

TUESDAY, SEPTEMBER 27TH 2011

### 399. The basic and the future: pure diagnostic or dedicated wavelengths play

#### P3680

##### The comparison of the two methods of hot biopsy and forceps biopsy in diagnosing endobronchial tumoral lesions

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**Introduction:** Forceps biopsy is a standard method for taking samples from endobronchial tumors whose most important complication is bleeding. Using electrocautery connected to the forceps (hot biopsy) is a way for controlling bleeding during sampling. But the main concern is if the sample tissue is sufficient for diagnosis, histological and pathologically or not. The aim of this study is to compare the diagnostic value of these two methods and also study their bleeding as a side effect.

**Materials and methods:** In this study 36 patients with endobronchial lesions underwent flexible bronchoscopy. First, three samples were taken without coagulation (Cold) and then three more were taken with coagulation (hot) at voltages 10, 20 and 40. The samples were blindly studied by pathologist. The severity of bleeding was determined by a non bronchoscopist.

**Results:** There was a meaningful difference between the amount of bleeding in hot and cold methods ( $p < 0/05$ ), but not between different voltages ( $p > 0/05$ ). There was no difference in the rate of tissue damage in voltages 20 and 40, but a meaningful difference was observed between the two voltage sets of 10 and 40 ( $p = 0/048$ ), and in 10 and 20 ( $p = 0/047$ ).

**Conclusion:** Using hot biopsy method in diagnosing endobronchial tumoral lesions reduced the amount of severe bleeding and the rate of tissue damage was not affecting the histological and pathological studying.

#### P3681

##### Comparison of hot versus cold biopsy forceps in the diagnosis of endobronchial lesions

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**Background:** Traditionally cold biopsy forceps were used for endobronchial biopsy; recently electrocautery (hot) bronchoscopy biopsy forceps are introduced. It is hypothesized that hot biopsy forceps may decrease procedure related bleeding and also may decrease the quality of obtained samples.

**Methods:** Patients with different indications for endobronchial biopsy underwent three hot and three cold endobronchial biopsies with a random fashion. All biopsies were obtained with a single biopsy forceps with and without the application of an electrocoagulation current, set on soft coagulation mode (120W). A four point scale was used for quantification of bleeding. A single pathologist blinded to the patients' history was requested to review all samples. A three point scale was used to assess electrocoagulation damage.

**Results:** A total of 240 biopsies were obtained from 40 patients. Frequency of positive concordance between the two methods was 85%. The degree of electrocoagulation damage of the samples was as follows: grade 1=52.5%, grade 2=32.5%, and grade 3=15%. The average bleeding score following hot biopsy was significantly lower compared to the cold biopsy ( $p = 0.006$ ). The concordance between diagnostic yield of hot and cold biopsies was 85%. There was no significant difference between the diagnostic yields of two biopsy methods ( $p = 0.687$ ).

**Conclusions:** In this study, hot biopsy forceps significantly decreased the procedure related bleeding and minimally impaired the quality of samples. Regarding low prevalence of bleeding following endobronchial biopsy, routine use of hot bronchoscopy forceps is not reasonable. However, familiarity of bronchoscopists with this method may improve bronchoscopy safety.

#### P3682

##### Evaluation of lung biopsy techniques for diagnosis of idiopathic interstitial pneumonias

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**Aim:** To assess and compare efficacy and safety of medical thoracoscopic lung biopsy with transbronchial lung biopsy (TBLB) for diagnosis of idiopathic interstitial pneumonias.

**Material and methods:** 59 patients with restriction on spirometry (Mean FVC -1.41 litres), exertional dyspnoea and interstitial pattern on HRCT (non classical for UIP) underwent lung biopsy using medical thoracoscopy. 31 patients with comparable clinical profiles subjected to bronchoscopy and TBLB were used as controls.

