnostic, or other diagnostic tissue biopsies established the diagnosis of a LPD and mediastinal/hilar LN were highly suspicious by radiologic criteria which included size, morphologic appearance on high-resolution computed tomography (HRCT) of the chest or FDG uptake if PET scan had been performed; An experienced hematopathologist (P.K.) reviewed all EBUS-TBNA samples and determined whether an adequate material was present to establish the diagnosis of LPD and if there if there was an adequate tumor sample for accurate typing of the LPD (and guide management). EBUS was performed using linear array ultrasonic bronchoscope (Olympus BF-UC160F-OL8) with a 22 gauge-needle. Flow cytometry was not used.

Results: Of 2283 patients who underwent EBUS-TBNA during that time period, 129 carried a diagnosis of a LPD within 3 months of EBUS procedure. 65 patients were ultimately diagnosed

with mediastinal/hilar involvement by the LPD. Upon independent pathology review of these 65 patients, 23 had a biopsy specimen interpreted as consistent with a LPD. However, 5 could not be characterized further, precluding a firm diagnosis. Of the other 42 patients who had a non-diagnostic EBUS-TBNA biopsy on review, thirteen underwent mediastinoscopy which established the diagnosis. Of the remaining 29 patients, the diagnosis was determined by a biopsy performed at a site other than the mediastinal lymph nodes and mediastinal/hilar involvement was assumed based on pre-established radiologic criteria. Six of these patients had an initial diagnosis of mediastinal/hilar involvement established on the basis of EBUS-TBNA examination, but expert blinded review could not confirm the diagnosis of a LPD. Overall, the sensitivity of EBUS-TBNA for the accurate diagnosis of lymphoma was established in 18/65 (28%) patients (95% CI 18-40). Considering only the patients for which pathologic confirmation was available on mediastinal and hilar LNs, EBUS-TBNA allowed for an accurate diagnosis of LPD in only 18/36 (50%) patients (95% CI 34-66).

Conclusion: Contrary to previous studies which have suggested that EBUS-TBNA may be an appropriate initial investigation for the diagnosis of lymphoma, our study demonstrates that EBUS-TBNA does not provide adequate pathologic tissue samples for accurate characterization of LPD in a significant number of cases. Furthermore, a blinded review of specimens initially thought to be consistent with LPD were found to be non-diagnostic. In case of mediastinal and/or hilar nodes suspicious for involvement by lymphoma, other tissue diagnostic tissue procedures are preferred.

33442

Transbronchial Needle Aspiration

COCCIDIOIDOMYCOSIS DIAGNOSIS BY EBUS TBNA

Divya C Patel¹, Michael Shawn Machuzak¹

¹*Cleveland Clinic , Cleveland, United States*

Introduction: Coccidioidomycosis is an endemic fungal infection caused by inhalation of *Coccidioides immitis* spores(1). The fungus is highly infectious and found in the southwestern region of the United States with an incidence of 150,000 new cases per year(2).

The lungs are the major focus of infection and approximately five percent of patients infected will have a chronic infection in the form of residual pulmonary nodules(3). **Presentation:** A 51-year-old, never smoker, Caucasian male, presented with intermittent right sided chest pain and shortness of breath of seven months duration. The chest pain lasted for a few hours, had no association with exertion or other triggers, and radiated to the back and neck.

The patient lives in North Dakota and is a neurosurgeon. He travels extensively around the United States and a few months prior to symptom onset, had visited Arizona and California. Electrocardiogram and cardiac biological markers were normal. Spirometry and diffusion capacity of the lungs for carbon monoxide were also normal. Cardiac computed tomography (CT) did not show coronary artery disease or aortic dissection but an incidental noncalcified lung nodule in the right lower lobe measuring 1.7 x 1.2 cm was seen (Figures 1 and 2).

He underwent an endobronchial ultrasound-guided (EBUS) transbronchial needle aspiration (TBNA) of the nodule. Acid fast bacilli stain, fungal culture, and tissue culture were all negative. However, cytologic study of the aspirate showed spherules of fungal element consistent with *Coccidioides* (Figure 3). Serum antibody testing for *Coccidioides* was negative.

Fluconazole was started for therapy and within a month his symptoms resolved.

Discussion: This case demonstrates a patient with chronic coccidioidomycosis of the lung presenting as atypical chest pain and a single pulmonary nodule. Although, the primary methods for diagnosis of coccidioidomycosis are culture and serology, cytology has been used as an alternative method for rapid diagnosis(4). Thus, fiberoptic bronchoscopy to obtain tissue sample and cytologic evaluation of bronchoalveolar lavage fluid have become important tools for diagnosis.

Fine needle aspiration of lung tissue by CT guidance for cytologic analysis is another option shown to have good yield in some retrospective studies(5,6). Our case shows that a bronchoscopic procedure using EBUS TBNA with cytologic evaluation of the fine needle aspirate may be another tool to diagnose coccidioidomycosis infection. To our knowledge this represents the first report of coccidioidomycosis diagnosed via EBUS TBNA.

References:

1. Dicaudo, D. Coccidioidomycosis: A review and update. J Am Acad Dermatol 2006; 55:929-42.
2. Bissell S and Weiss C. Increase in Coccidioidomycosis: California, 2000-2007. Morb Mortal Wkly Rep 2009; 58:105-9.
3. Stevens D. Coccidioidomycosis. NEJM 1995; 332:1077-1082.
4. DiTomasso J, Ampel N, Sobonya R, et al. Bronchoscopic diagnosis of pulmonary coccidioidomycosis: Comparison of cytology, culture, and transbronchial biopsy. Diagn Microbiol Infect Dis 1994; 18:83-87.
5. Raad S, Silverman J, and Zimmerman, K. Am J Clin Pathol 1993; 99:582-7.
6. Freedman S, Ang E, and Haley R. Identification of coccidioidomycosis of the lungs by fine needle aspiration biopsy. Acta Cytol 1986; 30:420-4.

33508

Transbronchial Needle Aspiration

ENDOBONCHIAL ULTRASOUND TBNA IN DIAGNOSING AND MANAGING BRONCHOGENIC CYSTS: A CASE SERIES

Wissam Jaber¹, Ashish Maskey², Francisco Almeida², Joseph Cicien², Michael Shawn Machuzak³, Thomas Gildea⁴, Yvonne Meli⁵

¹CCF , cleveland, United States; ²CCF , Cleveland, United States; ³Cleveland Clinic , Cleveland, United States; ⁴CCF , Cleveland, United States; ⁵CCF , Cleveland, United States

Introduction: The primordial lung bud arises from the ventral surface of the foregut at 3 to 4 weeks of gestation. The division into a ventral trachea and a posterior esophagus happens over the next 2 weeks. Initial foregut septation abnormalities lead to the anomalies of tracheoesophageal fistulas. A variety of anatomic malformations of the bronchopulmonary tree can develop in the event of a ventral foregut budding abnormality. Bronchogenic cysts are among the most common malformations. They are usually unilocular, lined with respiratory epithelium and contain fragments of cartilage and smooth muscle within the wall. Bronchogenic cysts can be intra or extra thoracic and cause symptoms by local compression to adjacent structures. Common intrathoracic locations include paratracheal, subcarinal, hilar and paraesophageal areas. The management of asymptomatic bronchogenic cysts remains controversial. Historically, surgical resection was recommended upon discovery for diagnosis, in

concern of late complications or to relieve symptoms already present. We present our case series of five adult patients with intrathoracic bronchogenic cysts diagnosed and managed with endobronchial ultrasound guided bronchoscopic drainage. **Patients and**

Methods: Bronchoscopic records at CCF for 2011 were reviewed. Five reports had a diagnosis of bronchogenic cyst. Clinical records, histopathology and radiologic images were reviewed.

Discussion: Bronchogenic cysts develop from the ventral foregut and are among the most common tracheobronchial tree malformations. When they form early in life, they are contained in the mediastinum. If they form later during bronchial budding and branching, they tend to be inside the lung parenchyma. The cyst in adults often present as an incidental radiographic finding while investigating another problem. They can increase in size and cause local compression, pain, infection, hemorrhage or rupture. Typically there is a delay between the presentation of symptoms, discovery of the cyst and intervention. It is because of this unpredictable course, the historical recommendation for management of symptomatic, and at times asymptomatic, cysts has been surgical intervention. The diameter of resected cysts in one case series was between 3.5 and 10 cm (mean 5.5 cm). Surgical resection of the bronchogenic cyst carries with it a significant risk especially if respiratory symptoms have already developed. One case series of surgical interventions on bronchopulmonary foregut malformation have reported a spectrum of complications post operatively including death from respiratory failure. In our case series, after discussion with our thoracic surgical colleagues we opted for less invasive management using EBUS- TBNA drainage of the cyst as first line treatment. This is an outpatient procedure that carries with it negligible risk to the patient. There are few complications and no deaths reported from EBUS-TBNA in the medical literature. This has proven successful in relieving symptoms as well as mechanical compression as noted by follow up ultrasound images and CT scans. Long term follow up with clinical visits and imaging is needed to study further the behavior of these cysts and to monitor for recurrence.

33510

Transbronchial Needle Aspiration

MEDIASTINAL LESIONS DIAGNOSED BY EBUS-TBNA

Akira Sakurada¹, Chiaki Endo¹, Takashi Kondo², Yoshinori Okada²

¹Tohoku University Hospital , Sendai, Japan; ²Institute of Development, Aging and Cancer, Tohoku University , Sendai, Japan

Background: EBUS-TBNA is a useful diagnostic tool for lymph node metastasis of lung cancer. Occasionally, mediastinal lesions beside or close to trachea/bronchus can be approached by EBUS-TBNA. **Objective:** To clarify the characteristics of patients who were diagnosed by EBUS-TBNA.

Methods: We retrospectively reviewed medical record of patients who underwent EBUS-TBNA for initial diagnostic method. Since January 2010, among 39 test of EBUS-TBNA, 10 mediastinal lesions have been approached.

Results: 7 patients with mediastinal lesion have been diagnosed by EBUS-TBNA. Diagnosis were, mediastinal carcinoma with unknown origin in one case, mediastinal metastasis from distant organ malignancy in 4 cases (2 renal cell carcinoma, bile duct carcinoma, malignant tumor of Salivary gland), local recurrence of malignant mesothelioma in one case, mediastinal cyst in one case. Three cases with negative results by EBUS-TBNA revealed thymoma in one

case, malignant lymphoma in one case, and local recurrence of esophageal carcinoma. The reason of diagnostic failure is insufficient material acquisition in former two cases and tracheal stenosis in latter case. There was no complication or hemorrhage during or after EBUS-TBNA. **Conclusion:** EBUS-TBNA is safe and powerful tool for diagnosis of mediastinal lesions which are beside or close to trachea/bronchus. In case with highly suspected of malignant lymphoma, surgery is desirable as an initial diagnostic method because enough amount tissue for flowcytometry can be surely obtained.

33528

Transbronchial Needle Aspiration

A CASE OF PULMONARY TUMOR EMBOLISM DIAGNOSED BY ENDOBRONCHIAL ULTRASOUND

Neeraj R Desai¹, Kevin L Kovitz¹, Mary Vance¹, Sara R Greenhill¹

¹*Chicago Chest Center , Elk Grove Village, United States*

Introduction: Pulmonary tumor embolism (PTE) can be microscopic and macroscopic, and is clinically indistinguishable from pulmonary venous thromboembolism and thus can be a diagnostic challenge. We present a case of PTE diagnosed using endobronchial ultrasound guided transbronchial needle aspiration (EBUS-TBNA).

Case report: 66-year-old woman was referred for evaluation of a right hilar soft tissue density. She had mild dyspnea on exertion. She had no associated chest pain, palpitations, cough, hemoptysis, leg swelling, fever, chills or syncope. Her medical history included renal cell carcinoma for which she underwent right nephrectomy in 2004, pulmonary embolism treated with anticoagulation, currently off anticoagulation, and hypertension. She had no history of tobacco use, alcohol abuse or illicit drug use. Her physical examination was unremarkable. CT scan of the chest revealed right hilar soft tissue density within or compressing the right pulmonary artery. She underwent bronchoscopy with EBUS-TBNA. On ultrasound examination the density was found to be located within the vessel (confirmed by Doppler). Multiple EBUS-TBNA samples were collected and were evaluated with rapid onsite evaluation. When performing EBUS-TBNA, with every pass, frank blood was aspirated further confirming the location of the lesion to be in the vessel. The cytologic examination of the aspirate showed renal cell carcinoma with abundant red blood cells. Tumor cells stained for vimentin and EMA, and were negative for TTF-1 and CK20.

Discussion: Pulmonary tumor embolism is often an unrecognized complication of malignancy. There have been few reported cases of tumor emboli associated with renal cell carcinoma. Schmidt first described PTE in 1897 and since then several cases have been reported using various modalities for diagnosis. Ventilation-perfusion scans can show "segmental contour pattern". CT scan may reveal defects or dilated and beaded appearance of arteries. Pulmonary wedge aspiration cytology can be obtained by placing a pulmonary artery catheter in a wedged position and can confirm the diagnosis. To our knowledge this is the first case report of PTE diagnosed by EBUS. EBUS is used to diagnose mediastinal and hilar diseases such as lung cancer, lymphoma and sarcoidosis. Pulmonary artery can be evaluated using EBUS and recently Aumiller and colleagues performed a pilot study and detected 97/101 (96%) pulmonary emboli using EBUS. EBUS can not only help evaluate the pulmonary artery with direct imaging, but

aspiration for cytology can be performed with minimal risk. This may be a useful tool in detecting tumor cells and diagnosing pulmonary tumor embolism.

33530

Transbronchial Needle Aspiration

USEFULNESS OF EBUS-TBNA FOR MEDIASTINAL AND INTRAPULMONARY TUMORS

Kentaro Iwasaki¹, Hidetoshi Honda¹, Hisashi Saji¹, Jitsuo Usuda², Kenatro Iwasaki¹, Norihiko Ikeda³, Tatsuo Ohira³, Tomokazu Omori¹, Wakako Hamanaka¹

¹Tokyo Medical University Hospital , Tokyo, Japan; ²Tokyo Medical University , Shinjuku-ku, Japan; ³Tokyo Medical University , Tokyo, Japan

Introduction: Methods for making a definitive diagnosis of lung tumors include transbronchial lung biopsy (TBLB) and CT guided needle biopsy (CTNB), but approaches to lesions in the area from the trachea to the lobar bronchi are sometimes difficult with these methods. In addition, diagnosis of mediastinal tumors requires tests performed under general anesthesia, such as mediastinoscopy and video-assisted thoracic surgery (VATS). We hypothesized that endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) may be useful for lesions that are difficult to approach with existing methods. Subjects: A total of 22 patients who underwent EBUS-TBNA for mediastinal or intrapulmonary tumors in the area from the trachea to the lobar bronchi between November 2008 and January 2012.

Results: Subjects included 13 men and 9 women, and had a median age of 62 years and a median tumor diameter of 45 mm. Tumors were localized to the mediastinum (n=5), tracheal wall (n=1), right lung (n=15), or left lung (n=1). A definitive diagnosis was made for 16 patients (diagnostic rate, 73%), and the histological types were adenocarcinoma (n=6), squamous cell carcinoma (n=4), neuroendocrine carcinoma (n=3), pleomorphic carcinoma (n=1), adenoid cystic carcinoma (n=1), atypical carcinoid (n=1), sclerosing hemangioma (n=1), and fibroma (n=1). The six patients for whom a definitive diagnosis was not obtained included two patients with neuroendocrine carcinoma and atypical carcinoid, and the other four patients were followed up as clinical findings strongly suggested a benign disease. Complications included one case of hemorrhage (4.5%).

Conclusion: The use of EBUS-TBNA in mediastinal or intrapulmonary tumors with no definitive diagnosis in the area from the trachea to the lobar bronchi was investigated in 22 patients. Although the number of patients was small, the diagnostic rate was high, and EBUS-TBNA was thought to be a useful diagnostic method for not only lymph node lesions, but also tumor lesions in the lungs and mediastinum.

33544

Transbronchial Needle Aspiration

SPECIMENT ADEQUACY OF ENDOBRONCHIAL ULTRASOUND TRANSBRONCHIAL NEEDLE ASPIRATE (EBUS TBNA) FOR TUMOR MARKERS IN NON SMALL CELL LUNG CANCER (NSCLC)

Nikolaos Koufos¹, Carla Lamb¹

¹Lahey Clinic , Burlington, United States

Introduction: New therapeutic strategies have become more personalized in lung cancer. Biomarkers such as EGFR, KRAS and EML4-ALK predict the response or resistance to specific treatment particularly in adenocarcinoma of the lung. The value of EBUS-TBNA as a diagnostic tool for LN staging of NSCLC is well established. Proper sampling, handling and analysis of the samples are key to correct diagnosis, staging and treatment. The evolving need for increased tissue samples for tumor marker analysis influences the bronchoscopic approach.

Objectives: Our primary aim was to evaluate the adequacy of EBUS-TBNA alone for tumor markers analysis. The relationship of different variables including number of TBNA passes, lymph node station, nodal size, use of ROSE and type of sedation were reviewed relative to sample adequacy. **Method:** After IRB approval we reviewed retrospectively the medical records of patients who underwent EBUS-TBNA in our bronchoscopy suite at Lahey Clinic from January 2010 to February 2012. Those with a final diagnosis of NSCLC, specifically adenocarcinoma with analysis of tumor markers were identified. Demographic information was collected and the technical aspects of EBUS-TBNA procedures were reviewed. The statistical analysis was performed to identify if any variables correlated with specimen adequacy.

Results: A total of 23 patients were diagnosed with NSCLC (20 with adenocarcinoma, 3 with squamous cell carcinoma). Eighteen were obtained by EBUS-TBNA with the 21 gauge needle. A Chi-Square Test was used to measure the correlation between different variables and sample adequacy. In 8 patients EBUS-TBNA with other bronchoscopic procedures were performed: conventional TBNA, brushing, TBBX and EBBX. A total of 78.2% (18) patients had an adequate tissue sample for at least one tumor marker. In 10 of these 18 patients, an adequate sample was made with the use of EBUS-TBNA alone, while in 44.4% (8/18) EBUS-TBNA samples were inadequate. Sufficient specimen was obtained with other diagnostic procedures (4 EBBX, 3 TBBX, 1 brushing) during the same procedure. No statistically significant correlation was associated with the number of EBUS passes and sample adequacy. The nodal station did not effect specimen adequacy. The use of rapid on-site evaluation (ROSE) in 12 patients had no impact on sample size. There was no difference between general anesthesia or moderate sedation. Specimen quality did not significantly vary among individual physicians operators.

Discussion: Due to the need for additional material for tumor marker analysis as part of individualized lung cancer treatment, technical details of EBUS-TBNA need further evaluation to assure adequate sample size for additional tumor marker analysis in NSCLC. Definitive conclusions cannot be made from our single center review due to small sample size; however, it is an initial step in identifying specific variables that may influence the use of EBUS-TBNA as a stand alone procedure when obtaining tissue for tumor marker analysis. We identified that coupling it with other standard endoscopic procedures such as brushing, TBBX or EBBX improved specimen volume. Larger multi-center studies should be performed to further identify factors that may assure sufficient specimen size for all desired studies with a single bronchoscopic procedure.

11:40AM-11:50 AM

Room: GRAND BALLROOM A

Role of Bronchoscopy in the Management of Pulmonary Nodule

NOVEL APPROACHES TO THE PATIENT WITH MASSIVE HEMOPTYSIS

Scott Parrish

Walter Reed National Military Medical Center , Bethesda, United States

Background: Massive hemoptysis is a life-threatening condition with a high mortality when treated conservatively. Several modalities have been described in the treatment of hemoptysis with varying results. Endobronchial therapy has traditionally been performed with rigid bronchoscopy. This requires both specialized training and equipment that is not readily available in many centers. The role of fiberoptic bronchoscopy (FOB) is unclear in these situations but is more widely accessible.

Objectives: We describe three cases of the successful treatment of hemoptysis with FOB using combinations of endobronchial placement of oxidized regenerated cellulose (ORC) and vascular embolization coils after other therapies failed to achieve hemostasis.

Methods: Two pieces of ORC were placed in a cavity caused by *Mycobacterium tuberculosis* in one patient with hemoptysis after initial use of topical thrombin and balloon bronchoplasty only succeeded in slowing the bleeding. In another patient with non-small cell lung cancer in the right middle lobe causing massive hemoptysis ORC was placed in the subsegment followed by a Vortex embolization coil. Another patient with cavitary parenchymal disease secondary to a history of tuberculosis and massive hemoptysis had a coil placed in the apical segment of the right upper lobe followed by ORC. Another coil was then placed to secure the ORC. All three of these procedures were performed utilizing only FOB.

Results: In all patients hemostasis was achieved initially. Additionally the patients had no further episodes of hemoptysis in follow-up.