**Results:** (Study group) Overall diagnostic yield was 98.3%. UIP (59.3%) was most frequent histopathological pattern. There were no intraoperative or immediate post-operative complications. Eventual complications included (in 19 patients) air leaks and prolonged ICD drainage (10), Delayed wound healing (3) and need for ventilatory support (5). Average duration of ICD was 4.81 days and average length of hospital stay was 6 days. There were 5 deaths within 1 month of the procedure (1 attributed to ischemic heart disease and Left ventricular failure, two to nosocomial pneumonia, two to unknown cause post discharge). Prolonged prior steroid use was single important factor associated with increased incidence of complications (14/23 complications in patients steroids vs. 5/36 complications in patients off steroids) ( $p < 0.05$ ). In the control group conclusive diagnosis was reached in 3/31 cases (1 Sarcoidosis, 1 DIP, 1 BOOP). Pneumothorax needing intercostal drainage was encountered in 2 cases.

**Conclusions:** 1. Medical thoracoscopic Lung biopsy has higher diagnostic yield than TBLB. (98.1% vs 9.7%) ( $p < 0.0001$ ). 2. Prolonged prior steroid use is associated with increased incidence of complications ( $p < 0.05$ ).

#### P3683

##### Serial transbronchial biopsies in patients with lung cancer after radiation therapy

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**Background:** Radiation therapy (RT) may cause lung damage in patients with lung cancer. However, serial microscopic evaluation of human lung parenchyma after irradiation is lacking. Transbronchial biopsy (TBB) is a bronchoscopic sampling tool for a variety of bronchial and pulmonary lesions.

The aim of the present prospective study was to assess lung parenchyma lesions after RT by serial TBBs.

**Methods:** 14 patients with lung cancer necessitating radiation therapy agreed to participate the study. Of these patients, 12 (85.7%) were assessable. TBB were obtained to the opposite of the tumor lung. Serial TBBs were performed before, just after RT and every 6 months in the first year of follow-up. Evaluation of each specimen was based on the presence of congestion, inflammation, hemorrhage and fibrosis, all these parameters giving a final total score.

**Results:** A median number of 4 biopsies were taken per patient and per procedure (range 2-6). In 11/12 patients (91%) congestion was present within the period of follow-up. All these patients presented a late evolution of a different degree of fibrosis at their TBB. Total score was before RT =  $3.1 \pm 3$ , just after RT =  $5 \pm 1.3$  and at 6 months =  $6 \pm 1.9$ . Significant difference was observed between before and after RT ( $p = 0.047$ ) and before and at 6 months after RT ( $p = 0.01$ ). Major limitation of the study was the low patient accrual due to the proposed repeated procedures in patients with advanced stage disease and, at the end, poor performance status (overall median survival after RT 8 months).

TUESDAY, SEPTEMBER 27TH 2011

**Conclusion:** Our study, although limited in accrual, showed that microscopic evaluation of lung parenchyma is possible with serial TBBs in lung cancer patients after RT.

**P3684****The combined conventional bronchoscopic methods are still useful in diagnosis of sarcoidosis**

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**Introduction:** At present EBUS-TBNA and EUS-FNA methods are suggested as the best methods in diagnosis of sarcoidosis. Until now a lot of pulmonologists use the standard endoscopic procedures to confirm this disease. In our study we present the results of the combined conventional bronchoscopic methods such as endobronchial biopsy (EBB), transbronchial lung biopsy (TBLB), transbronchial needle aspiration (TBNA) in diagnosis of patients with suspicion of sarcoidosis. **Material and methods:** 53 patients with suspicion of sarcoidosis (in stage 1 to 3) were sent to Division of Bronchoscopy for all 2009 year. The all patients were underwent bronchoscopy with simultaneous all three bronchoscopic methods. The presence of noncaseating epithelioid cell granulomas that correspond to clinical and radiological picture of sarcoidosis was obtained in 94.33%. In only one patient the sarcoidosis was confirmed by EBUS-TBNA, and two others with acute sarcoidosis still remain under clinical observation.

**Conclusions:** The results of combined bronchoscopic biopsies are comparable to the results from EBUS and EUS studies. It might suggest that the combined conventional bronchoscopic methods are still useful and recommended to confirm sarcoidosis suspicion.

**P3685****Safety and efficacy of outpatient bronchoscopy in lung transplant recipients: A single centre retrospective analysis**

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Bronchoscopy is an important diagnostic and therapeutic tool for the management of patients after lung transplantation. Out-patient bronchoscopy attempts to improve quality of life of transplant recipients and reduce health costs through reducing hospitalisation. Limited data exists however, regarding safety and efficacy of outpatient bronchoscopy.

Between August 2008 and January 2011, we analysed outpatient bronchoscopies in our program. Post-bronchoscopy a routine monitoring for at least one hour, excepted patients with transbronchial biopsies, was performed. 3.197 outpatient bronchoscopies were performed in 571 lung transplant recipients. Analysis indicated a median bronchoscopy rate of 4 examinations per patient (interquartile range 2-7). Bronchiolitis obliterans syndrome (BOS) was demonstrated in 38% of the patients at the time of examination. Long-term oxygen therapy was required by 9% before examination. A median duration of 15 minutes (interquartile range 10-20 minutes) was identified, 14% had intravenous sedation and 4% antitussive medication. Interventions performed included bronchial alveolar lavage (BAL) in 81%, transbronchial biopsy (TBB) in 23%, balloon dilatation in 4% and argon therapy in 15%. In 80% of examinations no detectable complications occurred. The most common occurring complications were coughing and minimal bleeding after TBB. Three patients (0,1%) developed pneumothoraces and two (0,15%) were hospitalized because of desaturation. We summarize that outpatients bronchoscopy is safe with an acceptable complication rate. Quality of examination is adequate in the vast majority based on a sufficient BAL recovery median and biopsy result.

**P3686****French national survey by the GELF on flexible bronchoscopy, patients, indications, results and complications**

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**Objective:** Estimate the indications and the results of the flexible bronchoscopy in France in 2009.

**Material and method:** The GELF led a forward-looking investigation in Mars 2009 with 150 pulmonologists distributed in a random way on the territory by a questionnaire of 2 patient cases. An extrapolation of procedures was realized over the year and on the number of days worked.

**Results:** A number estimated by 352 500 flexible bronchoscopies were realized in 2009. 64% of the procedures were made in public hospital and 36% in a private

clinic. More of  $\frac{3}{4}$  acts were made ambulatory or conventional hospitalization. In 74% of the cases, it was about an initial diagnosis. 2/3 of the patients had never had previous bronchoscopy. Average age: 62,5 years, 24% were women and 67% of smoking (39 PA). 48% were referred by the general practitioner. 72% of procedures were realized under local anesthetic. The main indications were the thoracic lesion (47%), the other one were, surveillance of bronchial cancer, low respiratory infection, hémoptysie, diffuse infiltrative lung disease, chronic cough, pleural effusion and suspicion of tuberculosis. The bronchoscopy was pathological in 59% of the cases. For more half, the histology revealed a bronchial cancer, mainly squamous cell (35%). The main complications were the bronchospasme (8%) and the bleeding (5%).

**Conclusion:** This survey of the GELF is the first study allowing the extrapolation of the number of annual bronchoscopies in France, the results and complications. The bronchoscopy allows on the national level, the diagnosis of a significant number of bronchial cancers.

**P3687****Endobronchial ultrasound using a guide sheath for peripheral pulmonary lesions: Experience from the first year**

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**Background:** Transbronchial biopsy (TBB) for peripheral pulmonary lesions (PPLs) is usually performed with help of fluoroscopy, but the yield varies widely. This feasibility study aimed to assess ability of endobronchial ultrasound guide sheath (EBUS-GS) to provide imaging guidance for TBB.

**Methods:** Twenty-eight patients with PPLs were prospectively enrolled and underwent bronchoscopy with fluoroscopy and EBUS-GS procedure. In this procedure, the probe covered by a GS was introduced into the lesions via the working channel of bronchoscope. The probe was withdrawn, while the GS was left in situ. A brush or biopsy forceps were introduced through the GS into the lesions.

**Results:** Mean size of PPLs was 2.4±1.0 cm. Twelve of 28 patients (42.9%) was diagnosis by the EBUS-GS procedure. Also, the diagnosis was 30.8% (4 of 13) for benign disease and 80% (8 of 10) for malignant PPLs (p = 0.036). There was no statistically significant difference between diagnostic yield and size of the lesions, positive CT bronchus sign, and the EBUS probe located either within lesions or adjacent to lesions. Fortunately, no major complication was observed.