Conclusion: The case series presented here describes two unique approaches to management of this often life-threatening problem and offers alternative approaches to control airway bleeding in cases where rigid bronchoscopy or vascular radiology is not readily available. In our review of the literature, no reports exist specifically addressing placing ORC directly into a bleeding cavity only using FOB as we described above. In the first case bleeding was both initially controlled using a combination of balloon bronchoplasty, topical thrombin, and placement of ORC using only FOB delivered outside of the central airways. The last two cases expand on this approach with the delivery of a vascular embolization coil placed directly into the culprit bronchial lumen using it not only to potentially secure the ORC but also, as with the third case, the coil itself was used to initially slow the bleeding followed by ORC and an additional embolization coil. To our knowledge this is the first report on endobronchial placement of an embolization coil to help control bleeding. While the numbers are obviously small, the clinical results suggest both efficacy and reproducibility. These techniques appear to be reasonable alternatives in the treatment of hemoptysis and don't necessarily require specialized centers. Further investigation is needed to confirm these observations. The views expressed in this presentation are those of the authors and do not necessarily reflect the official policy or position of the Department of the Navy, Army, Department of Defense, nor the U.S. Government

8:00AM- 5:30 PM

Room: WHITEHALL ROOM

POSTER SESSION 3 (MONDAY)

26456

Endobronchial Management of Central Airway Obstruction

BRONCHOSCOPIC BALLOON DILATION IMPROVES PULMONARY FUNCTION AND DISAPPEARS SYMPTOMS DUE TO BENIGN TRACHEOBRONCHIAL STENOSIS

Hiroshi Niwa¹, Eriko Suzuki¹, Haruhiko Yukiue¹, Hiroshi Haneda¹, Masayuki Tanahashi¹, Naoko Yoshii¹

¹*Seirei Mikatahara General Hospital , Hamamatsu, Japan*

Bronchoscopic balloon dilation (BBD) is a useful method of treating tracheobronchial stenosis. Tracheobronchial stenosis in adults can arise from benign or malignant disease. Benign stenosis causes include sarcoidosis, tuberculosis, Wegener's granulomatosis, trauma, berylliosis, and foreign body reaction. Furthermore, it can arise after prolonged endotracheal intubation, after sleeve resection or after lung transplantation. BBD has been considered a simple, rapid, and safe method to restore airway caliber. **Patients:** Eleven sessions of BBD for benign tracheobronchial stenoses in 8 patients were performed between 1987 and 2010. The patients were four males and four females, and ranged in age from 30 to 60 years. The indications were tuberculous stenosis (n=6), post-tracheostomy stricture (n=1) and post-bronchoplasty anastomotic stenosis (n=1). The sites of stenosis were the trachea (n=4), left main bronchus (n=3), right main bronchus (n=2), left upper bronchus (n=1), and left lower bronchus (n=1). Stenoses ranged in diameter from pinhole (more than 90%) to 70%, and in length from 0.5 to 6 cm. Technique: BBD is generally performed under topical anesthesia or general anesthesia for tracheal lesion. An appropriate size balloon catheter is advanced over the guidewire under both fluoroscopic and bronchoscopic guidance. The balloon is then inflated with a dilute nonionic contrast medium. The procedure repeats until proper diameter is gained.

Results: BBD was performed under local anesthesia in 3 patients and general anesthesia in 5 patients. For tracheal stenosis, 8-18 mm diameter balloons (55-80 mm long) were used. For bronchial stenosis, 4-12 mm diameter balloons (20-55 mm long) were used. Air way is successfully opened by TBB alone in seven patients. The other one patient with post-tracheostomy stenosis required T-tube stent placement to support the weakened cartilage resulting in secondary tracheomalacia. There were four patients with longitudinal tracheal or bronchial lacerations, but all lacerations healed spontaneously after conservative treatment. There were no other complications and no recurrences. The improvements in symptoms such as dyspnea, cough, and stridor following dilation were dramatic in most patients. Improvement of FEV1, peak expiratory flow (PEF) and Hugh-Jones classification are observed in all patients.

Conclusion: BBD is useful not only for increasing the tracheobronchial diameter of the stenotic segment but also for improving respiratory function and symptoms. The advantages of this procedure are minimally invasive, safe, and rapid.

32846

Endobronchial Management of Central Airway Obstruction

GRANULATION FORMATION AFTER STENT PLACEMENT FOR AIRWAY STENOSIS

Keigo Takagi¹, Aki Mitsuda¹, Fumitomo Sato¹, Hajime Otsuka¹, Hidenori Goto¹, Kazutoshi Shibuya¹, Kazuyoshi Tamaki¹, Rena Yuasa¹, Shoji Takahashi¹, Yoshinobu Hata¹

¹Toho University Omori Medical Center, Tokyo, Japan

Background: Granulation formation at the end of a stent is the second leading cause of airway stenosis after stent placement, and this complication is difficult to control. Here, we discuss treatment for granulation formation occurring after stent placement. **Objectives and methods:** Between 1996 and 2011, 10 out of 144 patients (7%) who had survived for over 6 months after stent placement developed granulation formation at the end of the stent. The patient age ranged from 19 years to 76 years, and 7 patients had a metallic stent while 3 patients had a silicone stent. The stent was located in the trachea in 8 patients and in the main bronchus in 2 patients, and 5 patients had malignant disorders while 5 patients had benign disorders.

Results: 1) Granulation formation after stent placement was observed after 2 months in the patients with the silicone stent and after one year in the patients with the metallic stent. 2) Colonization inside the stent was observed in 9 out of the 10 patients, and *Pseudomonas aeruginosa* was detected in many patients. 3) Stent-in-stent or endoscopic treatment with the local injection of prednisolone and the topical use of 2 mg of mitomycin-C was useful for controlling the granulation formation at the end of the metal stent. 4) Granulation formation at the end of the silicone stent shrank after the removal of the stent.

Conclusion: Granulation formation after stent placement is likely to be marked during the chronic phase of benign disorders or slow-growing malignant tumors. Especially in patients with metallic stents, granulation formation should be covered with a silicone stent. Colonization inside the stent may affect the granulation formation. Long-term bronchoscopy examinations should be performed for patients who are expected to survive for a long period.

32916

Endobronchial Management of Central Airway Obstruction

AN ELDERLY CASE OF SEVERE CARINAL STENOSIS DUE TO ADVANCED LUNG CANCER TREATED BY DOUBLE SPIRAL Z-STENTS SHAPED RAMMDA

Hisashi Saji¹, Kentaro Iwasaki¹, Norihiko Ikeda², Yasubumi Kato³

¹Tokyo Medical University, Tokyo, Japan; ², Tokyo, Japan; ³Tokyo Medical University, Mumbai, India

An elderly case treated with double spiral Z stents shaped rammda for severe carinal stenosis caused by lymph node metastasis of lung cancer was reported. A 77-year-old woman complained of severe stridor and dyspnea was referred for our hospital. Chest CT and bronchoscopy revealed 98% airway obstruction at carina due to extra-endobronchial lymph nodal swelling of advanced lung cancer. We initially performed percutaneous cardiopulmonary support under local anesthesia ventilated by BIPAP ventilation, because she could not be placed on supine position. After appropriate general ventilation, airway stenting was performed using rigid bronchoscopy. Double spiral Z stents were placed by rammda shape at carina. She could leave hospital and live in her home in 3 months.

VIBRATION RESPONSE IMAGING (VRI) IN THE DIAGNOSIS AND OUTCOME ASSESSMENTS OF INTERVENTIONAL BRONCHOSCOPY IN CASES WITH CENTRAL AIRWAY OBSTRUCTION.

Masamichi Mineshita¹, Hiroki Nishine¹, Hiroshi Handa¹, Hirotaka Kida¹, Seiichi Nobuyama¹, Takeo Inoue¹, Teruomi Miyazawa¹

¹*St Marianna University School of Medicine, Kawasaki, Japan*

Background: Accurate and effort independent assessment is needed to evaluate treatment outcomes in central airway obstruction (CAO). Vibration response imaging (VRI) is a noninvasive tool for pulmonary function imaging, and the usefulness of VRI in interventional bronchoscopy outcome assessment has been reported.

Objectives: To provide a usefulness numerical assessment for VRI in the diagnosis and outcome assessments of interventional bronchoscopy in cases with CAO.

Methods: Fifty cases of intervention were classified into three groups; tracheal stenosis (n=12), main stem bronchial stenosis (n=18) and extensive stenosis (n=20). Recordings were taken for VRI, dyspnea scale and pulmonary function. VRI recordings were assessed by quantitative lung data (QLD) and lung asynchrony (gap index and asynchrony score). Data from 20 healthy subjects were used for comparison.

Results: Pulmonary functions in patients with CAO were significantly lower than that of age-matched healthy subjects. Before intervention, the upper lung QLD of patients with CAO were significantly higher than that of age-matched healthy subjects (healthy subjects; $15.9 \pm 3.7\%$, tracheal; $22.0 \pm 4.3\%$ $p < 0.001$, extensive; $20.8 \pm 5.2\%$ $p < 0.01$, main stem bronchial; $21.5 \pm 6.2\%$ $p < 0.01$). Middle lung QLD of extensive stenosis cases were also significantly higher than that of healthy subjects, and lower lung QLD for all three groups were significantly lower than that of healthy subjects (healthy subjects; $48.7 \pm 6.6\%$, tracheal; $38.8 \pm 8.2\%$ $p < 0.001$, extensive; $38.3 \pm 5.4\%$ $p < 0.001$, main stem bronchial; $43.7 \pm 6.1\%$ $p < 0.05$). Receiver operating characteristic (ROC) validation of lower lung QLD revealed that a cut-off point of 46% had 80% sensitivity, 80% specificity, and 80% accuracy in the diagnosis of CAO. The middle lung QLD correlated negatively with FEV1/predicted FEV1 ($r = -0.34$, $p = 0.0156$) in CAO patients. In the assessment of quantitative parameters for dynamic VRI images, gap index and asynchrony score of extensive and main stem bronchial stenosis cases were significantly higher than those of healthy subjects (gap index: healthy subjects; 0.094 ± 0.119 sec, extensive; 0.202 ± 0.196 sec $p < 0.05$, main stem bronchial; 0.238 ± 0.204 $p < 0.05$. asynchrony score: healthy subjects; 11.09 ± 3.82 , extensive; 14.80 ± 6.65 $p < 0.05$, main stem bronchial; 18.16 ± 7.09 $p < 0.001$). After intervention, there were significant improvements in dyspnea score for all groups. For tracheal stenosis, FEV1 and PEF significantly increased by 111.0% ($p = 0.0014$) and 158.4% ($p = 0.0005$), respectively. FVC, FEV1 and PEF in the extensive stenosis groups also significantly improved after intervention (FVC; 19.0% $p = 0.0031$, FEV1; 34.5% $p < 0.0001$, PEF; 42.9% $p < 0.0001$). VRI parameters of tracheal and extensive stenosis cases showed no significant changes after intervention. In patients with main stem bronchial stenosis, slight improvements of pulmonary function was observed only in FEV1 (12.7% $p = 0.0374$). On the other hand, gap index (-46.2% $p = 0.0273$) and asynchrony score (-26.4% $p = 0.0167$) for patients with main stem bronchial stenosis were significantly reduced after intervention.

Conclusions: Considering the noninvasive nature, real-time capability and detectability of airflow asynchrony of VRI, numerical assessments for dynamic VRI image may offer an advantage over current conventional technologies in the field of interventional bronchoscopy.

33076

Endobronchial Management of Central Airway Obstruction

SEVERE TRACHEOBRONCHIAL STENOSIS IN PREGNANCY

Samira Shojaee¹, Harold Manning², Lisa Tilluckdharry²

¹Dartmouth Hitchcock Medical Center , West Lebanon, United States; ²Dartmouth Hitchcock Medical Center , Lebanon, United States

Introduction: Severe central airway obstruction (CAO) is rarely encountered during pregnancy. Signs of obstructive airway disease might not become evident until later in pregnancy. We report a case of a pregnant female with severe tracheal and bilateral main stem bronchial stenosis caused by tuberculosis.

Case Presentation: A 33 year old Korean female in the 34th week of her first pregnancy was transferred to our hospital with a 5 day history of stridor, cough with clear sputum production and dyspnea on exertion. At age 19, she was diagnosed with tuberculosis and received 6 months of anti-tuberculosis chemotherapy, followed by a new diagnosis of asthma for which she had been treated unsuccessfully for 5 years. After immigration to the United States, she was diagnosed with tracheobronchial stenosis and had undergone balloon bronchoplasty with some symptomatic relief. The early stages of her pregnancy had been uneventful, and at her 24th week of pregnancy she was seen by a pulmonologist who recommended prophylactic airway dilatation and stenting, but she refused any invasive procedures. Her FEV1 at that time was 0.98 L (28% predicted). At the time of transfer, her heart rate was 95, respiratory rate 18, and oxygen saturation 95% on room air. Her exam was notable only for mild stridor. The patient refused bronchoscopy, and a low-dose, non-contrast CT scan of the chest was obtained to evaluate her airway anatomy in anticipation of the possible need for intubation. A thin web within the proximal portion of the intrathoracic trachea narrowed the trachea to 6 mm in diameter. The right and left main stem bronchi measured 2.8 mm and 5.5 mm, respectively (Figure 1,2). Repeat spirometry showed that her FEV1 had decreased to 0.71 L. The patient was started on intravenous corticosteroids and azithromycin. After 3 days of treatment, there was no significant clinical improvement, prompting the decision to proceed with delivery of her baby. An intrathecal catheter was placed very early in the course, with plans for vaginal delivery as per the patient's request. Over a period of 20 hours the patient did not progress beyond 1 cm, and the decision was made to proceed with cesarean section under spinal anesthesia. At this point she began to experience worsening dyspnea, and Heliox was initiated with immediate, dramatic symptomatic relief. The Heliox was continued until after the delivery of her baby. She underwent an uncomplicated C-section and gave birth to a healthy infant. Following the delivery of her baby, her symptoms of dyspnea and increased mucus secretion subsided completely.

Discussion: In this patient with severe tracheobronchial stenosis, bronchorrhea and bronchial edema due to increased estrogen levels associated with pregnancy likely exacerbated the symptoms of CAO. Given the patient's refusal of invasive airway interventions, our use of Heliox for ventilation and spinal anesthesia for pain control were the cornerstones in this patient's successful delivery. The combination of severe tracheal stenosis and pregnancy is

extremely rare, with only 9 prior case reports in the literature with no reports of concomitant tracheal and bronchial stenosis in pregnancy.

33097

Endobronchial Management of Central Airway Obstruction

PHOTODYNAMIC THERAPY USING NPe6 FOR BRONCHOGENIC CARCINOMAS IN CENTRAL AIRWAYS

Yujin Kudo¹, Hidetoshi Honda¹, Hisashi Saji¹, Jitsuo Usuda¹, Kentaro Imai¹, Masatoshi Kakihana¹, Naohiro Kajiwara¹, Norihiko Ikeda¹, Taichiro Ishizumi¹, Tatsuo Ohira¹

¹*Tokyo Medical University, Tokyo, Japan*

Background: Photodynamic therapy (PDT) is recommended as a treatment option for centrally located early lung cancers (CLELC), meaning, roentgenographically occult squamous cell carcinomas that are located at no more distally than segmental bronchi and, histologically, are either carcinoma in situ or carcinoma associated with only limited invasion. Because patients with CLELC who are heavy smokers are at fairly high risk of developing a second primary lung cancer, they require treatment that will preserve their cardiopulmonary function. Most centrally located early lung cancers (CLELC) ≤ 1.0 cm in diameter do not invade beyond the bronchial cartilage and photodynamic therapy (PDT) with Photofrin is conventionally recommended as a treatment option for such lesions. However, the CR rate of CLELC > 1.0 cm in diameter was less than 60%. NPe6 is a second-generation photosensitizer, and because it has a longer absorption band (664 nm) than Photofrin (630nm), there are some reports that NPe6-PDT would exert a strong antitumor effect against cancer lesions > 1.0 cm in diameter, which are assumed to invade extra-cartilaginous invasion and to unsuitable for treatment with Photofrin-PDT.

Objectives: We evaluate the antitumor effect by NPe6-PDT for CLELC > 1.0 cm in diameter, and statistically analyzed the association between clinicopathological factors and clinical outcomes.

Methods: We retrospectively reviewed 128 patients (151 lesions) with CLELC who underwent NPe6-PDT between July 2004 and October 2011. We always perform photodynamic diagnosis (PDD) using autofluorescent bronchoscopy, SAFE-3000, just before PDT, in order to assume the extent of tumor lesion.

Results: All patients were men, 133 lesions of 151 lesions were endoscopically flat type, 12 lesions were polypoid type and 6 were nodular type. Ninety four cancer lesions ≤ 1.0 cm in diameter and 57 lesions > 1.0 cm in diameter were identified, and the complete response rate of the PDT was 93.6% (88 of 94) and 95.6% (55 of 57), respectively. There were no significant difference between two groups ($p>0.05$). After reducing the mass of large tumors and deeply invasive tumors by electrocautery or forceps, NPe6-PDT was performed for the residual cancer lesions.

Conclusion: NPe6-PDT has a strong antitumor effect against CLELCs > 1.0 cm in diameter that have invade beyond the bronchial cartilage, thereby enabling the destruction of residual cancer lesions after mass reduction of large nodular- or polypoid lesions by electrocautery. The PDT guidelines for CLELC should therefore be revised because use of NPe6-PDT will enable expansion of the clinical indications for PDT.

33106

Endobronchial Management of Central Airway Obstruction

SUBTYPES OF BRONCHOLITHS AND CLINICAL OUTCOMES

Sang-Won Um¹, Hojoong Kim¹, Kyung Jong Lee¹, So Yeon Lim¹

¹*Samsung Medical Center, Seoul, South Korea*

Background: We evaluated effective treatments of broncholithiasis based on its radiographic and bronchoscopic features.

Methods: This retrospective study conducted at Samsung Medical Center, Korea, enrolled patients who were suspected of having broncholithiasis based on chest computed tomography (CT). The broncholiths were classified as intraluminal, mixed (both intraluminal and extraluminal), and extraluminal based on chest CT and bronchoscopic findings.

Results: The study enrolled 46 patients between 1995 and 2009. The median age was 61 years and 17 (37%) were male. Symptoms included a cough, hemoptysis and purulent sputum in 21 (45.7%), 19 (41.3%), and 11 (23.9%) patients, respectively. Based on chest CT, there were 15 (32.6%) intraluminal, 15 (32.6%) mixed, and 16 (34.8%) extraluminal broncholiths. All 15 (100%) intraluminal broncholiths were removed completely via flexible (n = 2) or rigid (n = 13) bronchoscopy. For the 15 mixed broncholiths, seven (46.7%) bronchoscopic interventions were performed, but complete removal of the broncholiths was not accomplished. Six (40%) mixed and four (25%) extraluminal broncholiths were treated by surgical resection for symptom control. None of the patients who underwent surgical resection suffered morbidity or postoperative mortality.

Conclusions: The treatment of broncholithiasis should be based on chest CT and bronchoscopic findings. Intraluminal broncholiths can be removed via bronchoscopy, while surgery should be considered for symptomatic mixed or extraluminal broncholiths.

33107

Endobronchial Management of Central Airway Obstruction

PLACE OF CRYOSURGERY IN THE DESTRUCTION OF TUMORS OF THE TRACHEA AND MAIN BRONCHI

Mikhail A. Rusakov¹, Zoia V. Kochneva²

¹*Petrovsky National Research Center of Surgery, Moscow, Russia;* ²*Petrovsky National Research Center of Surgery, Mumbai, India*

Background: Many patients with tumors of the trachea and main bronchi have serious breathing problems that threaten an asphyxia and rapid death. Endoscopic removing or destruction of the tumor could significantly improve these patients state. Objective of this study is to determine what place in this treatment can take the cryosurgery.

Methods: Independent cryosurgical device operating at liquid nitrogen (the temperature its cryoprobe to -196oC), was used in this study.

Experiment at 19 dogs was performed to examine the effects of deep freezing on the normal tracheal wall. 148 patients with benign (46) and malignant (102) tumors of the trachea and bronchi were treated endoscopically between 1965 and 2011. Cryosurgery was used since 1980.

Results: Experimental research has shown that freezing as cartilage and membranous part of the wall of the trachea and main bronchi does not lead to its destruction or formation of stenosis. 290 endoscopic operations were made to 148 patients. Cryosurgery was used during 87 procedures. Intraluminal tumor masses were cut by rigid bronchoscope tube or removed by biopsy forceps in 88 procedures. They were destroyed by neodym-YAG laser during 38 operations or by high-frequency electric current coagulated in 27 ones. Two or more methods were applied simultaneously during 50 operations. As a rule, immediately after freezing and thawing of the tumor its destruction not occurred and the mechanical removal of the tumor immediately after thawing causing bleeding. Then, within 7 days, tumor cryonecrosis developed after which it can be easily removed endoscopically without any bleeding. There were no significant differences in immediate results depending of method of treatment. But it is important that usually it was necessary to perform two procedures at interval of 7-10 days for removing of large intraluminal mass by cryosurgery and only a single procedure by other methods. Freezing of the tracheal or bronchial wall as an intact and infiltrated the tumor has never caused its perforation or stenosis formation. It is very important that prior removal of the luminal portion of the tumor did not create any difficulties for cryodestruction its base if there was no ongoing bleeding. In addition cryosurgery does not create any obstacles for subsequent radiotherapy or chemotherapy. Follow-up of patients showed that cryosurgical effect to the tumor base allows to postpone continued growth luminal portion of the tumor and improves patients quality of life.

Conclusion: Cryosurgery is relatively ineffective for the recanalization of the lumen of the trachea and main bronchi but it is safe when exposed to the tracheal or bronchial wall and slows the regrowth of the tumor into the lumen. Therefore, it is appropriate to use as an additional method of endoscopic treatment after the removal of intraluminal masses.

33137

Endobronchial Management of Central Airway Obstruction

ACUTE TOXIC INHALATION INJURY - A CASE REPORT AND REVUE OF THE LITERATURE

Milena Encheva¹, Hristo Yordanov¹, Kosta Kostov¹, Nikolay Mladenov¹, Nikolay Petrov¹

¹*Military Medical Academy , Sofia, Bulgaria*

Background: Toxic inhaled substances may cause injury of respiratory tract at various levels, leading to from simple symptoms to life-threatening disease. Acute toxic inhalation injury (ATII) is not uncommon condition. ATII may occur at different conditions - at home or workplace. Environmental exposure is also possible. The severity of disease depends on individual susceptibility, as well as on the characteristics of inhaled substances - water solubility, size of particles and chemical properties and its location. Although ATII cases may recover in a few days they also may cause long-term complications, even death. We aim to discuss the effects of short-term exposures (minutes to hours) of toxic substances to the lungs.

Case report: We had an opportunity to study the pulmonary changes in one patient exposed in an accident to anhydrous ammonia. In the acute phase the patient presented with severe tracheobronchitis and respiratory failure, caused by severe burns of the respiratory mucosa. We

have detached a full "cast" of tracheobronchial tree by using a rigid bronchoscopy. After relative improvement she was left with severe tracheobronchial malacia and fixed airways obstruction. Computed tomography showed large infiltrative alveolar changes and blood gases analyses demonstrated continuous hypercapnia. After bronchoscopic desobstruction of the central airways, dynamic tracheal collapse and tracheo-esophageal fistula were observed and then stabilized with silicon stent. The patient is treated according to accepted protocols for intensive care. At present, the patient is still undergoing mechanical assisted ventilation through tracheotomy, but the severe inflammatory changes with persistent infection have become a reason for removing the stent.

Conclusion: We conclude that acute exposure to high concentrations of ammonia may lead to acute respiratory injury and long term impairment of respiratory functions with structural changes (i.e. bronchiectasis).

Key words: Acute inhalation injury, ammonia, tracheobronchial malacia, treatment

33143

Endobronchial Management of Central Airway Obstruction

SUBGLOTTIC/TRACHEAL STENOSIS FOLLOWING TRACHEOSTOMY: A DESCRIPTIVE OVERVIEW.

Sam Kosseifi¹, John Byers², Souheil Abdel Nour³

¹*Pulmonary And Critical Care Associates of Jacksonville , Jacksonville, United States;* ²*Director of Select Specialty Hospital and Interventional Pulmonary Medicine , Mumbai, India;* ³*East TN State University (ETSU) , Johnson City, United States*

Background: Advances in the management of respiratory failure have resulted in more patients requiring extended mechanical ventilation. Tracheostomy is routinely performed in critically ill patients requiring prolonged respiratory support. Subglottic/Tracheal stenosis (STS) is a potential complication of tracheostomy which can be a hazard to safe decannulation.

Objectives: We review our experience with STS as a complication of tracheostomy. We describe the predisposing risk factors for the development of STS in our cases and also provide a systematic stepwise diagnostic algorithm.

Methods: We report patients with tracheostomy who were referred to our center for further respiratory management over a 2 year-period. Patients underwent full evaluation by a certified speech pathologist. Patients who were intolerant to the Passy-Muir® valve (e.g., presence of back pressure, brassy cough, worsening dyspnea) underwent a diagnostic laryngoscopy/bronchoscopy. Thirty patients were diagnosed with post-tracheostomy STS. Patients with both surgical and percutaneous tracheostomies were included. All patients were managed endoscopically using a combination of Nd: YAG Laser, Argon Plasma Coagulation, Electrocautery debridement requiring multiple operative interventions.

Results: Twenty-eight out of thirty patients were successfully decannulated. No serious complications occurred. In addition to other known risk factors that promotes STS such as prolonged intubation, severity of critical illness, acid reflux, radiation therapy to the neck area, and other inflammatory diseases, we noted that the presence of granulation tissue and inflammation at the external stoma site can be a surrogate marker for the development of subglottic stenosis in some patients. We observed also that tracheal ring damage during the

tracheostomy seems to be a significant risk factor for early subglottic tissue formation. Other risk factors that can also promote STS tissue formation include high positioned tracheostomy tube placement and the presence of retained suture material (suture granuloma). STS appears to occur in both percutaneous and surgical tracheostomy procedures. The occurrence of macroscopic STS can vary in presentation from as early as days to even years post-tracheostomy.

Conclusion: STS secondary to tracheostomy can be life threatening if clinically overlooked. Several risk factors can promote the formation of STS. Since the development of STS can varies from a patient to the other with a wide window of presentation, a high index of suspicion for early recognition and appropriate endoscopic therapy prior to decanulation is always warranted.

33156

Endobronchial Management of Central Airway Obstruction

INCIDENCE AND MANAGEMENT OF ANASTOMOTIC COMPLICATIONS AFTER BRONCHIAL RESECTION: A RETROSPECTIVE STUDY

Olivier Bylicki¹, Bastien Orsini², Herve Dutau³, Pascal Alexandre Thomas², Philippe Astoul¹, Sophie Laroumagne¹, Thomas Vandemoortele²

¹Hopital Nord , Marseille, France; ²Hopital Nord , Marseille, France; ³Hopital Nord

Background: Bronchial resection and re-implantation in the surgical management of lung cancer are intended to spare lung parenchyma, with curative intent. We studied the incidence and management of anastomotic complications after such procedures.

Methods: We retrospectively reviewed charts of patients referred to our center for lung tumors, who underwent bronchial resection and re-implantation from 1991 to 2011,

Results: A total of 108 patients were included. Sixty eight percent were male, and mean age was 58 years. Sleeve lobectomies were performed in 100 patients, bronchial resections without lung parenchymal resection in 8 patients. Squamous cell carcinoma represented 46.3%, carcinoid tumors 22.2%, and adenocarcinomas 18.5%. Mean time between surgery and the first bronchoscopic examination was 4.47 days, with anastomotic abnormalities detected in 20.4%. Twenty three patients underwent therapeutic bronchoscopy for malacic or fibrotic bronchial stenoses in 9 cases, for dehiscences in 7, for obstructive granulomas in 3, and for bronchopleural fistulas in 3. Endoscopic treatment consisted in stent placement in 5 cases, mechanical dilations in 3, laser treatment for one case of bronchomalacia, and resection of granulomas in 3. No risk factors were identified as predisposing for bronchial complications. There was a trend towards lower 1-year survival in patients with bronchial complications compared to those without (71.9% vs. 83.4%, p=0.114).

Conclusion: Bronchial resection and re-implantation is a surgical procedure associated with an anastomotic complication rate of 21%. Regular endoscopic surveillance is advised in order to detect and treat early complications.

33168

Endobronchial Management of Central Airway Obstruction

AIRWAY TOOTHBRUSH

Fadi Safi¹, Dan Olson², Ragheb Assaly³

¹University of Toledo Medical Center , Toledo, United States; ²University of Toledo , Toledo,

Tracheobronchial Foreign body aspiration in adults is not common as in children; most cases are being reported in the elderly and mentally challenged. The nature of the foreign body is highly variable as well, ranging from nail or pin aspiration, to aspiration of dental debris, appliances, and prosthesis. Toothbrush ingestion, and oropharyngeal trauma caused by toothbrushes, have been reported recurrently in Ear, Nose, and throat (ENT) and Gastrointestinal literature 1-3 , however no cases of toothbrush aspiration into the airways have been reported before. Today, we are reporting the first case of a toothbrush aspiration to the trachea and right main stem bronchus, in a 43-year-old male patient who presented to emergency room with foreign body aspiration. We used a flexible bronchoscope and a pediatric Roth Net basket followed by biopsy forceps to force the object out without complications.

Case Report: A 43-year-old Hispanic male with past medical history of hypertension, presented to the emergency room with foreign body aspiration. He mentioned that while brushing his teeth and back of the tongue, the toothbrush broke and fell down his throat. He choked and coughed aggressively to try to expectorate but could not. He forced it down with his hand after which his dyspnea improved, but he was still feeling foreign body in the throat, and developed intermittent cough. He did not develop stridor, cyanosis, or loss of consciousness. When he presented to the ER he was fully awake and oriented to time, place, and person. He was speaking in full sentences without significant respiratory distress. Object wasn't localized with direct visualization of the oropharynx and thus a neck and chest soft tissue CT scan was obtained which showed the object to be present in the lower trachea and upper Right main stem bronchus (Fig1). Immediate bronchoscopy was planned.

Patient was placed in semirecumbant position. He received Intravenous atropine 0.5 mg, and Midazolam 2 mg. Laryngeal nerve block was done using 2% lidocaine. Fiberoptic bronchoscope was introduced through the mouth, and object was visualized in the Trachea towards the right mainstem bronchus. Attempts to remove object using mini forceps were unsuccessful, and thus a pediatric Roth Net retrieval basket was used successfully to pull the object out into the oropharynx after which a clamp forceps grasped it outside (Fig 2). Incidentally, oral thrush was noticed in the posterior surface of tongue and thus patient was prescribed Nystatin swish and swallow.

33174

Endobronchial Management of Central Airway Obstruction

CASE REPORT: CARCINOMAS SQUAMOSUM ASSOCIATED WITH ENDOBRONCHIAL LIPOMA- ROLE OF INTERVENTIONAL BRONCHOSCOPY PROCEDURES

Goran Stojanovic¹, Bojan Zaric², Branislav Perin³, Evica Budisin¹, Nensi Lalic³, Svetlana Jovanovic¹

¹Institute for Pulmonary Diseases of Vojvodina , Novi Sad, Serbia; ²Institute for Pulmonary Diseases of Vojvodina , Sremska Kamenica, Serbia; ³Institute for Pulmonary Diseases of Vojvodina , Sremska Kamenica, Serbia

Introduction: endobronchial lipomas are rare benign tumors. Associated with malignancy

require a multimodal diagnostic and therapeutic approach with the use of interventional bronchoscopy procedures. The aim of this study is to report a multimodal diagnostic and therapeutic approach in patient with squamous cell carcinoma of the left lower lobe and endobronchial metastases in the right bronchial tree associated with endobronchial lipoma in the right intermediary bronchus.

Case report: the patient was 72 years old and hospitalized due to chest pain on the left side, cough, dyspnea and fatigue. The following diagnostic algorithms were developed: physical examination, standard radiography, laboratory tests, CT scan, bodyplethysmography and bronchoscopy. CT scan of the chest reported the following changes: 67mm tumorous lesion in the left lower lobe and nodular changes in different segments of both lungs. Enlarged 20mm mediastinal lymph node is at the position 5. Bronchoscopic findings: tumor in the sixth segment of the left lower lobe. In the right bronchial tree, a tumor closing the entrance to the middle lobe has been observed, as well as hyperemia in the sixth segment of the right lower lobe. By examining the bronchial tree autofluorescent bronchoscope changes were observed in the sixth segment of the right lower lobe. Histopathological finding showed squamous cell carcinoma of the left lower lobe, in the sixth segment of the right lower lobe finding pointed out to endobronchial metastatic squamous cell carcinoma and in the intermediary right bronchus the finding indicated endobronchial lipoma. The patient underwent a complete preparation for endobronchiale interventional procedures and it was decided to remove the endobronchial lipoma with cryotherapy or electrocauteries wire and argon plasma coagulation (APC) of the treated area in the sixth segment of right lower lobe. Most of the lipoma was removed by cryotherapy while smaller part of it, as well as endobronchial metastatic, were removed by APC. Since it was a stage IV disease (T4N2M1a), the patient was also submitted to chemotherapy according to the protocol Gemcitabine / Cisplatin.

Conclusion: endobronchial lipomas are rare benign tumors and associated with cancer require a multimodal therapeutic approach. Removal of lipomas is performed by interventional bronchoscopy or surgical procedures and treatment of disseminated lung cancer requires interventional bronchoscopy procedures associated with chemotherapy.

Keywords: endobronchial lipoma, squamous carcinoma, bronchoscopy, interventional bronchoscopy procedures, chemotherapy

33179

Endobronchial Management of Central Airway Obstruction

ENDOBRONCHIAL PLASMOCYTOMA

Sebastian Fernandez-Bussy¹, Erik Folch², Ivan Caviedes³, Jerónimo Graf¹, Sebastian Fernandez-Bussy¹, Adnan Majid⁴

¹*Clinica Alemana de Santiago/Universidad del Desarrollo, Santiago, Chile;* ²*Beth Israel Deaconess Medical Center/Harvard Medical School, Boston, United States;* ³*Clinica Alemana, Santiago, Chile;* ⁴*Beth Israel Deaconess Medical Center/Harvard Medical School, Boston, United States*

Background: extramedullary plasmacytoma (EMP) is a plasma cell neoplasm that arises outside the bone. Most EMPs are located in the nasopharynx and upper respiratory tract. Diagnosis is usually made by surgery. Treatment has included resection, chemotherapy, and radiation therapy.

Endobronchial plasmocytoma is rare with only a few cases reported in the literature. We present a case of EMP with extensive bilateral endobronchial involvement .

Case report: 58 year-old man with a history of multiple myeloma Bence Jones III-A presented with dyspnea and hypoxemia. Chest CT-scan revealed multiples pulmonary nodules, segmental atelectasis , and central bronchial narrowing. Bronchoscopy showed extensive mucosa and submucosal infiltration, together with nodular-like lesions from the bronchus intermedius (BI) to the right lower lobe bronchus. Distal BI lumen was narrowed 90%, and no lumen was visualized in the middle lobe. A large nodular lesion was noted at the posterior membrane of the proximal left mainstem bronchus (LMS), as well as mucosa and submucosal infiltration at the distal LMS nearly occluding the left upper lobe uptake. Endobronchial biopsies showed extensive tumor infiltration with plasmocytoid cells, ovoid irregular excentric nuclei, prominent nucleoli, eosinophilic cytoplasm with a paranucleus pale area. High mitosis rate and frequent apoptotic figures were seen. Immunohistochemistry was positive for CD-138 and MUM-1. Only kappa light immunoglobulin chains were noted. Unfortunately this patient developed septic shock, no endobronchial treatment was performed, and died shortly thereafter.

Conclusion: endobronchial extramedullary plasmocytoma can extensively affect the central airways causing narrowing and atelectasis. EMP should be considered in the differential diagnosis of endobronchial lesions.

33202

Endobronchial Management of Central Airway Obstruction

OPTIMIZING THE TREATMENT OF INFLAMMATORY TRACHEAL STENOSIS ACCORDING TO A MORPHOMETRIC CLASSIFICATION.

Rosa Lopez-Lisbona¹, Antoni Rosell², Gabriela Rosado², Joan Moya², Jordi Dorca², Noelia Cubero³, Pablo Diaz², Rachid Tazi²

¹Hospital , L'Hospitalet de Llobregat. Barcelona, Spain; ²Bellvitge University Hospital , L'Hospitalet de Llobregat. Barcelona, Spain; ³Hospital Universitari Bellvitge , Barcelona, Spain

Objectives: 1. To describe the distribution of patients according to a morphometric classification
2. Identify the rate of success according to its corresponding treatment. **Method:** Only patients with post intubation (PITS) or idiopathic inflammatory tracheal stenosis were included. Other benign non inflammatory diseases, granulomas and neoplasms were excluded. Patients were classified based on 3 endoscopic variables (Table 1). Treatment was selected according to the grouping of these variables.

Results: 40 patients were included: PITS in 87.5%, idiopathic stenosis in 12.5%. Distribution of patients, treatments and rate of succes are presented in Table 2

Endoscopic treatment was performed initially in 95% of patients. The treatment was successful in 45% , 26% underwent further surgical treatment and 29% needed a permanent canula or tracheal silicon stent. Of the 12 patients who underwent surgery, 2 received no prior endoscopic treatment, and 3 required endoscopic treatment after surgery. Surgical treatment was successful in 83%. 17% of operated patients had tracheal restenosis.

Conclusions: 1. The more frequent tracheal stenosis group was S2D3L1 (39%). 2. Success rate with this multimodality approach was achieved in 68% of the patients.

33219

Endobronchial Management of Central Airway Obstruction

SUBGLOTTIC STENOSIS DIAGNOSED FOURTY YEARS AFTER TRAUMA. CASE REPORT.

Atis Buls

Dpt for Pulmonology and Allergology, P.Stradins University Hospital , Riga, Latvia

A 58 year old male patient was admitted to hospital for shortness of breath. He had a history of 40 pack- years of cigarette smoking, had been often excessively using alcohol. In the past he had been injured 39 years ago and therefor his larynx was operated on. Since then his voice had been hoarse. On admission there was a stridor audible on in- and expiration. Fiberoptic bronchoscopy disclosed left vocal cord palsy and scabbard trachea on the level of 2nd to 4th tracheal cartilage rings. The degree of obstruction varied from 70% during inspiration to complete obstruction while coughing. Due to high risk of postoperative suture insufficiency a decision was made not to perform tracheal resection. An uncovered nitinol stent 20x40 mm was placed in the narrowed part of trachea. The patient admitted improvement of his breathing on the next day. During the follow- up there had been observed several occasions of breathlessness after alcohol excessess that were managed by short courses of antibiotics and steroids. Our case shows, that in some circumstances subglottic stenosis can be diagnosed even fourty years after the injury and relieve can be achieved by the use of stenting.

33232

Endobronchial Management of Central Airway Obstruction

TEMPORARY PLACEMENT OF METALLIC STENT SUCCESSFULLY RELEASED AIRWAY STENOSIS INDUCED BY RADIOTHERAPY

Qiang Li

Second Military Medical University , Shanghai, China

Background: Radiotherapy-induced airway stenosis is a rare but severe complication of external beam radiotherapy. Management of this complication remains a great challenge to clinicians. Surgical reconstruction is difficult for these patients because of the patients' condition and disruption of local anatomic structure. Regular endobronchial management including balloon dilation, high frequency electrocoagulation and permanent stenting is useful for some patients, but often is associated with high frequency of recurrence and complications.

Objectives: Retrospective analysis of the efficacy and safety of temporary metallic stenting in six patients with airway stenosis induced by radiotherapy identified by bronchoscopy from January 1,2009, to January 31,2012, at a single institution.

Methods: A novel nickel-titanium airway stent (Li's stent, Patent number: 201020269768.6) was placed into the airway through flexible bronchoscope under local anesthesia and sedation. The stent was removed about four weeks later. Clinic symptoms were collected and computed tomography and bronchoscopy were performed to examine the airway caliber and airway complications before and after stenting during the follow-up.

Results: Of the six patients included, primary diseases consisted of esophageal carcinoma in five patients and thyroid carcinoma in one patient. The average radiation dose was 64Gy(range, 48 to

72 Gy). All of the stenosis located in the middle part of the trachea with one patient had additionally left main bronchus involved. The mean caliber of the stenosis was 3.7mm (range, 3 to 5 mm). Four of the patients presented as cicatricial stenosis and the other two presented as tracheomalacia. A total of six Li's stent were placed in six patients respectively. Time period of stenting varied between 19 days and 35 days. All of the stents were successfully removed through flexible bronchoscope. One patient was successfully cured without any other endobronchial treatment. Three patients received repeated bronchoscopy after the stents were removed because of granulation; however, the granulation tissues finally became stable after cryotherapy and high frequency electrocoagulation therapy in 1 to 3 month. Two patients ultimately received permanent covered metallic stenting because of significant tracheomalacia. Main complications included granulation and sputum retention.

Conclusion: Temporary metallic stenting seems a safe and effective method for cicatricial airway stenosis without significant tracheobronchial malacia induced by radiotherapy.

33236

Endobronchial Management of Central Airway Obstruction

ARTERIAL EMBOLIZATION BEFORE ENDOSCOPIC RESECTION IN TYPICAL CARCINOID TUMORS: TWO CASE REPORTS

Rachid Tazi Mezalek¹, Antoni Rosell², Elena Escalante¹, Esther Alba¹, Jose Pablo Diaz-Jimenez³, Juan Dominguez¹, Noelia Cubero⁴, Roger Barranco¹, Rosa Lopez-Lisbona²

¹Hospital Universitari de Bellvitge , Hospitalet de Llobregat. Barcelona, Spain; ²Hospital Universitari de Bellvitge , L'Hospitalet de Llobregat. Barcelona, Spain; ³Corachan Clinic , Barcelona, Spain; ⁴Hospital Universitari de Bellvitge , Barcelona, Spain

Background: Carcinoid tumors (typical and atypical) represent a small percentage of lung tumors. Although the surgery remains the gold standard, some endobronchial typical carcinoid tumors have been treated successfully by bronchoscopy. Nevertheless endoscopic resection can produce a significant and uncontrollable bleeding that represents an impediment for a complete treatment. Moreover, risk of recurrence by residual extraluminal tumor is always difficult to fully control.