**Conclusions:** EBUS-GS is a safe and useful method for collecting samples from malignant peripheral pulmonary lesions.

**P3688****Efficacy of transbronchial biopsies without fluoroscopy control in diagnostics sarcoidosis**

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**Background:** Currently diagnosis of sarcoidosis, most common entity among interstitial lung diseases, should be confirmed by biopsy during bronchoscopy, with routine BAL. Unfortunately, sometimes there is no fluoroscopy control in bronchoscopy room, thus the efficacy of biopsies is controversial.

**Aim:** To evaluate the efficacy and safety of "blind" transbronchial biopsy (TBLB) with BAL during flexible bronchoscopy (FBS).

**Materials:** 127 patients with newly diagnosed sarcoidosis undergo the FBS with TBLB and BAL. Frequency of pneumothorax/severe bleeding, median number of tissue samples, presence of lung tissue in sample, evidence of granuloma in histology and cytology, diagnostic changes in BAL were analyzed.

**Results:** There were 71 female in the group, mean age was 39.5 yrs, varied from 16 to 69. Mean duration of disease since first symptoms/chest abnormalities detection was 47,8 weeks. There were no cases of pneumothorax or severe bleeding after procedure. Mean tissue samples number was 3.1, varied from 1 to 6, median 2. Lung tissue was observed in 118/127 cases (93%). Granuloma was found in 82 out of 118 patients (64,6%), in cytology additionally granuloma was found in 7 patients, so the total efficacy was 89/127 (70%). Among the rest 38 cases with non-effective biopsy, diagnostic changes in BAL were found in 13 cases, thus total efficacy of TBLB plus BAL in sarcoidosis diagnostics was 102/127 (80,3%).

**Conclusion:** Bronchoscopy with TBLB and BAL even without fluoroscopy control is effective and safe method of diagnostics in newly diagnosed sarcoidosis.

**P3689****Evaluation on the factors affecting transbronchial lung biopsy results**

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Lung biopsy through the airways by using a flexible bronchoscope (TBLB: transbronchial lung biopsy) is an appropriate method for obtaining tissue samples. In previous studies, type of forceps, sample size, floatation of the sample in the liquid

TUESDAY, SEPTEMBER 27TH 2011

and its alveolality were suggested as factors impacting the diagnostic value of TBLB. This study aimed at evaluating the factors affecting TBLB results in order to increase the diagnostic value of this method. This was a prospective, double blind observational analysis.

We had a total of 44 patients with pulmonary lesions; each of these patients underwent 4 biopsies. Biopsy samples were taken using cup and alligator forceps alternatively. From 88 samples obtained by the alligator forceps, 16 were diagnostic while from the same number of specimens taken by the cup forceps, 21 samples had diagnostic value. Of the small sized samples (57 cases), 12 (21.1%) were diagnostic while among the 66 medium sized samples, 12 (18.2%) and from the 53 large sized samples, 13 (24.5%) were diagnostic. Among samples floating on the surface of the liquid (48 cases), 6 (12.5%) had diagnostic value. Of the 12 samples suspended in the liquid, 2 (16.7%) and among the 116 samples precipitated to the bottom, 29 (25%) were diagnostic. Of the 84 samples with more than 20 alveoli, 31 (36.9%) were diagnostic. Among 26 samples with number of alveoli less than 20, 5 cases (19.2%) were diagnostic. This correlation was statistically significant. In a conclusion, number of alveoli present in the tissue sample was directly correlated with its diagnostic value. However, this study did not find a significant correlation between the diagnostic value of TBLB and type of forceps, sample size and floatation of the sample in the liquid.

### P3690

#### Diagnostic value of the bronchoscopy in the focal pulmonary malignant lesions

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**Introduction:** A focal pulmonary lesion (FPL) is defined as an intraparenchymatous pulmonary lesion that is well circumscribed and completely surrounded by healthy lung.

**Objective:** To analyze the diagnostic value of the fiberoptic bronchoscopy (FB) in the malignant FPL in the last 18 months, concurring with a change in the medical staff.

**Material and methods:** Cross-sectional study of all the FBs done at our Unit between 02/2008 and 08/2009 in patients with a solitary FPL with a definitive diagnosis of malignancy. The diagnostic value by size and site was analyzed with Pearson's chi<sup>2</sup> statistics.

**Results:** We studied 131 patients of whom 107 (82%) were men. The area around the pulmonary hilum was divided in 3 elliptic areas; considering a central lesion when it was localized in the most internal ellipse and a peripheral lesion when it was localized in the 2 external ellipses. In 24 cases, the size of the FPL was not possible to be determined (23 central and 1 peripheral). The media size of the FPL was 4.8cm (SD 2.7cm). The diagnostic value of the FB in FPL was 0.73.

The diagnostic value of the TBB with radiosopic guide, according to the size and site is showed in the table (in 7 cases, the size was not determined).

	Global n: (%)	Size		p	Site		p
		≤2cm n: (%)	>2cm n: (%)		Central n: (%)	Periphera l n: (%)	
TBB	39/74 (53%)	6/16 (38%)	30/51 (59%)	0.02	6/11 (55%)	33/63 (52%)	0.56

**Conclusion:** The diagnostic value of the FB was 0.73 and of the TBB with radiosopic guide was 0.53, being a difference by size but not by site.

### P3691

#### Endobronchial ultrasound in the diagnosis of peripheral pulmonary lesions

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Endobronchial ultrasound (EBUS) is a useful diagnostic tool to localize peripheral pulmonary lesions (PPLs) and to guide transbronchial biopsy (TBB). We retrospectively evaluated the diagnostic accuracy of EBUS-guided TBB in comparison with a definitive diagnosis established by transthoracic CT-guided needle aspiration or surgical lobectomy. In the last ten months, 168 patients performed bronchoscopy for a PPL (mean diameter = 3.5±2.1 cm). PPL was visualized in 123 patients (73%) and TBB was performed in 117 patients. These patients had a PPL larger than patients with a non visualized lesion (mean diameter 3.7±2.1 vs 2.3±1.6 cm, respectively). A definitive diagnosis was obtained in 77 patients whereas 40 patients were lost to follow-up. The TBB diagnosis was cancer in 45 patients and non-malignant lesion in 32 patients. The definitive diagnosis was cancer in 67 patients and non-malignant lesion in 10 patients: all these 10 patients without cancer were correctly diagnosed with TBB.

In conclusion, sensitivity of EBUS-guided TBB in the diagnosis of cancer was 67% (45/67) and the overall diagnostic accuracy was 71% (45+10/77). Our data confirm that EBUS-guided TBB is a sensitive method with a high diagnostic yield in patients with PPLs.

### P3692

#### Combined endoscopic evaluation of the effectiveness of neoadjuvant chemotherapy of NSCLC using autofluorescence and spectroscopic methods

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**Objectives:** To estimate the informativity of autofluorescence bronchoscopy and spectroscopy for evaluating the effectiveness of neoadjuvant chemotherapy (NCT) for lung cancer.

**Material and methods:** The study included 46 patients with central NSCLC IIIa/IIIb stage who underwent 2-4 courses of platinum-based NCT. Endoscopy was done before treatment started and repeated each 21 day. Combined endoscopic investigation included: bronchoscopy in conventional mode (CB), spectroscopy in conventional mode (CS), bronchoscopy in autofluorescence mode (AFB) and spectroscopy in autofluorescence mode (AFS). Integrated system for autofluorescence and spectroscopy ClearVu Elite (Perceptronix Med. Inc., Canada) was used. The data obtained were compared with the results of histological study of biopsy samples from the respective sites.

**Results:** The sensitivity and specificity of the combination of AFB and AFS was 97.1% and 88.3%, respectively vs. CB and CS - 66.7% and 86.9%, respectively. Combined endoscopy revealed that the NCT was effective in 41,3% cases (n = 19 - partial endoscopic response), in 4 patients (10,3%) endoscopic tumor progression was found. Endobronchial spread of the tumor in 30.4% of cases (p = 0.03) was defined more accurately by AFB and AFS in comparison with CB and CS, it was important for choosing a volume of further resection. In 97,1% of cases, the data AFB and AFS is fully consistent with the results of histological studies (p = 0.02).