Objectives: To describe bronchial artery embolization before interventional bronchoscopy in intraluminal and no operable typical carcinoid tumors

Methods: We present two case reports. The first case is an adolescent patient with a tumor in the right main bronchus who presented a significant bleeding during the performance of diagnostic bronchoscopy. The surgical resection was postponed to avoid pneumonectomy in a growing child. The second one is a severe COPD patient with a typical carcinoid in left lower lobe bronchus inoperable due to his lung function. Embolization was performed between 24 to 72 hours before the endoscopic treatment using PVA particles (Polyvinyl alcohol particles) of 200 to 900 µm. In both cases, mechanical resection with rigid bronchoscopy was performed after photocoagulation with laser YAP (10 to 20W).

Results: The endobronchial lesions were removed safely and without any significative bleeding. The follow up at 6 months was satisfactory with no tumor recurrence in the TC scan and autofluorescence bronchoscopy.

Conclusion: Bronchial artery embolization before endoscopic tumor removal should be

considered as a treatment option in inoperable carcinoids. It allows a safe and complete resection. A multicenter study is warranted.

33245

Endobronchial Management of Central Airway Obstruction

INCIDENCE OF BACTERIAL COLONIZATION IN PATIENTS WITH TRACHEOBRONCHIAL STENTS

Daniel Huertas¹, Antoni Rosell², Jordi Dorca², Jose Pablo Diaz-Jimenez³, Maria Molina-Molina², Noelia Cubero³, Raquel Pascual², Rosa Lopez-Lisbona²

¹Hospital Universitari de Bellvitge. IDIBELL. , Hospitalet de Llobregat, Spain; ²Hospital Universitari de Bellvitge. IDIBELL. , L'Hospitalet de Llobregat. Barcelona, Spain; ³Hospital Universitari de Bellvitge. IDIBELL. , Barcelona, Spain

Objective: To describe the prevalence and incidence of potentially pathogenic microorganisms (PPM) colonizing the airways of patients with tracheobronchial stents. **Methods:** We included consecutive clinically stable patients attended either for palliative treatment of cancer or for post inflammatory tracheal stenosis in which silicone or metal expandible stents were implanted. Previous to endoscopic treatment, bronchial washings (BW) sample were obtained by flexible bronchoscope after the patient was intubated with rigid bronchoscope under general anesthesia. All patients had at least 1 control after 2 weeks. Microbiological results were expressed qualitatively and divided by quarters; only the first sample of each quarter was chosen.

Results: We retrospectively studied 39 patients during a median of 128 days (12-448), 28 (72%) subjects were males, 9 (23%) non-smokers, 9 (23% smokers), 21 (54% ex-smokers), 12 (31%) COPD with FEV1% 58% average, benign disease 5 (13%) and malignant in 34 (87%). Silicone Dumon stent were implanted in 74% of all the cases, a metallic Ultraflex autoexpandible in 20% and a combination of both in 6%. The anatomical area have been treated were main bronchi (44%), trachea (28%) and carina (28%). See table 1 for microbiological results. Analysis for nonparametric paired data (Wilcoxon test) shows that there are significant statistical differences in the prevalence of PPM colonization (25.6% vs. 71.8%, $p < 0.05$) and the type of germ ($p < 0.05$) previous to stent implantation and in the first control (34 days of median). Subsequent analysis between consecutive quarters does not find any statistical difference, indicating that colonization persisted irreversibly. Referring to the first control, 25.6% of 39 patients remained non-colonized, 23.1% remained colonized, 2.6% sterilized the culture, while 48.7% is colonized by nuovo. This increase represents a cumulative incidence of 62.1% ($18/29 = 0.61$). Assuming the colonization as an irreversible state, the incidence density is 42 cases per 100 person-month (25 new cases during follow-up 59.47 months).

Conclusions: 1. Tracheobronchial stents are associated with a high, increasing and irreversible colonization of PPM, with an incidence of 87.5% after 12 months. 2. Incidence density is high, calculated for this sample, 42 new cases per 100 person-month. 3. The main colonizing pathogens are *Pseudomonas aeruginosa* (23.1 to 37.5%) and *Staphylococcus aureus* (23.1 to 28.6%). MARSA are not an uncommon PPM.

33263

Endobronchial Management of Central Airway Obstruction

NECROTIZING TRACHEITIS CAUSED BY CORYNEBACTERIUM PRESENTING WITH AIRWAY OBSTRUCTION

Jorge Guerrero¹, Adnan Majid², Colleen Keyes², Erik Folch², Pavan Mallur²

¹Harvard Medical School/Beth Israel Deaconess Medical Center , Boston, United States; ²Beth Israel Deaconess Medical Center/Harvard Medical School , Boston, United States

Background: Central airway obstruction (CAO) may be secondary to malignant or non-malignant causes. Most common non-malignant causes include post-intubation and post tracheostomy tracheal stenosis. Infrequently, infectious tracheobronchitis can result in central airway obstruction. Most frequent etiologies worldwide include tuberculosis, diphtheria and airway papillomatosis. Necrotizing tracheitis presenting with CAO is infrequent and most published cases are secondary to staphylococcus aureus. We present a rare case of necrotizing tracheitis secondary to corynebacterium species causing critical central airway obstruction and respiratory failure in an adult.

Case Presentation: 39 year-old woman with diabetes mellitus and coronary artery disease presented with stridor 5 weeks after coronary artery bypass surgery. Her post operative course was complicated by Dressler's syndrome treated with Dexamethasone. Computed tomography of the chest showed severe tracheal stenosis with an airway lumen of 4mm. The patient was bridged with Heliox and emergently underwent rigid bronchoscopy which showed 95% obstruction of the proximal trachea due to necrotic mucosa (Figure 1) which was debrided with cryotherapy and flexible forceps restoring patency to 90% of the airway lumen. Biopsies grew Corynebacterium species sensitive to Clindamycin and the patient was treated with a two-week course of this antibiotic. Two weeks later, the patient presented with acute dyspnea and required emergent intubation with a size 5.0 endotracheal tube. She was taken to the operating room emergently for a rigid bronchoscopy which showed near complete obstruction of the proximal and mid trachea secondary to a combination of mucus, necrotic mucosa and concentric scar. Underwent tissue debridement with cryotherapy and balloon dilation with minimal response. For this reason airway dilation was performed using the 10 mm rigid barrel. This was complicated by a 1 cm partial mucosal laceration in the mid trachea at the junction of the posterior membrane and tracheal ring on the left. A percutaneous tracheostomy tube was placed with the cuff distal to the area of laceration. The patient was discharged and readmitted 8 days later with sudden dyspnea and worsening mucus secretions via the tracheostomy tube. A flexible bronchoscopy showed suprastomal subglottic and tracheal stenosis with complete obstruction of the airway (Figure 2). The tracheal laceration had completely healed. The procedure was terminated and the patient scheduled for microsuspension laryngoscopy, CO2 LASER, balloon dilation and Montgomery T-Tube placement. Unfortunately the patient was lost to follow up and this procedure has not been performed to date.

Conclusions: Corynebacteria are aerobic gram positive bacilli that can cause a severe form of tracheitis resulting in central airway obstruction. It typically affects the immunocompromised host and patients may present with acute respiratory failure. Given the need for complex endoscopic multimodality therapy and the potential for complications, these cases are best managed at a center of excellence where an interventional pulmonologist, an otolaryngologist and a thoracic surgeon are available.

Endobronchial Management of Central Airway Obstruction

EFFICACY OF HOT POLYP SNARES IN EXCISION OF TRACHEOBRONCHIAL TUMORS THROUGH A FLEXIBLE BRONCHOSCOPE

Maria del Mar Cirino-Marcano¹, Jay Dobkin¹, Maria del Mar Cirino-Marcano¹

¹*Montefiore Medical Center/Albert Einstein College of Medicine , Bronx, United States*

Background: Tracheobronchial tumors may result in airway obstruction causing significant morbidity. Different methods for excision of tracheobronchial tumors have been reported in the literature, ranging from mechanical interventions such as rigid bronchoscopy and forceps to more advanced methods including laser and cryotherapy. We report the use of hot polyp snares, designed for resection of colon polyps, for excising endobronchial tumors.

Objectives: To review our experience with the safety and efficacy of colonic polyp snares coupled with electrocautery in the excision of tracheobronchial tumors.

Methods: Six patients with tracheobronchial tumors in which polyp snares were used during bronchoscopy were identified. All procedures were performed under conscious sedation or monitored anesthesia care and the oxygen requirements were with FiO₂

Results: All patients had tracheobronchial tumors removed with the polyp snare without any complications including bleeding, perforation or airway fire. The characteristics of the tumors and diagnoses are reported in Table 1.

Conclusion: The use of hot colonic polyp snares for resection of tracheobronchial tumors can be successfully performed with minimal sedation and through the flexible bronchoscope. This method is a form of minimally invasive tumor resection with a very low rate of complications. It should be considered in patients with localized tracheobronchial tumors of polypoid appearance.

33268

Endobronchial Management of Central Airway Obstruction

MANAGEMENT OF HIGHLY PLACED TRACHEOSTOMY TUBE OBSTRUCTING THE VOCAL CORDS- CASE REPORT

Kiranmayee Lanka

The University of Toledo Medical Center , Maumee, United States

Introduction: High tracheostomy or cricothyrotomy are no longer performed on routine basis because of the possible complication of tracheal stenosis. But it can be used as a last resort for failed airways. We present an unusual case where the tracheostomy tube appeared to be placed through the thyroid cartilage just below the vocal cords resulting in airway obstruction.

Case Report: A 72 year old female is transferred to Long term acute care facility (LTAC) in Toledo after being hospitalized for small bowel obstruction at an outlying hospital. Post-op course was complicated with prolonged intubation requiring tracheostomy placement. Subsequently, patient remained intolerant to Passy-muir valve. Airway visualization done through the tracheostomy revealed partial obstruction caused by granulation tissue at the distal end of the tracheostomy. Follow up bronchoscopy in two weeks revealed complete absence of granulation tissue which allowed better visualization of the actual placement of tracheostomy. Further examination showed that the tracheostomy is obstructing the vocal cords and interfering with patient's exhalation. CT of the neck confirmed above findings. A make shift tracheostomy tube

was customized by cutting the tip so that it just enters the trachea and maintain the airway but do not obstruct the vocal cords. Patient did well and we were able to decanulate the patient with no airway compromise.

Discussion: The patient we had in the above scenario had the tracheostomy placed on an elective basis for long term airway management. But it was placed in such a high position that it was obstructing the vocal cords causing inflammation and edema so that she could not exhale properly. The options are to reintubate and place a new tracheostomy at a lower position versus try to remove the constant irritation and inflammation caused by the present tracheostomy tube. We chose the second option and made a custom tracheostomy tube by cutting the tip so that it is in the trachea but not obstructing the vocal cords. This type of management is not recommended in any literature but it was successful in this patient. Even though it has a high risk of dislocation because of the short length, it may be helpful in situations as mentioned above.

33277

Endobronchial Management of Central Airway Obstruction

UNUSUAL CAUSE OF HEMOPTYSIS

Erik Folch¹, Adnan Majid², Jose Fernando Santacruz³, Sebastian Fernandez-Bussy⁴

¹*Division of Thoracic Surgery and Interventional Pulmonology, Beth Israel Deaconess Medical Center, H , Boston, United States;* ²*Division of Thoracic Surgery and Interventional Pulmonology/Beth Isreal Deaconess Medical Center , Boston, United States;* ³*St. Luke's Episcopal Hospital , Houston, United States;* ⁴*Clinica Alemana de Santiago/Universidad del Desarrollo , Santiago, Chile*

Background: most common causes of hemoptysis include bronchitis, pneumonia, lung cancer, aspergilloma, tuberculosis, bronchiectasis, pulmonary embolism, cystic fibrosis, diffuse alveolar hemorrhage and mitral stenosis. Images techniques and bronchoscopy are in the algorithm armamentarium to evaluate conditions associated with hemoptysis. Tracheopathia osteochondroplastica (TPO) is a rare benign disease that has particular radiologic and bronchoscopies findings and can present with hemoptysis.

Case presentation: A 34-year-old non-smoker, previously healthy man presented with a slowly progressive onset of chest pain. He described it as mid-sternal pressure, of moderate intensity (4/10), non-pleuritic, without radiation, and accompanied by an infrequent dry cough with minimal intermittent hemoptysis. There was no dyspnea, weight loss or other significant respiratory disease. He had no joint pain, malaise or fever. On physical examination: vital signs were normal, with adequate oxyhemoglobin saturation room air. He was in no respiratory distress. Inspiratory wheezing was auscultated with right-side predominance. Wheezing was not responsive to bronchodilators, and had gone unnoticed to the patient. Cardiac and abdominal exam were normal. No digital clubbing or cyanosis were seen. Joints showed no swelling or effusions. Skin exam was normal. A bronchoscopic exam confirmed the diagnosis of tracheopathia osteochondroplastica, as shown in Figures 1 and 2.

Discussion: tracheopathia osteochondroplastica is characterized by hard nodules that protrude into the airway lumen occasionally causing airway obstruction. Usually has an indolent course and may go undiagnosed for many years, however, when it is severe it may presents with chest pain, cough, exertional dyspnea, wheezing, hoarseness and hemoptysis. The etiology of TPO is unclear. The radiologic appearance is that of irregular thickening of the tracheal wall and the

cartilaginous rings with patchy calcification, comprising the anterior wall of the trachea and sparing of the posterior or membranous wall of the trachea. The lack of posterior wall involvement helps differentiate from other tracheobronchial diseases, such as relapsing polychondritis. The differential diagnosis also includes calcific airway tuberculosis and amyloidosis. Bronchoscopically, the nodules are partially or completely covered by non-ulcerated mucosa, raised and rigid, while protruding into the lumen. The beaded appearance is only confined to the anterolateral walls of the trachea. Attempts to biopsy are usually failed due to the solid and firm nature of the submucosal nodules, and friable overlying mucosa. Even by using transbronchial needles the nodules can hardly be penetrated. A rigid bronchoscope is frequently needed to obtain adequate specimens, although characteristic appearance is sufficient for diagnosis. There is no current treatment. Whenever the diagnosis is incidental, conservative management is warranted. When the process is severe and causes airway obstruction, the use of Nd:YAG laser, or mechanical debulking with rigid bronchoscope may be attempted with limited success.

Conclusion: In our patient, hemoptysis was related to friction occurring between two opposing nodules during episodes of cough. Tracheopathia osteochondroplastica should be considered in the differential diagnosis of hemoptysis.

33289

Endobronchial Management of Central Airway Obstruction

NEW GENERATION OF Y-SHAPED ENDOSCOPIC BILATERAL STENT

Massimo Torre¹, Adriana Lomonaco², Serena Conforti², Stefano Fieschi¹

¹Niguarda Hospital , Milano, Italy; ²Niguarda Hospital , Milano, Italy

Background The main problem in improving airway patency in inoperable cases of stenosis of the carina and large airways is the Y-shaped configuration of the carinal bifurcation.

Objective: Evaluation of the palliative benefit of a new stent in a group of patients with severe airways obstruction due to terminal cancer.

Methods: We employed a self-expanding single-unit, Y-shaped covered metallic stent which is characterized by easy placement under endoscopic supervision, in 10 cases of severe stenosis of the carina and main bronchi at danger of imminent suffocation due to end-stage esophageal cancer (3) and lung cancer (7). All prostheses were easily placed, under general anesthesia, through a rigid tracheoscope under bronchoscopic or fluoroscopic guidance, within 24 hours of admission. While the average time of all procedure was 30 minutes, the insertion procedure was less than 2 minutes.

Results: All patients had immediate benefits after stenting, and there were no immediate or late adverse events directly related to the stent. The 2 deaths within 1 week of stent placement were unrelated to the

stents (acute pulmonary edema and acute myocardial infarction). The average survival after stent placement was 13.4 weeks.

Conclusion: This device has excellent stability and resistance to compression and has the added benefit of easy insertion. It is therefore another useful weapon in the arsenal that can be used to maintain the airway and improve quality of life in inoperable terminal cancer cases with severe stenoses.

CENTRAL AIRWAY OBSTRUCTION SECONDARY TO A HIGH-GRADE B-CELL FOLLICULAR LYMPHOMA: BILATERAL SELF-EXPANDING METALLIC STENTS AS A BRIDGE THROUGH THERAPY

Jose F Santacruz¹, Devesh Pandya², Erik Folch³

¹*St. Luke's Episcopal Hospital / Texas Medical Center , Houston, United States;* ²*Oncology Consultants , Houston, United States;* ³*Beth Israel Deaconess Medical Center, Harvard Medical School , Boston, United States*

Background: Endobronchial lymphoma is rare, even in the presence of advanced disease. Hodgkin's disease is more often seen than Non-Hodgkin's lymphoma (NHL). One series reported that lymphoma compromised 1.1% of all endobronchial malignancies. Two types of lymphoma airway involvement have been described. Type I includes diffuse submucosal infiltrates from hematogenous or lymphatic spread. Type II includes airway involvement by a localized mass due to direct spread from lymph nodes or arising de-novo from bronchus-associated lymphoid tissue. Few cases are reported of high-grade follicular lymphoma presenting as life threatening malignant central airway obstruction (MCAO) with mixed involvement (extrinsic and intrinsic) luminal compression.

Case presentation: An 81 years old Hispanic woman presented to a community hospital complaining of productive cough, wheezing and severe dyspnea, initially diagnosed as asthma. She had history of 40-pack years smoking, and bilateral breast carcinoma, treated with bilateral mastectomies and hormonal therapy. Over the following months, she developed worsening symptoms and a transudative effusion that prompted a CT of the chest that showed severe tracheo-bronchial obstruction. Flexible bronchoscopy confirmed severe obstruction of the right main stem (RMS) and partial obstruction of the left main stem (LMS) with carinal involvement. Washings were negative for malignancy. Subsequently, she was transferred to our institution in respiratory distress requiring non-invasive mechanical ventilation. Rigid bronchoscopy demonstrated 98% obstruction of the RMS with an endobronchial tumor involving grossly the carina, and about 65% external compression of the LMS. Endobronchial debulking was done with a combination of electrocautery, argon -plasma-coagulation and the microdebrider. After balloon bronchoplasty, bilateral covered self-expanding metallic stents (Ultraflex ®) were deployed. She was discharged home on room air. Pathology results showed a high-grade B-cell lymphoma, compatible with follicular lymphoma. Further work-up showed benign findings in the bone marrow aspirate and on PET imaging, extensive mediastinal and retroperitoneal lymphadenopathy with a maximal SUV uptake of 3.2. She received chemotherapy with CHOP-R (Cyclophosphamide, Doxorubicin, Vincristine, Prednisone and Rituximab). After several cycles of chemotherapy, the stents were successfully removed. A follow-up PET scan, 5 months after the initial presentation showed an interval resolution of the multiple hypermetabolic nodes, with minimal residual FDG activity in the left para-aortic and iliac nodes.

Discussion: MCAO can present as a life-threatening situation, and as such, rapid control of the airway and re-canalization is indicated. The most common cause of MCAO is primary bronchogenic carcinoma, however other etiologies such as intrathoracic metastatic disease or endobronchial lymphoma should be considered. Given the relative good prognosis of lymphoma, multimodality tumor debulking and whenever indicated, temporary stent use should be considered to improve patient's performance status and allow further aggressive oncologic

therapy. Temporary SEMS or silicone stents may be used; with follow-up bronchoscopic surveillance to remove the stents once the obstruction has improved and avoid short and long-term stent-related complications. Ideally, the stents should be used as "bridge" through therapy to allow the patients undergo aggressive oncology therapy with the goal of improving survival.

33472

Endobronchial Management of Central Airway Obstruction

A CASE REPORT AND REVIEW ON TREATMENT OF RECURRENT RESPIRATORY PAPILLOMATOSIS- USE OF ARGON PLASMA COAGULATION

Rohit Gupta¹, Nader Mina², Sanjay Dogra³, Sikandar Ansari⁴

¹Wayne State University/ Detroit Medical Center , Detroit , United States; ²Wayne State University/Detroit Medical Center , Detroit, United States; ³Wayne State University, Detroit Medical Center , Detroit, United States; ⁴Detroit Medical Center / Wayne State University , Detroit, United States

Introduction: Recurrent Respiratory Papillomatosis (RRP) is an uncommon but potentially life-threatening viral disease. RRP is caused by human papillomavirus (HPV) types 6 and 11 and is characterized by the proliferation of benign squamous papillomas within the aerodigestive tract. It is the most common benign neoplasm of the larynx among children and described to have an aggressive juvenile form and a less aggressive adult form. Clinical features include hoarseness, stridor (first inspiratory and then biphasic), chronic cough, recurrent pneumonia, failure to thrive, dyspnea, dysphagia, acute respiratory distress or airway obstruction. Several therapies have been investigated, tried and showed promise, but there remains no 'cure' yet. There is an enormous hope for prevention of RRP through quadrivalent HPV vaccination.