**Conclusions:** The combination of AFB and AFS is effective in determination of margins of central lung cancer spread and effectiveness of NCT.

### P3693

#### Changes of the pulmonary arteries in patient with pulmonary hypertension: Using optical coherence tomography

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**Objective:** To assess clinical using of optical coherence tomography (OCT) in patient with pulmonary artery hypertension (PAH).

**Design and method:** We studied the condition of vessels in a patient with systemic scleroderma and PAH. Our patient was a woman of 57 years. In the study, we used the following equipment specifications: IVUS (Eagle Eye Gold, catheter 40 MHz; Inc., USA), OCT (Light Lab Imaging Inc.) and general characteristics of different tissues by OCT.

**Results:** Cardiac catheterization showed pulmonary artery pressure of 90/20/35 mm Hg. Pulmonary capillary wedge pressure - 9 mm Hg. Both IVUS and OCT visualized the anterior basal segment pulmonary artery at the level of 16,3 mm<sup>2</sup> (external area) by IVUS and at the level of 16,15 mm<sup>2</sup> by OCT. Intima thickness was 0,41 mm by IVUS and 0,68 by OCT. We analyzed the tissue characteristics of the segment by OCT. We didn't find the scarp borderers, irregular borders or superficial signal. Thus we didn't find any features of calcium, lipids or mural thrombosis. The predominant tissue of the defected segment was homogenous bright tissue, e.t. fibrosis. We attempted to use radiofrequent analysis (VH by IVUS), but, because of its lower resolution in the case of pulmonary arteries, in comparison to the coronary arteries, it turned poor information.

**Conclusions:** In the case of PAH IVUS looks like a method, which underestimates the intima thickness, in comparison with OCT. OCT enables to detect morphological features and possible injuries of the inner layer of the vessel wall. However, like any new technology, OCT will require a learning curve, to improve our ability and optimize treatment of patients with PAH.

### P3694

#### Acriflavine-aided confocal laser-endomicroscopy for evaluation of central airway lesions

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**Introduction:** Probe based confocal laser-endomicroscopy (pCLE) is a novel technique in pulmonary endoscopy. Acriflavine could be shown to be an effective topical staining agent in confocal laser endomicroscopy (CLE) of the upper and lower gastrointestinal tract. Compared to fluorescein, another staining agent for CLE, it strongly labels the superficial epithelial cells by nuclear interaction. Native pCLE of malignant central airway lesions showed disturbed elastin structures but

TUESDAY, SEPTEMBER 27TH 2011

not tumor tissue itself. So the aim of our study was to evaluate acriflavine-based pCLE in malignant and non-malignant central airway lesions.

**Methods:** In 31 patients with known primary or secondary pulmonary malignancies or probably malignant tracheobronchial lesions we evaluated 36 lesions in the central airways and 19 macroscopically normal areas after staining with 10 ml of a 0.05% acriflavine solution with a pCLE system (Cellvizio, Mauna Kea Technologies, Paris, France) without any side effects. Subsequently biopsies were taken from all positions which were investigated before.

**Results:** Histology showed malignant lesions in 28 patients. The other 3 patients were suffering from sarcoidosis, tracheal papillomatosis and an inflammatory tumour respectively. For detection of malignant lesions pCLE showed a sensitivity of 96% and a specificity of 87%. Positive predictive value was 86% and negative predictive value was 96%.

**Discussion:** Acriflavine-based pCLE appeared to be safe and well tolerated. Imaging of tumour tissue was possible in almost all cases. Sensitivity and negative predictive value were both high. Further studies are needed to evaluate if histological workup can be substituted by pCLE in particular cases.

### P3695

#### Combined endoscopic evaluation of central lung cancer spread using autofluorescence and spectroscopy

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**Objective:** To estimate the diagnostic value of autofluorescence bronchoscopy with spectroscopy in determination of lung cancer endobronchial spread.

**Material and methods:** The study included 78 patients with central NSCLC stage II-IV. Combined endoscopic investigation included: bronchoscopy in conventional mode (CB), spectroscopy in conventional mode (CS), bronchoscopy in autofluorescence mode (AFB) and spectroscopy in autofluorescence mode (AFS). Integrated system for autofluorescence and spectroscopy was used. The data obtained were compared with the results of histological study of biopsy samples from the respective sites.