Case Presentation: 58 year old female was admitted for exertional dyspnea and stridor. She was being treated for possible COPD exacerbation & had a chest CT to rule out pulmonary embolism which revealed interval enlargement of multiple tracheal masses extending from the level of thyroid to the thoracic inlet causing significant airway obstruction. The patient had a history of papillomatosis and had undergone treatment 30 years ago at an outside facility and debulking and laser photocoagulation about 6 years ago but did not follow up. A rigid bronchoscopy was performed with debulking and removal of lesions. Subsequently, argon plasma coagulation was performed to the remaining parts of the lesions which were at multiple points of the proximal part of the trachea. Patient's symptoms improved and she was discharged for follow up later in clinic.

Discussion: Although it is a benign disease, RRP is challenging as it has an unpredictable course, tends to recur and spread throughout the aerodigestive tract, and can rarely undergo malignant conversion. Surgical debulking is the mainstay of treatment but adjunctive therapy which is still under evaluation is necessary for some patients. The goals of therapy are complete removal of papillomas or reduction in burden in extensive disease, creation of patent airway, increasing the time interval between surgical procedures with preservation of normal structures and avoiding complications. The methods of surgical removal have advanced from 'cold instruments' to laser therapy with CO₂ being the most widely used. Emerging methods include microdebriders and Argon Plasma Coagulation (APC). Intralesional Cidofovir is currently the most frequent adjuvant therapy used in children with encouraging results but needs caution with reports of

carcinogenicity in animals and progressive dysplasia in human recipients. We used APC as adjuvant therapy with debulking in our patient with good results. The advantages of APC include low risk of perforation and damage of cartilage, low cost, no carbonization or vaporization of tissue and non contact use with better visibility. Thus, APC is an alternative therapy with excellent result for treatment of RRP, especially in lower airway and has promise to evolve further with time.

33495

Endobronchial Management of Central Airway Obstruction

HYPOPERFUSION-INDUCED TRACHEAL SLOUGHING COMPLICATED BY POST INTUBATION TRACHEAL STENOSIS IN A POST-PARTUM CARDIOMYOPATHY PATIENT

Armin Farajzadeh Deroee¹, Basem Abdelmalak¹, John Doyle¹, Michael Shawn Machuzak¹, Thomas Gildea¹

¹*Cleveland Clinic Foundation , Cleveland, United States*

Introduction: Although post-partum cardiomyopathy can be deadly, it usually does not affect the airway. Here we present a case of a patient with tracheal sloughing from intubation tracheal stenosis due to poor airway tissue perfusion caused by severe post-partum cardiomyopathy.

Case Description: 38 y/o female G1P1 whose pregnancy and C-section was complicated by severe pre-eclampsia and HELLP syndrome. After she was discharged home she developed progressive orthopnea, dyspnea and edema and presented to the ED with severe respiratory distress and hypoxemia. Post-partum cardiomyopathy was diagnosed and the patient was intubated for about 72 hours. A TTE showed an EF of 25%. Following extubation she developed stridor. Bedside bronchoscopy revealed a tight stenosis of the trachea 3 cm below the vocal cords.

Management: Following induction of general anesthesia (GA) and muscle relaxation, a rigid bronchoscope was placed in the subglottis. General anesthesia was maintained with IV propofol infusion, and ventilation was achieved through attaching the breathing circuit to the bronchoscope's side port, and manual positive pressure bag ventilation. Discolored tracheal tissue (sloughed mucosa) was identified. This tissue formed a stenotic ring producing a ball valve flap. Using cryotherapy and a flexible bronchoscope, sheets of tissue debris were removed from the endotracheal mucosa. The trachea was widely patent at the end of the procedure. Pathologic analysis of the tissue showed it to be membranous fragments of fibrino-inflammatory debris with focal areas of reactive squamous epithelium. After the procedure the patient was vastly improved and she was discharged home.

Discussion: The duration of intubation and cuff pressure are important factors in the development of post-intubation tracheal stenosis. The affected area in this case was unusually primarily posterior, since this tissue is believed to be less prone to necrosis because of its expansion into the esophagus after intubation. Moreover it usually takes more than three days of intubation for subglottic stenosis to develop. However in this case there was already hypoperfusion of the trachea. The difference between the tube cuff pressure and the tracheal mucosal perfusion pressure is thought to be the main factor in developing tracheal ischemia that

later results in stenosis. In this case, the already compromised perfusion had worsened the viability status of the tracheal mucosa surrounding the ETT cuff. Patients usually remain asymptomatic until tracheal stenosis exceeds 50% ; stridor usually appears only when the tracheal lumen is narrowed to under 5 mm.

33527

Endobronchial Management of Central Airway Obstruction

RESPIRATORY FAILURE DUE TO CENTRAL AIRWAY OBSTRUCTION: ROLE OF AIRWAY STENTS

Raul Perez-Vazquez¹, Sanjay Dogra¹, Tahuanty Pena¹

¹Wayne State University , Detroit, United States

Background: Central airway obstruction secondary to malignancy resulting in respiratory failure leads to poor prognosis and difficulties in liberating patients from mechanical ventilation.

Objectives: We are reporting 2 cases of patients with central airway obstruction secondary to bronchogenic neoplasias who were in respiratory failure, after successful bronchoscopic interventions and placement of airway stents they were able to be successfully extubated.

Results: Case 1: 50-year-old male who presented with swelling of his face and arms for 2 weeks. During this time he also had cough productive of clear to white sputum. He has a history of 60-pack/year smoking. CT of the thorax demonstrated a right upper lobe 2.8 cm nodule associated with right hilar and mediastinal lymphadenopathy, with invasion of superior vena cava and proximal right main stem bronchus. Bronchoscopy revealed a friable mass with 80% obstruction of the right main stem bronchus. Fine needle aspirate diagnosed adenocarcinoma. There were immediate complications from bleeding post-biopsy requiring intubation for airway protection. Two days after biopsy and while on mechanical ventilation, patient's right lung collapsed. Repeat bronchoscopy and a size 12x40mm Nitinol-Polyurethane covered stent was deployed on the right main bronchus. Repeat chest roentgenogram revealed re-expansion of right middle and lower lobes. Patient was extubated and oxygen requirements titrated down to 30% FiO₂ within 24 hours of stent placement. Patient was transferred to general medical floor, where arrangements were made for outpatient hospice. Case 2: 58 year old female admitted after presenting with dyspnea and non-productive cough for 2 days. During the first days of admission these symptoms rapidly progressed and patient had to be placed on mechanical ventilation due to increased work of breathing. Patient had been diagnosed with small cell lung cancer in the previous three months, with lesions in chest wall, mediastinum, right upper lobe, bone and brain. Palliative radiation was received for the latter. Chest roentgenogram showed a right paratracheal mass distorting the trachea. Patient was extubated within 48 hours. In the following 12-24 hours patient had several episodes of stridor, cyanosis and accessory muscle use, and required re-intubation. Bronchoscopy revealed 70-90% luminal narrowing of the right main stem bronchus secondary to a combination of extrinsic and endobronchial growth, with post obstructive patency of all segments. Based on these findings a 14x30 mm metallic covered stent was placed along the right main bronchus. Patient continued on minimal ventilatory support and was extubated after 48 hours. Patient was transferred to general medical floor where she was kept for an additional 9 days while she completed intravenous antibiotic therapy for pneumonia, a three day course of

carboplatin and etoposide, and received physical therapy for deconditioning. Two months later the stent was removed after response to treatment with chemotherapy and radiation.

Conclusions: Airway stenting may represent a viable measure to palliate respiratory failure secondary to central airway obstruction.

33550

Endobronchial Management of Central Airway Obstruction

TRACHEAL CHONDRONECROSIS SECONDARY TO MEDITATIONAL RADIOACTIVE SEEDS TREATMENT

Abdul Hamid Alraiyes¹, Abbas Abbas²

¹*Tulane University , New Orleans, United States;* ²*Ochsner Clinic Foundation , New Orleans, United States*

Background: Radioactive treatment of the chest and mediastinal tumors carries many complications. Chondronecrosis of trachea is a well-recognized delayed complication following radioactive treatment. It happens after at least one year of radiotherapy. We are presenting a radioactive seeds-induced chondronecrosis of the distal trachea 8 years following treatment of mediastinal adenocarcinoma.

Case Report: A 66-year-old woman presented with 4 months history of progressive shortness of breath and dyspnea on exertion. She had history of primary mediastinal adenocarcinoma in the year of 2000 which was treated with chemo therapy and mediastinal radiotherapy. The tumor recurred in 2004 for which she underwent a mediastinoscopy and implantation of radioactive radium seeds within the mediastinum which put her in remission again. Four months ago, she started complaining of dyspnea on exertion, stridorous breathing, and productive cough with occasional hemoptysis. On examination she was overweight and comfortable with stable vital signs. Chest exam was significant for stridorous breathing bilaterally with normal effort and good air movement bilaterally. Remaining of the systems exam was unremarkable. Computed tomography (CT) scan of the chest showed severe wall narrowing with cartilage loss of the distal part of the trachea and the proximal part of bilateral main bronchus (figure 1). Airway inspection with flexible bronchoscopy showed a normal structure of the trachea until the distal third where there was a complete disruption of the tracheal wall with cavitation and loss of epithelium due to severe necrosis. Carina and bilateral main bronchus were difficult to indentify (figure 2). Multiple airway dilatations attempted using balloon bronchoplasty at the distal trachea and bilateral main bronchus (figure 2). The anatomical distortion made it difficult to implement any type of stents considering the depth of the necrosis and the risk of bleeding from the adjuvant vascular organs. Following the dilatations there was remarkable drop in the peak ventilatory pressure and the patient had uneventful postoperative recovery.

Discussion: Chondronecrosis of trachea is a well-recognized delayed complication following radioactive treatment. Usually, necrosis of the upper airway is more common comparing to distal trachea following radioactive therapy. Predisposing factors for chondronecrosis of the airway following radiotherapy are; radiation dose, portal and frequency of radiotherapy and the stage of the tumor. Chondronecrosis develops years the radioactive treatment. Dyspnea and frequent respiratory infections are the main presenting symptoms. Diagnosis is based on clinical

presentation, imaging and mainly bronchoscopy which show a necrosis and narrowing of the trachea with different types of tracheal fistulas.

Management: Each case should be treated individually depending on the extent and depth of the chondronecrosis. Therapeutic interventions usually limited to bronchial dilatation and silicone stents placement. Surgical options like laryngopharyngectomy may can be performed for upper airway chondronecrosis. However sleeve resections and end-end anastomosis of the trachea can be performed for distal tracheal involvement.

33554

Endobronchial Management of Central Airway Obstruction

ENDOBRONCHIAL METASTASECTOMY USING ARGON PLASMA COAGULATION (APC) AS ADJUNCT FOR THE TREATMENT OF MELANOMA: REPORT OF 2 CASES AND LITERATURE REVIEW

Mohamad Zein¹, Rana Hejal²

¹University Hospitals-CWRU , 44118, United States; ²UH Case Medical Center , Cleveland, United States

Introduction: Melanoma, the most common skin cancer, is one of the most aggressive cancers that metastasize to the lung parenchyma commonly and to the bronchial tree rarely. Targeted immunotherapy with adjunctive surgical resection has improved survival in patients with metastatic disease. Extensive surgical resection, irrespective of stage or location, occasionally offers long-term survival. However, many patients present with multiple lesions prohibiting traditional surgical interventions. Moreover, recurrence is common; hence, therapeutic approaches that spare functional lung tissue are required. Here, we describe 2 cases with metastatic endobronchial melanoma successfully controlled with APC allowing immunotherapy to take effect.

Cases Presentation: Two patients diagnosed with malignant melanoma presented to the pulmonary clinic with dyspnea, persistent pneumonia and cough. Endobronchial masses were suspected by chest computed tomography. Diagnostic bronchoscopy confirmed the presence of large obstructing lesions amenable to endobronchial resection. APC was performed via flexible bronchoscopy under local anesthesia and moderate sedation. Given the large size of the tumors and multiple lesions, endobronchial control was achieved in two settings. Surveillance bronchoscopies then followed. APC was performed each time a lesion developed. This management strategy was maintained till all measurable disease resolved. Details of case management are outlined in Figures 1 and 2.

Discussion: We are reporting the first 2 cases of metastatic endobronchial melanoma successfully treated with repeated APC applications. For many years, this modality has been used during bronchoscopic procedures to debulk malignant airway tumors, control hemoptysis, remove granulation tissue from stents or anastomoses, and treat a variety of other benign disorders. In these 2 patients, prompt investigation and endobronchial management using APC provided a safe, quick relief of pulmonary symptoms and allowed patients to benefit from original treatment modalities.

Minor obstruction can be asymptomatic, however rapid deterioration, may occur if swelling or secretions increase the degree of luminal impingement during a respiratory tract infection.

Consequently, any signs of impaired oxygenation and ventilation should prompt direct bronchoscopic examination for possible airway blockage even in the absence of radiological evidence.

Conclusion: Endobronchial metastatic melanoma carries high morbidity. Novel approaches to improve survival as well as quality of life are warranted. APC metastasectomy as adjunctive therapy would improve the efficacy of targeted immunotherapy by providing symptomatic relief and probable cure.

33559

Endobronchial Management of Central Airway Obstruction

PRE- AND POST-STENT MODELING OF AIRFLOW DYNAMICS AIDS IN PATIENT SELECTION FOR STENTING FOR MALIGNANT AIRWAY OBSTRUCTION

Faiz Y Bhora¹, Cliff Connery², David Lee², Gary Schwartz², Scott Belsley², Syed Razi²

¹*Continuum Cancer Centers of New York, St. Lukes-Roosevelt Hospital Center, New York, United States;* ²*St. Luke's-Roosevelt Hospital Center, Columbia University College of Physicians and Surgeons, New York, New York, United States*

Background and

Objectives: Airway stenting for malignant obstruction has been demonstrated to improve performance status as well as improve survival. While radiographic improvement in airway diameter can be achieved with stenting, not all such patients have physiologic improvement in their symptoms. We aimed to evaluate the changes in airflow dynamics before and after stenting for malignant airway obstruction and correlate with anatomical and clinical outcomes.

Methods: A retrospective review was performed for 106 tracheobronchial stents deployed in 75 patients over a 3 year period at a single institution by a single surgeon. Eastern Cooperative Oncology Group (ECOG) and Medical Research Council Dyspnea Scales (MRC) were used to evaluate performance status. Pre- and post-stent CT scans were used to quantify improvement in airway caliber. Three-dimensional volumetric airway meshes were generated using ScanIP and +ScanFE software (Simpleware Ltd., Exeter, UK) and were subsequently exported to FLUENT (Ansys Inc., Canonsburgh, PA) for computational airflow dynamics. A two-equation turbulence model ($k-\epsilon$) was employed to simulate inspiratory airflow from the tracheal inlet to the main stem bronchi pre- and post-stenting. Computations were performed at a constant turbulent flow rate of 0.005 m³/s to simulate airway obstruction.

Results: In patients where airflow parameters including velocity, turbulence, and pressure gradient were significantly improved following airway stenting, there was significant improvement in dyspnea. Patients who had no significant improvement in airflow dynamics did not have improvement in dyspnea, despite radiologic improvement in airway caliber.

Conclusion: Improved performance status correlates best with improved airflow dynamics as measured by a three dimensional airway model. Pre-stent modeling of patients with malignant obstruction incorporating anatomic as well as flow characteristics could optimize patient and stent selection.

32862

Endobronchial Radiation

HIGH DOSE RATE (HDR)BRACHYTHERAPY IN RECURRENT BENIGN COMPLEX

TRACHEOBRONCHIAL STENOSIS : EXPERIENCE IN TWO CASES

Jamsak Tscheikuna¹, Supparerk Disayabutr²

¹Siriraj Hospital , Bangkok, Thailand; ²Siriraj Hospital, Mahidol University , Bangkok, Thailand

Benign complex tracheobronchial stenosis (BCTS) is a tracheobronchial stenosis that longer than 1 cm or has more than one site of stenotic area. Most common etiology of the stenosis is endobronchial tuberculosis. BCTS causes challenge in diagnosis and management because of nonspecific presentation and usually precluded surgical treatment. Available intervention bronchoscopic techniques fail to manage BCTS because of high rate of restenosis. Experience in using HDR brachytherapy to prevent restenosis in two cases of BCTS is reported.

Methods: Retrospective analysis of data from medical records of BCTS patients who received HDR brachytherapy to prevent restenosis was done. The indication, sites, length, etiology, number of intervention bronchoscopic procedure and time interval before the brachytherapy were reported. Outcomes after HDR brachytherapy were shown.

Results: There were two cases of BCTS who received HDR brachytherapy in order to prevent restenosis. First case was a 39 year-old female who had 5 cms tracheal and 2 cms left main bronchial stenosis from endobronchial tuberculosis. After 36 procedures of tracheobronchial dilatation by rigid bronchoscopy and two tracheal stents placement, her trachea became restenosis in average time of 1 month. She also developed anaphylactic reaction with lidocaine. She received HDR brachytherapy with the dose of 10 Gy and no restenosis was found after 5 months follow up. The second case was 18 year-old male who had 4 cms tracheal stenosis from post intubation. He was done dilatation and stenting trachea because he refused surgery. After 1 year, the tracheal stent was removed and rapid restenosis of the trachea resulted in respiratory failure occurred in 7 days. The tracheal stent was re-implanted and 1 year later 7.0 Gy HDR brachytherapy was done after stent removal. He was doing well 4 months after with 50% tracheal stenosis and occasional stridor.

Conclusion: Failure of intervention bronchoscopic techniques in management of BCTS was significantly shown by the restenosis even after endobronchial stent placement. HDR brachytherapy had a beneficial role in preventing granulation tissue formation and delay or prevent restenosis after bronchoscopic dilatation in selected case of BCTS patients. The case selection and long term outcome were needed before introduced HDR brachytherapy to be the standard care of BCTS patients.

33024

Endobronchial Radiation

IS THERE A ROLE FOR RADIATION THERAPY IN TRACHEOBRONCHIAL AMYLOIDOSIS?

Gustavo Cumbo-Nacheli¹, Thomas Gildea², Vinay Shah³

¹Cleveland Clinic , Cleveland, United States; ²Cleveland Clinic , Cleveland, United States;

³Synergy Medical Education Alliance , Saginaw, United States

Background. Tracheobronchial amyloidosis is an unusual primary disease of beta-amylin deposition, often with lesions large enough to result in complex central airway impingement.

Optimal management for tracheobronchial amyloidosis remains uncertain. Various therapeutic approaches have been attempted.

Objectives: To report two cases of tracheobronchial amyloidosis, which responded favorably to local radiation therapy. We discuss the role of bronchoscopy and radiation therapy, in the management of airway deposits with luminal obstruction.

Methods. An in-depth literature review was performed using reference textbooks, and PubMed. Key words included tracheobronchial amyloidosis, surgical and bronchoscopic debulking, and radiation therapy. A retrospective chart review was conducted.

Results. Two patients presented with signs of tracheobronchial amyloidosis. Both cases required endobronchial resection of amyloid material, secondary to near complete narrowing of the airways. Balloon tracheobronchoplasty, Argon plasma coagulation (APC), and Nd-YAG laser were performed on various occasions, to restore airway patency. After several bronchoscopic procedures failed to result in durable resolution of symptoms, these two patients were referred for external beam radiation to the affected areas. This approach resulted in sustained clinical and radiologic improvement. To date, there have been no symptomatic relapses.

Conclusion. A high index of suspicion and an aggressive diagnostic approach is necessary in cases of irregular tracheobronchial wall thickening. Prompt initiation of endobronchial treatment is necessary when there is symptomatic airway obstruction. Additional low dose mediastinal radiation may be valuable, definitive, and generally well tolerated.

33459

Endobronchial Radiation

SURVIVAL AFTER PALLIATIVE BRACHYTHERAPY

Toomas Uibu¹, Katarina Nordman², Seppo Saarelainen¹, Tuija Tuunanen¹

¹Tampere University Hospital , Tampere, Finland; ²Tampere University , Tampere, Finland

Background and

Objectives: Intrabronchial radiotherapy (RT) has been used for palliative treatment of obstructing lung tumours for 60 years, but the long-term outcome of these patients has not been reported during the recent years.

Methods: We analysed the data of all 105 consecutive patients treated in our hospital in 2000-2011 and evaluated the factors affecting survival.

Results: The clinical data of the patients is presented in the table 1. The median survival after the diagnosis was 10,0 (interquartile range 3,4-18,9) months and the median survival after the procedure was 4,8 (1,8-9,6) months. The most important factor affecting the survival was the WHO performance score (figure 1). The median survival after the procedure was 2,1 months for the patients with score 3 and only 0,1 months for the score 4 patients.

The median survival was the longest for the metastatic cancers and the shortest for SLCL (figure 2). The presence of atelectasis weakened the survival, but it was better in the subjects in whom RT was able to re-open the airways (no statistical difference noted). There was a 11,4 month survival benefit for the subjects receiving chemotherapy after RT ($p=0,011$). Visible reduction of the tumour during the treatment period clearly increased the survival. The tracheal involvement of the tumour did not affect the outcome. Seven (6,7%) patients died within 3 days from the

procedure. Two cases were clearly related to the procedure - pneumothorax and tracheal oedema. The most frequent reported side effects were haemoptysis (3 reports), pneumonia (2), pneumothorax (2) and fever. One subglottic tracheal stenosis and one reactivation TBC was reported after RT. In conclusion, the survival of the patients after RT is strongly associated with the performance status of the patient and the reduction of the tumour mass in the bronchi. Combining internal and external RT, chemotherapy and cryotherapy seems to increase the survival of the patients.

33553

Endobronchial Radiation

RADIATION INDUCED FIBROSING MEDIASTITIS WITH PULMONARY STENOSIS REQUIRING ENDOVASCULAR STENTING

Anuradha Ramaswamy¹, Thomas R Gildea²

¹Cleveland Clinic , Cleveland, United States; ²Cleveland Clinic Foundation , Cleveland, United States

Background: Fibrosing mediastinitis, with proliferation of soft tissue, collagen and inflammation in the mediastinum, is rare. When it occurs, it is generally attributed to infectious causes including tuberculosis, histoplasmosis, and other fungal infections. Other less common causes include autoimmune diseases, idiopathic variety, drugs and radiation therapy. When fibrosing mediastinitis causes obstructive symptoms to vessels, the superior vena cava is more commonly affected. Extrinsic compression and narrowing of pulmonary arteries and veins is less common, and bilateral involvement is rare.

Methods: Report of one case referred to a tertiary medical center

Results : A 64 year old patient presented for evaluation to the interventional pulmonary department of our hospital. He had a prior history of Non-Hodgkin's lymphoma diagnosed 7 years earlier for which he had received chemotherapy as well as more than 20 radiation treatment sessions, using both posterior and anterior approaches, complicated by esophagitis and dyspnea during his radiation therapy. 3 years prior to presentation, he had developed pericarditis and one month earlier, he developed fever, dyspnea on exertion and purulent expectoration. He denied hemoptysis. On examination, he had diminished sounds in the right base with few crackles. Chest CT scan showed densely calcified mediastinal and hilar nodes along with presumed fibrosis of the mediastinal and hilar regions, encasing both pulmonary arteries and veins and causing stenoses, more prominent on the right. Bronchoscopy showed extrinsic compression, with occlusion of the right middle lobe (RML) and superior segments of right lower lobe. There was marked dilatation of endobronchial vessels indicative of fibrosing mediastinitis. Procedures including bronchoplasty or fogart balloon for probing of RML were unable to be performed due to severe hilar calcification. Angioplasty and stenting of the right pulmonary vein (totally occluded) and right upper pulmonary artery (severely narrowed) were successfully performed, with significant clinical improvement. Both lung perfusion and exercise tolerance improved, and further supplemental oxygen or inhalers were not required. The patient subsequently developed a viral respiratory infection approximately 3.5 years later and presented with pleural effusions and worsening pulmonary function testing. However, catheterization only showed moderate in-stent restenosis in his right upper pulm vein (40%) and arterial stents (40-50%) with 50% occlusion of the right lower pulmonary artery. 6 months later, the patient started developing dyspnea on

exertion, pleural effusion requiring thoracentesis and worsening signs of right sided heart failure and pulmonary hypertension (RVSP of 93mmHg). The patient was admitted, diuresed and underwent right heart catheterization with two pulmonary vein stents placed in the right upper pulmonary vein (80% stenosis) and pulmonary angioplasty to right upper pulmonary artery for in-stent restenosis (60%). The patient again clinically improved and continued to do well few months later, but eventually passed away. **Conclusion** : Radiation induced fibrosing mediastinitis contributing to bilateral pulmonary arterial and venous stenoses is rare. Endovascular stenting and/or angioplasty of pulmonary vessels remains a viable treatment option. However, long term risks include stent restenosis, such as occurred in our patient, requiring additional procedures to maintain stent patency.

32922

Medical Thoracoscopy

EFFECT OF ROUTINE CLOPIDOGREL USE ON BLEEDING COMPLICATIONS AFTER US-GUIDED THORACENTESIS.

Mohammad Bachar Zalt

Emory University, School of Medicine. , Atlanta, United States

Study Background and

Objectives:Thoracentesis is one of the most commonly performed medical procedures with an excellent safety profile. Clopidogrel (Plavix) is often prescribed for primary or secondary prevention of cardiovascular disease and has been associated with unwanted bleeding events. The objective of our study was to assess the safety of ultrasound (US)-guided thoracentesis in patients receiving antiplatelet (Clopidogrel) therapy.

Method: Data were collected on 30 patients taking Clopidogrel without underlying coagulation problems. These patients underwent 45 US-guided thoracenteses over 26 months. Antiplatelet therapy (Clopidogrel) was not discontinued before thoracentesis in patients who were already using it. Thoracenteses were performed and the incidence of bleeding and other complications among patients receiving Clopidogrel was reported.

Results: Between June 2009 and August 2011, there were 30 patients on Clopidogrel at the time of Thoracenteses. These patients presented with respiratory distress due to pleural effusion and underwent a total of 45 thoracenteses. There was no significant intraoperative or postoperative bleeding or other morbidity in patients who underwent thoracentesis and were receiving Clopidogrel. No patient required transfusion after the procedure.

Conclusion: Patients who are receiving Clopidogrel can safely undergo US-guided thoracentesis without interrupting the antiplatelet therapy prior to the procedure as our study showed that Clopidogrel does not increase bleeding complications after this procedure.

33105

Medical Thoracoscopy

PLEURAL CRYOBIOPSIES DURING SEMIRIGID THORACOSCOPY: A NEW TECHNIQUE

Ales Rozman¹, Izidor Kern¹, Luka Camlek¹, Mateja Marc-Malovrh¹

¹*University Clinic Golnik , Golnik, Slovenia*

Performing biopsies during semirigid thoracoscopy is often a difficult and time-consuming task due to the lack of mechanical power when using dedicated flexible forceps. The purpose of this pilot study was to test the feasibility of taking biopsy specimens by cryoprobe from the pleural cavity using semirigid thoracoscopy. Our aim was also to assess the size and quality of the specimens and the safety of the procedure. Fifteen patients with pleural effusion of unknown origin that underwent semirigid thoracoscopy were included. Biopsies were obtained using a flexible autoclavable cryoprobe 20416-032 (Erbokryo CA, ERBE, Germany) 2.4 mm in diameter. Tissue samples were obtained from 14 patients, three from each. The median size of the sample was 17.1 (3.9-86.7) mm². Of the samples, 81% were easily interpretable and 19% were interpretable with some difficulty by the pathologist. The samples were of good quality, with a low level of artifacts. The specimens were adequate for histological diagnosis, immunohistochemical staining, and DNA isolation. There were no bleeding problems after the biopsies. Cryobiopsy during semirigid thoracoscopy appears to be an effective and safe new method for obtaining biopsy specimens from the pleural cavity.

33186

Medical Thoracoscopy

IS IT SAFE TO PERFORM A THORACENTESIS ON CLOPIDOGREL?

Sonali Sethi¹, Lavanya Kodali²

¹*NY Methodist Hospital , New York, United States;* ²*New York Methodist , Brooklyn, United States*

Background: Clopidogrel (Plavix), a thienopyridine compound that inhibits adenosine diphosphate-induced platelet aggregation, binds irreversibly to platelets. Aggregation requires 7-10 days to recover as newer platelets form and enter circulation. Current recommendation for patients taking clopidogrel and needing invasive intervention such as thoracentesis requires holding clopidogrel for five days prior to procedure. Patients stopping clopidogrel after coronary artery intervention have a high risk of late stent thrombosis if therapy is interrupted within 1 month for a bare metal stents or within 12 months for drug-eluting stents. Clopidogrel is also recommended in stroke patients, patients with recent myocardial infarction or peripheral vascular disease to prevent vascular events (i.e. ischemic stroke, myocardial infarction). Clopidogrel has a mixed safety record in regards to bleeding risk depending on which invasive intervention is studied.

Objectives: Pleural effusions can complicate many disease processes and can cause dyspnea and hypoxemia. Thoracentesis for pleural fluid removal in patients with a pleural effusion is a commonly performed procedure in both the therapeutic and diagnostic settings. Bleeding is a well documented complication of thoracentesis. Bleeding within the pleural space is not amenable to application of direct pressure or cautery, and therefore coagulation disorders and medications that induce bleeding are contraindicated. The risk of maintaining clopidogrel during thoracentesis has not been extensively studied.

Methods: We performed a retrospective chart review of all patients who underwent thoracentesis from 2008 to 2011. All patients who were either on clopidogrel at the time of thoracentesis, or had it discontinued prior to performing the procedure, were included. Patients who had a thoracentesis despite being on an clopidogrel required the procedure in an urgent manner. Patients who were not on clopidogrel in the peri-procedure period were excluded.

Bleeding complications such as chest wall hematoma, hemothorax, or acute drop in hematocrit were recorded, if present. Follow up chest x-rays were reviewed for complications following the procedure.

Results: 12 patients received 13 procedures of whom 5 patients had clopidogrel stopped for an average of 5.8 days [range from 4 to 9 days] while 7 patients remained on clopidogrel at the time of the procedure. In both populations, no bleeding complications were noted. Five of the seven patients who remained on clopidogrel had chronic kidney disease while one of the five patients whose clopidogrel was held had chronic kidney disease. INR range for patients who stopped clopidogrel was [1.0-1.3], and [1-1.4] for the group that continued on clopidogrel. Patients whose clopidogrel was held prior to the procedure did not have any acute coronary events or death.

Conclusion: In conclusion, in this small series the risk of bleeding complications in patients on clopidogrel does not appear to be significantly increased during thoracentesis. A larger randomized controlled study needs to be done to confirm these preliminary results. If the results of the study are confirmed, withholding plavix for five days prior to thoracentesis may not be necessary, which can lead to reduced thromboembolic risk and obviate delay of performing the procedure.

33253

Medical Thoracoscopy

SINGLE CENTER EXPERIENCE WITH 91 INDWELLING PLEURAL CATHETERS INSERTED FOR RECURRENT PLEURAL EFFUSIONS

Eugene Shostak¹, Carla Lamb², Ghazwan Acash²

¹New York Presbyterian Hospital , New York, United States; ²Lahey Clinic Medical Center , Burlington, United States

Background: Tunneled pleural catheters have been traditionally used in the management of recurrent malignant pleural effusions and have been increasingly utilized in the management of recurrent symptomatic pleural effusion due to non malignant diseases.

Objectives: To describe the experience with tunneled pleural catheters in the management of recurrent pleural effusions due to both malignant and benign diseases, and to review associated success and complication rates.

Methods: Retrospective analysis of 91 indwelling pleural catheters inserted at a single center.

Results: Ninety-one tunneled pleural catheter insertions were performed in 88 patients at Lahey Clinic Medical Center between August 2007 and December 2011. Indications for pleural catheter insertions was malignant pleural effusions (43/91), para-malignant pleural effusions (25/91), and non malignant conditions such as refractory congestive heart failure (7/91), hepatohydrothorax (5/91), yellow nail syndrome (2/91), tuberculosis (1/91) and transudative effusions of unknown etiology (8/91). Five patients were taking clopidogrel and six patients had coagulopathy defined as platelet count < 1.5 at the time of tunneled pleural catheter insertion. Pleurodesis, defined as lack of fluid reaccumulation allowing for removal of the pleural catheter, was achieved in 25/91 patients. Nine of these patients were treated with talc pleurodesis at the time of medical thoracoscopy and one patient had instillation of talc through the pleural catheter. The remaining 15 patients underwent spontaneous pleurodesis. The average length of time from catheter

placement to spontaneous pleurodesis was 140 days. The the average survival time following catheter insertion was 57 days. One patient had an unresolving pneumothorax that required additional chest tube placement and one patient developed a large persistent pneumothorax with respiratory failure that required intubation and placing the pleural catheter to wall suction. There were 4 patients whose catheter migrated and required removal. Among infectious complications, there were 3 cases of bacterial catheter colonization, defined as a positive bacterial culture from catheter tip in the setting of independent pleural effusion analysis obtained via thoracentesis confirming absence of empyema, that were not clinically significant. There were 5 cases of mild superficial cellulitis requiring outpatient oral antibiotics with one case requiring catheter removal. There were two cases of empyema requiring intravenous antibiotics and catheter removal. The average length of time for pleural catheter insertion in cases with infectious complications was 243 days (range 7-780 days). Other minor complications included a self-limiting vagal reaction (1/38), subcutaneous emphysema (2/38) and blockage of the catheter requiring instillation of fibrinolytic agents (8/38). There were no complications related to bleeding, tumor seeding of the tract, and no deaths attributed to the insertion of the indwelling pleural catheter.

Conclusion: Tunneled pleural catheter placement is a safe and effective method for outpatient palliation of symptoms related to recurrent pleural effusions of both benign and malignant etiologies that are refractory to medical management. Complication rates are low and are often not clinically significant. Higher infectious complication rates may be associated with the length of time a catheter is present as well as more frequent drainage and manipulation of the catheters.

33275

Medical Thoracoscopy

COMBINED MEDICAL THORACOSCOPY AND INDWELLING PLEURAL CATHETER PLACEMENT FOR PALLIATION OF MALIGNANT PLEURAL EFFUSIONS

Michael A Jantz¹, Abbie Begnaud², Ragheed Alturkmani²

¹University of Florida , Gainesville, United States; ²University of Florida , Gainesville, United States

Background: The development of a symptomatic malignant pleural effusion greatly impacts quality of life. Potential interventions for malignant pleural effusions include thoracoscopy and talc poudrage, chest tube instillation of pleurodesis agents, and placement of indwelling pleural catheters. Our preference for treatment of malignant pleural effusions at the University of Florida is medical thoracoscopy and talc poudrage for pleurodesis. Pleurodesis procedures will not be effective, however, if lung entrapment prevents pleural apposition or if there is extensive pleural tumor involvement.

Objectives: We sought to determine whether placement of indwelling pleural catheters at time of thoracoscopy would circumvent potential unsuccessful pleurodesis procedures.

Methods: 84 patients with symptomatic malignant pleural effusions underwent medical thoracoscopy at the University of Florida. All these patients had experienced symptom relief after therapeutic thoracentesis. Patients with extensive tumor burden or adhesions underwent thoroscopically directed indwelling pleural catheter placement (PleurX-CareFusion or Aspira-Bard) with or without talc poudrage. The decision to place a catheter was made based on the likelihood of entrapped lung and/or potential for unsuccessful pleurodesis. Pleurodesis was not

attempted in those patients with severe pleural adhesions. The initial method of catheter insertion included placement of the guidewire and peel-away sheath adjacent to the thoracoscopy port with visualization of insertion with the thoracoscope. A second method was developed using the forceps through the scope to grasp the distal end of the catheter. After removal of the port, the catheter and scope were inserted as a unit into the pleural space. In both methods, the catheter was positioned as necessary using forceps through the thoracoscope. The subcutaneous tunneling as performed in a standard fashion in both methods.

Results: Extensive tumor involvement of the pleura, extensive adhesions, and/or apparent entrapped lung was noted in 26 of the 84 patients and they underwent pleural catheter placement under thoracoscopic visualization. Diagnoses included lung adenocarcinoma (n=13), GI cancer (n=4), breast cancer (n=3), small cell lung cancer (n=1), GU carcinoma (n=4), mesothelioma (n=1) and squamous cell carcinoma of uncertain origin (n=1). Talc insufflation was performed prior to catheter placement in 14 of the 26 patients. No complications were noted related to the procedure. Inadvertent catheter removal occurred in 1 patient when the patient unintentionally pulled the catheter out. Subsequently, pleurodesis was achieved and the catheters were removed in 6 of 13 patients treated with talc poudrage and in 2 of 13 patients with catheter insertion alone.

Conclusions: Indwelling pleural catheters may be successfully placed at the time of thoracoscopy in patients with high tumor burden and adhesions. Symptoms were controlled in all patients without complications. Some patients do have the potential for successful pleurodesis despite the findings noted at thoracoscopy and can undergo eventual catheter removal. In patients with failed pleurodesis or entrapped lung, placement of an indwelling pleural catheter at time of thoracoscopy alleviates the patient from having to undergo a second procedure for palliation of symptoms.

33296

Medical Thoracoscopy

RIGID MEDICAL THORACOSCOPY IN MANAGEMENT OF EXUDATIVE PLEURAL EFFUSION.

Essam Hassanein¹, Emad Ibrahim²

¹Alexandria Faculty of Medicine , Alex, Egypt; ²Alexandria Faculty of Medicine , Alexandria, Egypt

To evaluate the role of rigid medical thoracoscopy in the management of patients with undiagnosed exudative pleural effusion. **Design:** Prospective cohort study. **Setting:** Large, tertiary care, Alexandria university teaching hospital, Chest Department. **Subjects:** Sixty patients with symptomatic undiagnosed exudative pleural effusion.

Methods: Medical thoracoscopy using rigid non-disposable, re-sterilizable instruments was performed in all studied patients for diagnostic and/or therapeutic purposes. Pleurodesis was done when the pleural fluid was known to be positive for malignant cells before thoracoscopy or when detecting highly suspicious lesions inside the pleural cavity. **Measurements and results:** The mean age was 53.9 years (SD 13.9 years). Forty-eight (80%) patients lied in the age group between 40 and 80 years. The number of male patients was 36 (60%) while 24 (40%) patients were females. Regarding radiological findings, the pleural effusion was right-sided in 34 (56.7%), left-sided in 25 (41.6%) patients and bilateral in one (1.7%) patient. The mean amount of pleural fluid drained during thoracoscopy was 2.5 L. Pleural nodules were the commonest

lesions detected as 37 (61.7%) patients. Pleural plaques were found in 24 (40%) patients, pleural masses were found in 6 (10%) patients, focal pleural thickening was detected in 10 (16.7%) patients and finally pleural peel was found in 20 (33.3%) patients. There was significant positive correlation between the pleural nodules and the occurrence of complications ($X^2=4.435$, $p=0.037$). Regarding adhesions encountered inside the pleural space during thoracoscopy, 24 (40%) patients were adhesion-free "grade 0". Adhesions were grade 1 in 15 (25%) patients, grade 2 in 9 (15%) patients, grade 3 in 11 (18.3%) patients and grade 4 in a single patient. Pleural biopsy was of benign nature in 21 (35%) patients (TB pleuritis in 7 (11.7%) patients and non-specific pleurisy (NSP) in 14 (23.3%) patients), while malignant pleural biopsy was diagnosed in 39 (65%) patients (Bronchial carcinoma in 16 (26.7%) patients, malignant mesothelioma in 7 (11.7%) patients, metastasis from cancer ovary in 3 (5%) patients, cancer breast in 2 (3.3%) patients, adenocarcinoma of unknown primary in 8 (13.2%) patients and other malignancies in 3 (5%) patients). Thoracoscopic therapeutic interventions succeeded in 22 (88%) patients and failed in 3 (12%) patients.

Conclusions: Rigid Medical thoracoscopy in the hands of pulmonologists is generally safe, cheap, and highly effective in obtaining a histopathological diagnosis. It is very promising for the future training and for the diagnostic tools in the field of interventional pulmonology of the pleura.

Key words: Medical, Rigid, Thoracoscopy, Biopsy, Pleura, Effusion, Intervetional.

33514

Medical Thoracoscopy

A CASE OF POST-OPERATIVE HEMOURINOTHORAX

Manish Mohanka¹, Manoj Monga², Thomas Gildea²

¹*Cleveland Clinic Foundation, Lakewood, United States;* ²*Cleveland Clinic Foundation, Cleveland, United States*

Urinothorax is a rare form of pleural effusion and results from the accumulation of urine in the pleural space. Fewer than 70 cases were described in literature till 2011. We report a case of haemourinothorax after a urological procedure. Forty-seven year old female patient with history of right nephrolithiasis (status-post percutaneous nephrolithotomy and ureteral stent placement 8 days prior) presented to the emergency room (ER) with progressively worsening shortness of breath (SOB), stabbing pleuritic chest pain and dry cough of 8 days duration. Her respiratory symptoms became notable three days ago and acutely worsened over the last one day. Eight days earlier, patient electively underwent right percutaneous nephrolithotomy and two renal stones (12 mm and other stone as 2 large fragments) were removed. An indwelling 6F double-J ureteral stent was also placed. Nephrolithiasis history although known for twenty-years became concern two-months ago due to an episode of acute abdominal pain. Post-operatively, she became hypotensive with right upper back pain and was found to have near-complete opacification of the right hemithorax on chest X-ray (CXR). She received blood transfusion on post-operative day (POD)#1 due to decrease in hemoglobin level. She was discharged on POD#2 with good renal function, adequate pain control and a 5-day course of oral ciprofloxacin for a mild urinary infection in the setting of renal stones. In the ER, patient described SOB upon walking one block, besides feeling clammy and diaphoretic on exertion. The chest pain was "stabbing", "very-severe", most prominent under the right breast, radiating to the back on the

right side and worse with chest motion. She required 3 L/min oxygen by NC. She denied sputum, fever and chills. CXR revealed a large right pleural effusion. Computed tomography (CT) confirmed a large right pleural effusion with atelectasis of all right lung lobes. Chest ultrasound evaluation revealed complex fluid collection in the right pleural space. On thoracentesis, hemorrhagic fluid was found in the pleural space and a 14-French Cook pigtail catheter was inserted, removing 1500 milliliters of hemorrhagic fluid. Evaluation of pleural effusion revealed marked acute inflammation, exudative by Light's criteria. The pH and glucose were normal. LDH was elevated to 3100 (normal serum range 100-220 IU/L). Hematocrit was 14.2% in the pleural fluid and 33.5% in blood. The pleural effusion creatinine was 1.0 mg/dl, with serum creatinine at 0.6 mg/dl. Hemourinothorax was diagnosed with the pleural fluid/ serum creatinine ratio >1. Subsequent evaluation with CT chest revealed persistence of large loculated right pleural effusion necessitating video-assisted thoracoscopic surgery (VATS) and decortication. Patient was discharged 2 days later with improved symptoms. Follow-up CXR 2-weeks later revealed significant improvement in right pleural effusion without total resolution.