**Results:** The sensitivity and specificity of the combination of AFB and AFS was 97.1% and 88.3%, respectively vs. CB and CS - 66.7% and 86.9%, respectively. Maximal diagnostic value had green-red ratio (GRR) - the ratio of intensity in the green range (500-565 nm) to the red range (620-760 nm). For normal tissue mean GRR was 3.4±0.9, on the borders of tumor growth in 97% of the cases did not exceed 2.0 (mean 1.2±0.4) (p = 0.02), over areas of tumor tissue - in all cases less than 1.0 with an average of 0.7±0.2 (p = 0.001). In 97.1% of cases, the data AFB and AFS is fully consistent with the results of histological studies (p = 0.02). In general, in 30.4% cases AFB and AFS more accurately clarified the extent of tumor in comparison with CB and CS.

**Conclusions:** Combination of AFB and AFS helps to objectively and accurately establish the boundaries of the tumor spread in bronchus/trachea.

### P3696

#### Autofluorescence and narrow band imaging videobronchoscopy in detection of premalignant bronchial lesions

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**Background:** The search for most efficient bronchoscopic imaging tool in detection of early lung cancer is still active. The major aim of this study was to determine sensitivity, specificity, positive (PPV) and negative predictive value (NPV) of each technique and their combination in detection of premalignant bronchial lesions.

**Patients and methods:** Ninety six patients were enrolled in the study. Major indications were: radiological suspicion for lung cancer, surveillance of patients after surgery, evaluation of known malignancy, positive sputum cytology and prolonged cough. Lesions were classified as visually positive if pathological fluorescence was observed under AFI or, dotted, tortuous and abrupt ending blood vessels were identified under NBI. Squamous metaplasia, mild, moderate or severe dysplasia and CIS were regarded as histologically positive lesion were.

**Results:** Sensitivity, specificity, PPV and NPV of WLB in detection of premalignant lesions were 26.5%, 63.9%, 34.4% and 54.9% respectively, corresponding values for AFI were 52%, 79.6%, 64.6% and 69.9% respectively, for NBI were 66%, 84.6%, 75.4%, 77.7%, respectively, while corresponding values for combination of NBI and AFI were 86.1%, 86.6%, 84.6%, and 88% respectively. Combination of NBI and AFI significantly improves sensitivity when compared to each individual technique (p<0.001). When specificity is of concern combination of techniques improves specificity of WLB (p<0.001), specificity of AFI (p=0.03) but it has no significant influence on specificity of NBI (p=0.53).

**Conclusion:** Combination of NBI and AFI in detection of premalignant bronchial lesions increases both sensitivity and specificity of each technique.

### P3697

#### Development and clinical testing of a device for functional bronchoscopy

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We have developed a universal interface that enables to observe and process physiological data during flexible bronchoscopy. Various sensors for measuring flows, pressures, CO2 and other gas concentrations, pulse oximetry and optical spectra are built into a block that is placed next to the patient's head. It also contains an emphysema valve simulator. Sensing catheters are guided through the working channel of the bronchoscope. Curves and values are displayed on the video-screen, superimposed over the endo-image. All are stored and processed in real time. So far, the system has been used in more than 150 patients. Measuring mouth air-flow while observing the larynx enables to validate vocal chord dysfunction at rest and during exercise. Internal flow and pressure measurements combined with airway planimetry are useful to identify and quantify malacias. Examples are shown demonstrating bronchoscopy guided lobar lung function tests with measurement of collateral ventilation, lobar gas exchange and perfusion. Together with the built-in valve simulator it facilitates individually tailored endoscopic emphysema treatment. Using the optical catheter, auto-fluorescence and drug-induced fluorescence of the mucosa is measured for cancer detection and photodynamic therapy.

The simultaneous measurement of physiological data and the bronchoscopic image broadens the application of bronchoscopy, helps to solve diagnostic puzzles and has proven to be extremely useful for endoscopic treatment planning.