Summary: Urinothorax is rare, likely remains undiagnosed and underreported in literature. Urinothorax should be considered in patients with urological disorders including obstructive uropathy, trauma, surgical injury, malignancy, lithotripsy, renal biopsy and transplant. Postulated routes of leakage of urine include diaphragmatic defects, rupture of pleural space or lymphatic pathways. Diagnosed with pleural fluid/ serum creatinine ratio over 1

33529

Medical Thoracoscopy

EFFECTIVENESS OF PLEURODESIS IS INVERSELY RELATED TO NUMBER OF THORACENTESSES IN PATIENTS WITH MALIGNANT PLEURAL EFFUSION

Neeraj Desai¹, Kevin L Kovitz¹, Mary Vance¹, Sara Greenhill¹

¹Chicago Chest Center , Elk Grove Village, United States

Purpose: To determine if number of thoracenteses performed prior to thoracoscopy reflects pleurodesis success rates.

Methods: We performed a retrospective chart review of patients with a diagnosis of malignant pleural effusion that underwent medical thoracoscopy from March 2007 to March 2011. The patients were divided into two groups based on the success of pleurodesis. Patients who did not have talc pleurodesis or tunneled pleural catheter placement at the time of thoracoscopy were excluded. Demographic data, number of thoracenteses, primary malignancy, positive pleural fluid cytology and whether pleurodesis was achieved were analyzed.

Results: 63 patients underwent medical thoracoscopy, of which 35 were diagnosed with malignant pleural effusion. 11 patients had diagnostic thoracoscopy only. The remaining 24 underwent either talc pleurodesis or tunneled pleural catheter placement during the thoracoscopy. The average age was 63 ± 2.55 . There were slightly more women than men (58 % vs. 42 %). Of the 24 patients 16 (67 %) achieved pleurodesis. The pleurodesis rates in patients who underwent talc pleurodesis and indwelling pleural catheter were 86 % (1 failure) and 61 % respectively. The mean number of thoracenteses performed prior to thoracoscopy was significantly higher in patients who failed pleurodesis (2.28 vs. 1.44; $p = 0.04$). There was no statistically significant difference between the groups regarding age, sex, primary malignancy, positive pleural fluid cytology or type of intervention performed (talc pleurodesis or tunneled pleural catheter).

Discussion: The number of thoracenteses performed was significantly higher in patients who failed pleurodesis. In patients with malignant pleural effusion, the number of thoracenteses may inversely reflect success rates of pleurodesis. Whether this is due to delayed interventions or as a result of the thoracenteses remains to be determined; but, may suggest that early intervention should be considered when appropriate.

33567

Medical Thoracoscopy

ORAL DOXYCYCLINE CAPSULES VERSUS TALC SLURRY IN PLEURODESIS FOR PALLIATIVE TREATMENT OF MALIGNANT PLEURAL EFFUSIONS

Semra Bilaceroglu¹, Soner Gursoy²

¹, Izmir, Turkey; ²Dr. Suat Seren Training and Research Hospital for Thoracic Medicine and Surgery, Izmir, Turkey

Objective: Injectable forms of tetracycline and its derivatives are currently unavailable in many countries. There is still a search for an optimally effective, safe and inexpensive pleurodesis agent. Thus, in this study, we compared the efficacy and safety of bedside pleurodesis with inexpensive doxycycline (DOXY) oral capsules and frequently used talc slurry for the palliative treatment of malignant pleural effusions.

Methods: Symptomatic patients with malignant pleural effusions were randomized to receive contents of oral doxycycline capsules (500mg) or calibrated sterile talc (4gr) through chest tube. The contents of doxycycline capsules dissolved in saline, or talc slurry were given through chest tube under sterile conditions. A sample of DOXY solution prepared for each patient was sent to microbiologic cultures. Success or failure of pleurodesis, frequency of complications, cost of pleurodesis agents and survival after pleurodesis were assessed.

Results: 36 pleurodesis procedures with DOXY was performed in 34 patients whereas 39 procedures were performed with talc in 32. Chest tubes were removed within 4 d in 64% and 69% and within 7 d in 96% and 93% after DOXY and talc pleurodesis, respectively. Complete success of pleurodesis was achieved in 62% and 59%, partial success in 24% and 30%, and failure in 14% and 11% out of 34 and 38 evaluable procedures in DOXY and talc pleurodesis, respectively. The overall success rate of pleurodesis was 86% in DOXY and 89% in talc pleurodesis. Toxicity due to both DOXY and talc pleurodesis was mild and included pain (34% vs 28%), fever (8% vs 6%), and pneumothorax (1% vs 2%), respectively. No infectious complications were encountered in both pleurodesis groups. There was no microbiological growth on the cultures of DOXY solution samples. No relationship was found between instillation of intrapleural anesthetics and development of pain. The median survival after DOXY pleurodesis was 124 d vs 108 d after talc pleurodesis. The cost of 500 mg of DOXY capsules was 3-5 TL whereas the cost of 4 gr of talc was 130-200 TL. .

Conclusions: Pleurodesis with contents of DOXY capsules can provide cheaper pleurodesis with an efficacy, safety and survival comparable to those achieved with talc pleurodesis.

25312

Percutaneous Dilatational Tracheostomy

LONG-TERM DISPOSITION AFTER PERCUTANEOUS TRACHEOSTOMY: A

SINGLE INSTITUTION REVIEW

Timothy Udoji¹, David Berkowitz¹, Parks Christopher¹, Rabih Bechara¹

¹Emory University, Atlanta, United States

Purpose: Percutaneous dilatational tracheostomy (PDT) is a common procedure performed in critically-ill patients in the intensive care units (ICU) for long-term mechanical ventilation after failed attempts at extubation. Its use continues to increase globally despite debates about the proper timing and the correct identification of the patient population that will benefit the most from the procedure. There is scarce data about the potential benefit of this procedure in allowing for rapid transfer of patients out of the intensive care units. The purpose of our study was to examine the effect of this procedure in expediting disposition to sub-acute facilities.

Methods: This is a retrospective review of critically-ill patients admitted to the medical and surgical intensive care units at Emory University Hospital.

Results: 148 patients (50.7% males; 57.4% white and 35.1% black patients; 62.8% with at three or more medical and surgical comorbidities) with a mean age of 56 underwent successful PDT at a mean of 18 days after hospital admission. There was no immediate complication from the PDT procedures. Seventy-three patients were discharged to LTAC at a mean of 31 days after hospital admission. Twenty patients were discharged to acute rehab at a mean of 44 days after hospital admission. Thirteen patients were discharged to home at a mean of 39 days after hospital admission. Eleven patients were decannulated prior to being discharged from the hospital at a mean of 36 days after hospital admission. Six patients were discharged to hospice (home or inpatient) at a mean of 61 days after hospital admission. Two patients were discharged to nursing home at a mean of 74 days after hospital admission. There were no deaths from PDT procedure. Thirty-four patients experienced death (18 from withdrawal of medical care, 9 from cardiac arrest and 6 related to critical illness and multiple organ failure) at a mean of 39 days after hospital admission.

Conclusion: PDT can be safely performed in the ICU and it led to a majority of patients (n=114) being discharged from the ICU. Patients going to LTAC spent more time in the hospital prior to PDT than after the procedure. While there were no deaths attributable to PDT, most of the deaths were the result of withdrawal of medical care. As multi-disciplinary care and goals of care discussion continue to improve, there may be a potential resource utilization savings through early identification of patients undergoing withdrawal of medical in the ICU.

30135

Percutaneous Dilatational Tracheostomy

EXPERIENCE IN PERCUTANEOUS DILATATIONAL TRACHEOSTOMY IN SIRIRAJ HOSPITAL

Supparerk Disayabutr¹, Jamsak Tscheikuna¹, Viratch Tangsujaritvijit¹

¹Siriraj Hospital, Mahidol University, Bangkok, Thailand

Background: Tracheostomy is a procedure that commonly done in patients who require prolonged mechanical ventilation. The traditional method is surgical tracheostomy. In 1957, percutaneous dilatational tracheostomy (PDT) was first described and increasingly performed

after the commercial kit was available in 1985. There were several techniques of PDT. The popular techniques are Ciaglia's and Griggs' technique that were developed in 1985 and 1990, respectively. The meta-analysis by Delaney and Kevin showed that PDT was equivalent to surgical tracheostomy considering perioperative and long-term complications and PDT was more cost-effective and provide greater feasibility in terms of bedside capacity and nonsurgical operation.

Objective: To evaluate safety and complication of percutaneous dilatational tracheostomy.

Study design: A retrospective observational study.

Material and method: The data of patients who were performed PDT at Division of Respiratory Disease and Tuberculosis, Department of Medicine, Faculty of Medicine Siriraj Hospital were collected since March 2007 to December 2011. All procedures were done at bedside in intensive care unit or general ward of internal medicine under intravenous anesthesia. PDT was performed by using Griggs' technique. This technique is based on Seldinger guidewire technique and use the guidewire dilator forceps (GWDFs) to enlarge the hole in the trachea under flexible bronchoscopic visualization. The perioperative, early and late postoperative complications were collected.

Results: Ninety-one patients were enrolled with a mean age of 67.7 years old (range 17-100). Majority of patients had ASA (American society of anesthesiologist) classification 3. Most common indication for tracheostomy is failure to wean from the mechanical ventilator (74.7%). Fifty-two procedures (57.1%) were done at intensive care unit and 39 procedures (42.9%) were done at general ward of internal medicine. Mean time from consultation to date of procedure was very short (1.8 days, range 1-10). Mean duration of procedure was 18 minutes (range 5-90). The rate of perioperative complication was 11.0%. Five patients (5.5%) had desaturation and all of them were improved by short disruption of the procedure for ventilatory support. Three patients (3.3%) had moderate bleeding and one (1.1%) had severe bleeding that were stopped by electrocauterization and pressure compression. There was 1 serious perioperative complications that was accidental extubation. No perioperative or postoperative mortality that related to procedure was found.

Conclusion: PDT is a safe procedure and can be performed easily and rapidly at the bedside either in intensive care unit or general ward. This may reduce the total cost of procedure in terms of nonsurgical operation and method of anesthesia.

33145

Percutaneous Dilatational Tracheostomy

REFINEMENT OF PERCUTANEOUS TRACHEOTOMY TECHNIQUE

Mark Rumbak¹, Kimberly Cao¹, Nathan Do¹

¹*University of South Florida , Tampa, United States*

Introduction: Percutaneous tracheotomy (PT) is routinely performed in many intensive care units throughout the United States and world. The technique has been largely accepted. We present certain refinements to this technique, which may make the procedure safer.

Methods: a. Positioning of endotracheal tube. Accepted methods include flexing the

bronchoscope forward so that the light is seen through the anterior skin to give an idea of the position of insertion of the needle, ultrasound positioning of the endotracheal tube and pulling the endotracheal tube back until the cuff is just proximal to the vocal cords. We insert the bronchoscope distal to the endotracheal tube and pull the endotracheal tube back in 2mm increments until the cricoid cartilage is seen. The cricoid cartilage has a smooth surface when seen in the trachea. In contrast, when looking at the tracheal rings from the trachea, they look like many small ridges and thus differentiating the cricoid cartilage from them. The Murphy's eye of the endotracheal tube is more proximal than distal end of the trachea and so by looking through Murphy's eye, the cricoid is seen there before it is seen at the distal end of the trachea. This allows the operator to pull the endotracheal tube back less and prevents extubation. Insertion of needle can be seen to go between the 2nd and 3rd tracheal rings. b. Minimize bleeding in patients who may bleed excessively e.g. those on heparin; stop the heparin if possible, reverse abnormalities with DDAVP, give platelets if indicated. Lift the skin with a small clamp and cut the skin only but not the subcutaneous tissue, which bleeds more. Don't cut through superficial veins identified with naked eye, ultra sound or flexing with the bronchoscope. Portable cautery is used to stop any obvious oozes. c. Endotracheal tube cuff: do not deflate this when pulling endotracheal tube back as infected material behind the cuff will flood the lung. d. Minimum cuff technique; once tracheotomy tube is inserted and stabilized, it is attached to ventilator. On expiration, air is expelled through the endotracheal tube left in situ. The distal end of the endotracheal tube is placed under water and the tracheotomy tube cuff is inflated, on expiration, just until the leak through the endotracheal tube stops. This causes less damage long term.

Conclusion: We believe that the above refinements will make the Percutaneous technique safer.

33526

Radiology of the Airways

DISTAL AIRWAY CONFOCAL LASER ENDOMICROSCOPY IMAGING IN PULMONARY SARCOIDOSIS

Myung Jae Lee¹, Arthur Sung², Edwin Laryea Annan³, Mohammad Umar Sharif², Veronica Palmero⁴

¹Beth Israel Medical Center , New York, United States; ²Beth Israel Medical Center , New York, United States; ³Beth Israel Medical Center , Internal Medicine - Division of Pulmonary & Critic, United States; ⁴St Luke's/Roosevelt Hospital , New York, United States

Background: Advancements in the use of probe-based confocal laser endomicroscopy (pCLE) has allowed non-invasive visualization of the respiratory subepithelial and elastin network in real-time. Derangements in the subepithelial basement membrane structures as well as loss of autofluorescence have been reported among various diseases of the lung. In this study we used confocal imaging of distal airways in a series of patients with suspected stage II pulmonary sarcoidosis to evaluate for presence of related parenchymal structural changes.

Objectives: To obtain in-vivo pCLE imaging of distal airways in presumed stage II sarcoidosis.

Methods: We performed a prospective case-series among patients referred to our tertiary care hospital for bronchoscopic lymph node biopsy to confirm suspected stage II sarcoidosis. 6 patients were consecutively enrolled. Distal airways (right middle lobe, right lower lobe, left lower lobe and lingua) were imaged with the Alveoflex™ probe and recorded using the Cellvizio

system. Lymph node biopsies were performed via bronchoscopic-guided fine needle aspiration and were assessed by a pathologist. Images were reviewed using the Cellvizio Viewer™ software. Measurements of interalveolar septum and elastin fiber thickness were done in each imaged lung segment. All images were compared to normal historical controls obtained from the Cellvizio's image bank.

Results: 5 out of 6 patients enrolled had histologically proven sarcoidosis and 1 with poorly differentiated carcinoma. 2 out of 6 patients had a history of tobacco use. pCLE imaging of the distal airways in all patients revealed patterns of marked architectural distortion in alveolar ducts, shredded elastin fibers, thickened interalveolar septum, but no discernible evidence of subepithelial granuloma-like structures. Mean elastic fiber thickness measured $7.14 \pm 1.17\mu\text{m}$ among all patients. Mean inter-alveolar septal thickness measured $15.66 \pm 2.57\mu\text{m}$ vs. $24.85 \pm 5.23\mu\text{m}$ among patients with sarcoid vs poorly differentiated carcinoma, respectively. 1 patient with active tobacco use showed dense collections of alveolar macrophages.

Conclusion: Using confocal imaging it is feasible to see patterns of architectural distortion in the distal airways. Increased elastin deposition and interalveolar septal thickening is suggestive of active fibroblast activity in inflammatory states such as sarcoidosis, lung cancer, and tobacco use. Further studies with larger patient samples and direct comparisons to matched histopathology are needed to further assess the validity of confocal imaging as a diagnostic tool.

28223

Surgical Management of Airway Lesions

HO: YAG LASER-APPLICATION TO LARYNGOMICROSURGERY-

Kiyoshi Makiyama¹, Minoru Ikeda¹, Ryoji Hirai¹, Tomoyuki Takane²

¹*Nihon University , Tokyo, Japan;* ²*Nihon University , Tokyo, Japan*

Background: Traditionally in Japan, a carbon dioxide laser with direct laryngoscopy has been used generally for laser surgery in the laryngopharyngeal area. Because an articulated arm is used in carbon dioxide laser surgery, the surgeon must be able to look directly at the site using a microscope (if the lesion cannot be visualized in a linear manner, surgery is impossible). In recent years, surgery with a curved endoscope or flexible fiber has been increasing. When performing laser surgery using these types of endoscopes, laser beam delivery by a laser fiber system is necessary. Currently, the equipment with a laser fiber system available for use in Japan is the Holmium:YAG (Ho:YAG) laser. The KTP laser, which is a similar laser fiber system, can also be applied to laryngeal surgery, but it has not been made available in Japan yet. Ho:YAG laser has sufficient force to crush hard tissues. It can perform evaporation, incision and coagulation (hemostasis) simultaneously and the depth of reach is less regardless of the distribution of pigment or the distribution of blood vessels in the tissue, which are characteristic. It enables the treatment of target tissue only, making surgery less thermally damaging to surrounding tissue.

Objective: The Ho:YAG laser provides a different range and depth of evaporation depending on the distance between the laser fiber tip and the mucosa. We use this feature and have applied it to the treatment of laryngeal diseases. The clinical cases are presented and the potential for treatment of laryngeal diseases with laryngo-microsurgery is discussed.

Methods: We designed the following three ways of irradiation. Non-contact irradiation: With 1

Watt output (0.2 joules x 5 pulses), there is no evaporation at a distance of more than 5 mm. Evaporation occurs only at the mucosal surface at a distance of 2 to 5 mm. The depth of evaporation is 2 to 3 mm with irradiation for 3 seconds. Contact irradiation: When irradiated with light contact with the mucosa, the area of evaporation on the mucosal surface is smaller than in and evaporation can be up to a depth of about 5 mm. Shooting irradiation: When irradiated with pressing the tip of the fiber on the mucosa, only spots of evaporation are left on the mucosal surface. On the other hand, evaporation can be up to a depth of approximately 2 cm with irradiation for approximately 2 seconds.

Case reports and Discussion: Cases of hemorrhagic vocal cord polyp, laryngeal papillomatosis, T1b vocal cord cancer, and recurred vocal cord cancer were presented. For evaporation of a narrow area and point evaporation, contact irradiation was suitable. Irradiation experiments on chickens and fish showed that shooting irradiation can evaporate up to a depth of 2 to 3 cm despite the narrow area of evaporation at the shooting site. It is believed to have been proven by the experiences of treating patients with recurrent laryngeal cancer.

Conclusion: There was no residual tumor after surgery in the cases of tumor. Application of this technique to laryngeal surgery is expected.

32547

Surgical Management of Airway Lesions

A STUDY OF PREOPERATIVE PREDICTION OF A DIFFICULT CASE FOR THE DIRECT LARYNGOSCOPE TO EXPOSE THE LARYNX

Ryoji Hirai¹, Hirotaka Suzuki², Hirotaka Tomomatsu³, Hiroyuki Kishi³, Kiyoshi Makiyama³, Minoru Ikeda⁴, Ryoji Hirai³, Tomoyuki Takane³, Yusho Higuti⁴

¹*Nihon University Surugadai Hospital , Tokyo, Japan;* ²*Surugadai Nihon University Hospital , Mumbai, India;* ³*Surugadai Nihon University Hospital , Tokyo, Japan;* ⁴*Nihon University School of Medicine , Tokyo, Japan*

Background: We experience occasionally a case where it is hard for the laryngoscope to expose the larynx in direct laryngoscopic surgery. If such a case is definitely predicted before surgery, it should greatly benefit selection of surgical methods as well as surgical instruments and explanation of surgical risks to the patient. Actually, we can unconsciously estimate a certain case to be difficult exposing the larynx already at the time of preoperative examination judging from the patient's mandibular morphology and oral findings. However, we think we have no definite idea of what indexes let us make such prediction. In patients who had a laryngeal illness that was to be treated by direct laryngoscopic surgery, we made pre-operative detailed anatomical measurement of the neck for the purpose to assess difficulty in laryngeal exposure. We explored what measurement items could identify a specific case that should make laryngeal exposure difficult.

Objectives: Out of patients who received suspension laryngoscopy under general anesthesia at Surugadai Nihon University Hospital between November of 2008 and January of 2012, 160 were selected as study subjects who gave consent to participating in this study with analyzable measurement data. Their illnesses were vocal cord polyp, polypoid vocal cord, vocal cord nodule, vocal cord cyst, laryngeal papilloma, laryngeal cancer, or vocal cord leukoplakia.

Methods: Prior to surgery, the following measurements or findings besides gender and BMI were acquired: the distance between upper and lower incisors with the mouth open, atlanto-

occipital joint function, laryngeal findings with the mouth open (Mallampati test), the hyoid-mental distance, thyroid-mental distance, and sternum-mental distance. On the radiograph, we measured also effective mandibular length, and widths of posterior and anterior mandibule. We used a small-type Saitoh's laryngoscope, manufactured by Nagashima Medical Instrument Corp. Degrees of difficulty in laryngeal exposure were classified on a scale of 4 grades from 1 to 4. Grade 3 and 4 represented difficult cases. Additionally, degrees of difficulty in intubation were classified by the anesthesiologist according to the Cormack's classification. Statistical analysis was made using U-test of Mann—Whitney.

Results: Grade 1 or 2 was decided in 132 cases (82.6%) while 28 cases (17.4%) were assessed at grade 3 or 4. There was a significant difference in the distance between upper and lower incisors with the mouth open or in the width of anterior mandibule. Concerning laryngeal findings acquired with the mouth open, class II or worse pharyngeal findings as scored by the Mallamapti's scoring method could foresee difficulty in laryngoscope intubation.

Conclusion: We considered that the distance between upper and lower incisors with the mouth open, the width of anterior mandibule, and pharyngeal finding with the mouth open were predictive indexes of difficult laryngoscopic exposure of the structure.

32641

Surgical Management of Airway Lesions

A CASE OF STAB WOUNDS OF THE INNOMINATE ARTERY

Ryohei Akiyoshi

Dokkyo Medical University , Tochigi, Japan

Innominate artery stab wounds are rarely encountered. In the United States, injuries to the innominate artery have been sometimes documented. The most common mechanism of injury is low-velocity gunshot wounds, followed by stab wounds. As a result, the experience with stab wounds to the innominate artery is limited. We report a case of stab wounds of the innominate artery. A patient is a 80-year-old woman with hypertension and rheumatoid arthritis taking a steroid. She attempted suicide by a narrow gimlet several times a night in her house the day of admission. Her daughter found the patient lying on the floor in 7 hours after the accident. Her daughter took the patient to the hospital by ambulance. The patient was referred to our department for evaluation and treatment of stab wounds of the neck because she had neck swelling and dyspnea. Her vital was unstable on admission. She had pulse deficits. Computed tomography demonstrated a large bleeding area in the neck. Surgery was performed. When we had incision on frontal neck surface, we found a lot of hematoma in the wounded area. Although we tried to remove hematoma as much as possible, there was an active bleeding in the neck. We couldn't find a point of bleeding and couldn't stop it in spite of pushing it. Finally, we found a bleeding point of innominate artery. Vascular surgery was consulted. They sutured the injury of innominate artery. The operation was done. We experienced a case of stab wounds of the innominate artery. It is rare in Japan. Therefore a careful diagnosis and procedures should be done.

32903

Surgical Management of Airway Lesions

CHANGING INDICATIONS FOR BRONCHOSCOPIC ELECTROCAUTERY

THERAPY FOR CENTRAL AIRWAY OBSTRUCTION FROM PALLIATIVE, TO CURATIVE AND FACILITATIVE PURPOSE.

Rajiv Goyal

Jaipur Golden Hospital , Delhi, India

Background - Bronchoscopic Electrocautery therapy (BECT) is a technique for coagulating and burning tissue using electrocautery resulting in rapid debulking of intraluminal tumors or to cut through web like stenosis. It can be used through either rigid or fiberoptic bronchoscope. It may be used alone or as part of a multi modality therapy like balloon dilatation, stenting or mechanical coring. Conventionally BECT has been used mainly for palliative purpose in patients with central airway obstruction due to otherwise untreatable malignant disease.

Objectives - We present a retrospective analysis of patients with central airway obstruction (CAO) due to different causes where BECT was used not only for palliation, but also for cure or to facilitate subsequent cancer treatment.

Methods- Patients who presented with CAO due to different etiologies where BECT was performed were selected from the year 2009 till 2011. Patients with tumors more than 4cm in size and /or where the distal extent of the obstructed segment was not visible were excluded. Monopolar cautery was used and applied through an insulated probe, snare or knife passed through the channel of the fiberoptic bronchoscope. Outcome measures were visual assessment of deobstruction by bronchoscopist, improvement in symptoms assessed by visual analogue scale, complications, and recurrence of obstruction on follow up.

Results- There were 55 patients between 17 to 75 years of age. There were 40 males and 15 females. BECT was performed with curative intent in 22 patients. Of these 11 patients had benign tumors including 6 typical carcinoids, 10 patients had benign stenosis and 1 patient had a post bronchotomy granuloma. Palliative BECT was done in 17 cases with CAO due to advanced primary lung or metastatic malignancies to give symptomatic relief to the patients. BECT was also done in 16 cases for malignant obstruction to facilitate subsequent treatment with surgery, radiation or chemotherapy thereby prolonging survival. More than 75% deobstruction as assessed by the bronchoscopist could be achieved in 47 patients (85%) and between 50-75% in 6 patients (10%). Unsatisfactory deobstruction ie.

Conclusions - In properly selected cases BECT is an excellent modality for CAO with immediate results and minimal complications. It is very effective for palliation, in selected case it can be used for cure and may also be indicated for facilitating subsequent treatment surgery where it can be used upfront before definitive treatment.

33127

Surgical Management of Airway Lesions

USEFULNESS OF INTERVENTIONAL BRONCHOSCOPY COMBINED WITH SURGERY

Kinya Furukawa¹, Hideyuki Furumoto², Hisashi Saji³, Jitsuo Usuda³, Makoto Saito¹, Norihiko Ikeda⁴, Shingo Kobayashi¹, Takefumi Oikawa¹

¹Ibaraki Medical Center, Tokyo Medical University, Ibaraki, Japan; ²Ibaraki Medical

University , Ibaraki, Japan; ³Tokyo Medical University , Tokyo, Japan; ⁴Tokyo Medical University , Ibaraki, Japan

Background: The report of patients with respiratory disease who could receive surgery after interventional bronchoscopy (IVB) or IVB for complication after surgery is relatively rare. Also, the influence of IVB on surgical procedure is virtually unknown.

Objectives: To assess the usefulness and clinical issue of IVB combined with surgery.

Methods: We experienced a total of 10 patients treated by IVB combined with surgery (lung cancer: 5, bronchogenic cancer involved carina: 3, empyema with fistula: 2, the details are shown in Table), 6 of whom were performed IVB first. In 3 of 5 lung cancer patients, because of improvement of severe dyspnea and/or general condition after IVB, we could perform surgery. A patient with severe cicatricial stenosis caused by photodynamic therapy (PDT) was performed right middle and lower lobectomy after Dumon stent placement in the right main bronchus. The remaining 2 patients were performed left lower lobectomy. One was after snaring and argon plasma coagulation (APC) of the polypoid tumor which located in left main bronchus originated from B6 followed by induction chemotherapy, and another was after endobronchial Watanabe spigots (EWS) occlusion to stop bleeding from peripheral lung cancer. We experienced 3 patients with bronchogenic cancer involving the carina. One of 3 patients was treated by a Dumon-Y stent placement followed by carinoplasty, and the remaining 2 patients were performed stenting for the anastomotic complication after carinoplasty. Two patients of empyema with fistula were performed EWSs occlusions of drainage bronchi to improve aspiration pneumonia followed by thoracoplasty with muscle flap packing, or omentopexy.

Results: Dumon stents or custom-made stents were placed for the bronchial stenosis or anastomosis complication in 5 patients. EWSs were used to occlude the bronchi for the purpose of stopping aspiration of blood in 2 patients, or purulent discharge in 2 patients. In a lung cancer patient, electrocautery alone using snaring and APC was performed for reduction of the tumor extent. The findings of patients who were performed lobectomy showed severe adhesion and hypertrophic scar surrounding the treated bronchial wall and lymphoid hyperplastic change in the hilar and mediastinum lymph nodes. These inflammatory reactions make the surgical procedure difficult. We lost the patient of Dumon-Y stent placement followed by carinoplasty caused by anastomotic failure due to infection of pseudomonas aeruginosa.

Conclusion: We need careful manipulation and management on surgery after IVB because of severe inflammatory reaction and infection due to biofilm. However, we should realize that there are some patients who can be treated by surgery after IVB because of improvements of their conditions. Also, IVB is useful for the management of anastomotic complication after surgery. It is important to devise a strategy for the management of a patient with respiratory disease always considering the treatment of IVB combined with surgery.

33158

Surgical Management of Airway Lesions

TEMPORARY ENDOBRONCHIAL EMBOLIZATION WITH SILICONE SPIGOTS FOR MODERATE HEMOPTYSIS: A RETROSPECTIVE STUDY

Olivier Bylicki¹, Herve Dutau², Philippe Astoul¹, Sophie Laroumagne¹, Thomas Vandemoortele³

¹Hopital Nord , Marseille, France; ²Hopital Nord; ³Hopital Nord , Marseille, France

Background: Management of airway bleeding is generally performed in emergency in order to prevent hypoxemia and lung flooding .When the bleeding arises from peripheral lesions, not visible endoscopically, bronchoscopic options have limited curative intents. They generally precede radiological or surgical managements. Endobronchial embolization using silicone spigots (EESS) is a novel approach.

Methods: We retrospectively reviewed charts of patients referred to our center for moderate hemoptysis (MH) who underwent EESS since 2008. Successful management is defined as immediate bleeding cessation

Results: From December 2008 to January 2012, nine patients (pts) have been treated with EESS in our endoscopy unit. The etiology of MH was known for 6 cases (4 lung cancers, 1 bronchiectasis, and 1 anticoagulant overdose) and 3 were unknown. The MH originated from the left upper lobe in 4 cases, the right upper lobe in 3 cases, the right middle lobe and the left lower lobe in one case each. 13 spigots were inserted. Success rate was 78%. Failures were due to difficult bronchial anatomy access. Of the 9 pts, 6 were then referred to interventional radiology for bronchial artery embolization, with a success rate of 83% and two were referred for thoracic surgery. One patient had EESS as definitive treatment. For the remaining 8, the silicone spigots were bronchoscopically removed after a median of 4 days in 6 patients. Only 2 pts had hemoptysis recurrence after a median follow-up of 107 days [13-1017]. None of the patients died from hemoptysis. There were no complications from EESS.

Conclusion: EESS is an original, temporary technique that only requires a flexible bronchoscope and biopsy forceps for placement and removal. EESS allows airway protection while waiting for definitive management.

33191

Surgical Management of Airway Lesions

FUNCTIONAL OUTCOME AFTER CONCURRENT CHEMORADIATION IN PATIENTS WITH LOCALLY ADVANCED LARYNGEAL OR HYPOPHARYNGEAL CANCER.

Madoka K Furukawa¹, Masaku Furukawa²

¹Kanagawa Cancer Center , Yokohama, Japan; ²Yokohama City University Medical Center , Yokohama,, Japan

Objective: Laryngeal or hypopharyngeal carcinomas are more frequently treated using chemoradiation as an organ preservation therapy. Functional assessment of larynx and hypopharynx preserved after chemoradiation is important. We evaluated changes of laryngeal and hypopharyngeal function after concurrent chemoradiation in patients with locally advanced laryngeal or hypopharyngeal cancer. Patients: Fifty-eight patients with locally advanced laryngeal(13cases) or hypopharyngeal(45cases) cancer treated with concurrent chemoradiation between January 2000 and December 2010, those could be followed over 1 year after chemoradiation without recurrence were evaluated focusing on function of larynx and hypopharynx(StageII 5, III 17,IV 36 cases).

Results: Six patients required a tracheostomy before treatment, and 1 patient required a tracheostomy 3 years after treatment because of laryngeal stricture. Four patients complained of dysphagia after treatment. One of these 4 patients complained of dysphagia even before

treatment . Other three patients had no dysphagia before and immediate after treatment , but swallowing difficulty began more than 1 year after treatment.

Conclusions: After chemoradiation of locally advanced laryngeal or hypopharyngeal carcinoma, gradual decrease of laryngeal and/or pharyngeal function may occur. Patients receiving chemoradiation should be informed about the possibility of dysfunction of larynx and pharynx long after treatment.

33283

Surgical Management of Airway Lesions

LARGE FOREIGN BODY IN THE TRACHEA.

Sikandar Ansari¹, Nader Mina², Rohit Gupta², Sanjay Dogra², Sunil Jhalaria³, Tahaunty Pena²
¹*Detroit Medical Center / Wayne State University , Detroit, United States;* ²*Detroit Medical Center/ Wayne State University , Detroit, United States;* ³*Detroit Medical Center /Wayne State University , Detroit, United States*

Foreign body aspiration is more common in children, when it is present in adults it is usually associated with risk factors like altered mental status or oropharyngeal motility problems. The foreign bodies usually comprise of food material or at times teeth and cases of paper clips lodged in the airway have also been reported. Larger foreign bodies although have been reported to be found in the gastrointestinal tract , it is not hard to imagine that due to the limited size of the airway , they are very uncommonly found in the lower airway. A 26 year old male presented to the ED with shortness of breath, non productive cough and a sensation of globus for about 20 hour duration. He denied any previous medical history but did mention that he smokes tobacco, abuses alcohol and heroine. Last use of heroine was more than a week prior to presentation. In the ER he had sinus tachycardia, was tachypneic with a rate in the 30s , a blood pressure within the normal range, was using accessory muscles for breathing and his pulse oximetry was 79% on room air (91% on 100% FiO₂). His ABG showed a PH of 7.13, a PCO₂ of 69, a PaO₂ of 153 and a oxygen saturation of 98% on 100% FiO₂.Chest rise was appropriate bilaterally, breath entry was heard bilaterally with no wheezing or crackles, but a harsh inspiratory stridor like sound was heard over the upper trachea. An ENT evaluation showed pharyngeal mucositis, involving the larynx (erythema and mucous) but no airway obstruction up to the vocal cords. A urine drug analysis was positive for opiates. Other basic labs did not show any abnormalities. He had worsening respiratory failure and had to be intubated and put on mechanical ventilation. A CT scan of the chest was done which showed a small left sided pneumothorax , pneumomediastinum , bilateral anterior chest subcutaneous emphysema and filling defects in the lower trachea and the upper bronchi on both sides. Bronchoscopy was done which showed a plastic bag in the lower trachea, resting on the carina and occluding 90% of the airway into both bronchi [Images 4]. Patient was taken to the operating room with the plan of doing rigid bronchoscopy . However using a therapeutic bronchoscope and grasping forceps the plastic bag was able to be grasped, and slowly trying not to rupture it, was pulled out intact along with the ET tube. The patient was re intubated immediately and the airway was stabilized. The bronchoscope was then re introduced, and mucous discharge was found after the point of obstruction [image 6].

33482

Surgical Management of Airway Lesions

TRACHEAL METASTASIS FROM ADENOCARCINOMA OF THE COLON

Mingsi Li¹, Joseph Scharpf¹, Thomas Gildea¹

¹*Cleveland Clinic Foundation , Cleveland, United States*

Colorectal cancer is the third most prevalent cancer in the United States and accounts for approximate 9% of all cancer related deaths. The most common sites of metastasis are liver and lungs. Despite its commonality, metastatic colon cancer to the trachea is exceedingly rare. In fact, metastatic cancer to the trachea from any distant site is very uncommon, and has been documented in only a handful of case reports. We report on a 66 year-old man with a history of metastatic adenocarcinoma of the cecum, who was initially treated with surgical resection at the primary site, lobectomy for pulmonary metastasis and chemotherapy. Twenty-one months after the diagnosis and initiation of treatment, he presented to the hospital complaining of productive cough with blood tinged sputum, and was found to have metastatic disease to the trachea on bronchoscopy. Three areas of recurrence were identified in the trachea. The first was located in the right posterior lateral wall extending from the inferior border of the vocal cord to approximate 2 cm into the trachea. The second and third areas were located in the anterior and posterior wall at 4 cm into the trachea. The tumors were resected using a cautery snare with the exception of tumors close to the vocal cord, which were resected using flexible biopsy forceps. All of the resected areas were treated with argon plasma coagulation after the resection. Post-operatively, the patient received palliative radiation. Despite treatment, he developed early recurrences in the trachea 2 months later, and was ultimately treated with brachytherapy and chemotherapy.

33536

Surgical Management of Airway Lesions

OLD STENTS, NEW TECHNIQUE FOR MANAGEMENT OF TRACHEOMEDIASTINAL FISTULA.

Ashish Prakash Maskey¹, Michael Shawn Machuzak², Thomas Gildea², Wissam Jaber³

¹*Cleveland Clinic Foundation , Cleveland, United States*; ²*Cleveland Clinic , Cleveland, United States*; ³*CCF , Cleveland, United States*

Tracehoemmediastinal fistula (TMF) is a rare but a serious complication of lung cancer. The fistula causes recurrent mediastinitis and pneumonia. This can significantly contribute to morbidity and mortality. Definitive treatment for cancerous TMF includes radiation, chemotherapy, and rarely surgical intervention. More often palliative measure is the only option. Bronchoscopic endoscopic procedure and tracheal stenting have shown to add some quality of life for the patient. In order to palliate symptoms, various endoscopic procedures including, tracheal stent, autologous adipose-derived stem cells, and surgical techniques have been attempted. We report a patient with a large TMF secondary to adenocarcinoma of the lungs. The CT scan showed air around the right side of the trachea and the RUL mass with a necrotic center. A repeat CT of the chest showed the TMF along with a bronchopleural fistula extending from the

posterior aspect to the distal trachea into the right upper lobe. A large portion of the right postero-lateral wall of the trachea was missing with fistula between the trachea and the lung parenchyma. (Fig 1, 2). As a palliative measure rigid bronchoscopy was performed under general anesthesia with the patient spontaneously breathing to avoid positive pressure. Airway showed tumor infiltration of mid trachea causing obliteration of 40% of the tracheal wall extending down to and including the main carina. At the junction of the carina and the right main stem there was a necrotic flap with a fistulous communication with the lung parenchyma. Initially an Ultraflex self expanding covered stent (Boston Scientific Corp, Natick, MA) measuring 16 mm in diameter and 60 mm in length was deployed in the trachea. Dumon Y stent measuring 16 mm in diameter, with tracheal stem shortened to 25 mm with bronchial limbs 13 mm in diameter, shortened to 1 cm on both sides was deployed through the Ultraflex with a Dumon rigid bronchoscope. The Y stent provided support and patency to the narrowed carina and the main stem bronchi. It also closed the fistula between the carina and the upper trachea. After the initial placement of the two stents, serial surveillance bronchoscopies were performed. Two years later both the stents remained in good position, except that the Ultraflex stent shows features of fatigue. As the disease progressed, radiation therapy was attempted as palliation despite our best recommendations. The patient died as a result of exanguinating/asphyxiating hemoptysis. Self-expanding metallic stents have been used in tracheoesophageal fistula with variable success. There are only few case reports of TMF closure with metallic stents. Both bare metal stents and covered stents have been used successfully in bronchomediastinal fistula. In our case we used a self expanding metal stent through which a Dumon Y stent was inserted providing closure of the TMF in the trachea and the carina. The stents also provided patency to the airways with significant improvement in dyspnea. The two year survival was surprisingly long. This technique has never been reported in the past.

33547

Surgical Management of Airway Lesions

TRACHEOBRONCHIAL MUCOEPIDERMOID CARCINOMA- A REVIEW OF 10 RESECTED CASES.

Koichi Yoshida¹, Hidetoshi Honda¹, Jitsuo Usuda², Naohiro Kajiwara¹, Norihiko Ikeda¹, Tatsuo Ohira¹

¹Tokyo Medical University, Tokyo, Japan; ²Tokyo Medical University, Shinjuku-ku, Japan

Background: Mucoepidermoid carcinoma (MEC) of the lung is a tumor of low malignant potential of bronchial gland origin. MEC is considered to be salivary gland-type neoplasms. MEC is comparatively rare with an incidence of all lung cancers.

Purpose: The aim of this study was to identify the clinicopathological features of MEC.

Method: We recently encountered 10 cases of this type of lung cancer. This study retrospectively investigated the features of MEC which were resected at Tokyo Medical University Hospital, Tokyo from 1989 to 2011.

Results: There were 7 males and 3 females, with the median age of 40 years (range, 16-69 years). Most of MEC presented in the main bronchus (20%), in the second carina (30%), and in a segmental bronchus (20%). Computed tomography showed well defined nodules or masses with a smooth margin in most of cases (90%). There were 6 patients with stage IA, 3 patients with

stage IB, and one patient with stage IIIA. 6 patients underwent lobectomy. One patient received bilobectomy, 2 sleeve lobectomy, and one patient received pneumonectomy. MEC tumors ranged in diameter 15 to 40mm (mean, 26.9mm) histologically. MEC tumors (60%) were low grade, and 40% were high grade malignancy by histology. No patients received neo adjuvant or adjuvant therapy.

Conclusions: MEC is extremely rare. There were no significant correlation between prognosis and histological grade in our experience. MEC have to be treated by radical surgery with lymph node dissection. Patients with lymph node metastasis (N2 disease) or high grade MEC can be expected to be cured following complete resection .