### P3698

#### Percutaneous computed tomography-guided radiofrequency thermal ablation: Efficacy and safety in lung cancer

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**Background:** Computed tomography (CT)-guided percutaneous thermal radiofrequency ablation (RFTA) is a recently developed technique for the treatment of lung tumors with growing scientific evidence supporting its use.

**Aim:** Characterize a population of patients with malignant lung tumors that underwent RFTA and evaluate its safety and efficacy.

**Material and methods:** CT-guided percutaneous RFTA performed since 2004 were collected for data purpose. A CT scan performed before and after each procedure evaluated tumor's size, shape and location and assessed immediate results and complications. A high-density area with a diameter equal to or greater than the initial tumor, surrounded by a ground-glass opacity was defined as complete tumor necrosis. The frequency of local recurrence and disease progression was calculated based on imaging follow-up. Population demographics, tumor's histological type and primary lung cancer staging were also assessed.

**Results:** A total of 29 tumor lesions (28 patients), 20 primary and 9 metastatic, underwent the procedure. Mean age was 69 yo (range: 16-81 yo). Lung adenocarcinoma and lung metastatic disease were the most frequent histological types, each accounting for 31%. TNM staging identified stage IIIA as the predominant (30%). Total necrosis was achieved in more than 95% of the cases. Procedure-related complications occurred in 55.2% and death in 3.4% of the cases. Mean survival rate post-RFTA was 21 months (range: 0-73 months). Disease-related mortality was 46.4%.

**Conclusions:** CT-guided percutaneous RFTA is a minimally invasive procedure with proven efficacy in the treatment of lung tumors, associated to a low rate of major complications.

### P3699

#### Transbronchoscopic catheter deposition of radioopaque hydrogels as pseudotumors - Useful tool in advancing bronchoscopy image-guided intervention development & training

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**Introduction:** Advances in CT-Imaging and processing are leading to new Image-guided Interventions such as Virtual Bronchoscopy Navigation. There are few "pseudotumor" targets for technology development or training.

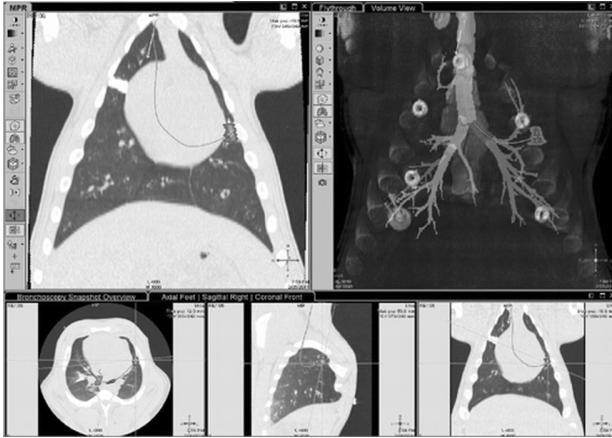
**Aims:** Develop Transbronchoscopic Deposition of Hydrogels as Radioopaque targets.

**Methods:** IRB approved porcine protocol. 5mm bronchoscope delivery of non-migrating targets (Alginate polymerized with CaCl 1:1 ratio). Compounds (Iohexol, tantalum) added and tested to optimize radiodensities and stability. To deliver targets, a coaxial catheter advanced transbronchoscopically under fluoro guidance. 1ml-2.5ml Alginate mix injected to simulate 1-2 cm diameter lesion. Animals then imaged in CT to assess target deposition.

**Results:** 36 targets (18 Omnipaque, 9 Hypaque, 9 Tantalum) in 6 animals. Hydrogels expands with a measured to delivered volume ratio of 1.7 to 18.6. Avg

TUESDAY, SEPTEMBER 27TH 2011

Expansion Factors 2.76 Tant, 4.0 Omni & 4.9 Hypaque. Tantulum results in CT metallic artifacts, but appears distinct under fluoro. Omni-Hypaque have softer outline simulates "typical" nodules, but progressively leaches radioopacity over 4-6 hrs. Complications include traumatic pneumothoraces.



**Conclusions:** Transbronchoscopic delivery of Radioopaque Hydrogels effectively simulate tumors usable for development of bronchoscopy enhancement software, and as targets for animal lab practice.