450. Progress in endoscopy for lung cancer

P4399

Analyzing images of endobronchial ultrasonography (EBUS) using histogram to assist in the diagnosis of lung cancer

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Background: Recently, brushing and biopsy techniques of EBUS using a Guide Sheath (EBUS-GS) is available for the diagnosis of lung cancer. Obstetrics and gynecology fields have previously reported that quantification of sonographic echogenicity with histogram were useful for the diagnoses of tissue.
Aim: To evaluate whether histogram data collected from EBUS-GS images can contribute to the diagnosis of lung cancer or not.
Methods: Fifty clear EBUS images (25 lung cancer and 25 inflammatory disease) were included in this study. The region of interest (ROI), was set within a 5mm radius from the EBUS probe with 400 pixels (20×20). Histograms were created and compared using imageJ software, with a width of the histogram: (maximum – minimum gray scale)/256 (full gray scale) × 100 (%), height of the histogram: (maximum pixel counts), and the standard deviation of the histogram.
Results: The diagnosis yield by the width of the histogram were sensitivity of 84%, specificity of 88%, and positive predictive value of 87% when the cut-off level was 22 for lung cancer. Standard deviation of histograms also contribute to diagnosis of lung cancer, sensitivity of 80%, specificity of 88%, and positive predictive value of 87% when the cut-off level was 10.7. Height of the histogram was not useful due to low sensitivity.
Conclusion: The width and standard deviation of EBUS image histograms were useful in differentiating lung cancer from inflammatory lesion.

P4400

Aberrant methylation in lung cancer identified by EBUS-TBNA as a marker of advanced staging

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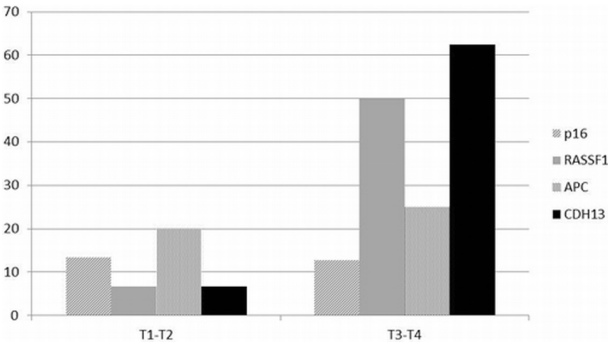
Introduction: Aberrant methylation of DNA results in gene silencing and is frequently observed in tumours from lung cancer patients. Methylation aberrancies can also be detected in lymph nodes,but it is unknown if the assessment of the nodal methylation status may identify more advanced stages of the disease
Objective: To determine the relationship between the methylation status of 5 genes in metastatic lymph node and tumours samples obtained by EBUS-TBNA and the presence of an advanced stage of lung cancer



Methods: Nodal and tumour samples positive for lung cancer were obtained with EBUS-TBNA. The methylation status of DAPK, p16, RASSF1, APC and CDH13 genes was determined by methylation-sensitive high resolution melting
Results: 23 samples were analysed, 15 samples (12 mediastinal nodes, 1 lobar node and 2 tumour) were early cases of lung cancer (T1/T2) and 8 (4 mediastinal nodes, 3 lobar nodes and 1 tumour) more advanced lung cancer (T3/T4). Percentages of methylated samples for each gene according to T staging are shown in the figure.The samples from patients with a more advanced stage of lung cancer had significantly more genes methylated (p=0.043) than the samples from patients with early lung cancer.
Conclusion: The level of methylation in tumour cells obtained from lymph nodes and/or tumours accessible to EBUS-TBNA is higher in patients with more advanced stages of lung cancer, identified by a higher T staging
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P4401
Sampling of ipsilateral mediastinal nodes by EBUS-TBNA in lung cancer staging
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Background: Endobronchial ultrasonography transbronchial needle aspiration (EBUS-TBNA) has shown its usefulness in lung cancer (LC) staging. However, determinants of negative predictive value (NPV) are not well known.
Aim: To determine clinical characteristics of LC that are associated to a low NPV, that will allow a more accurate selection of patients needing additional staging techniques before surgery in front of a negative result of EBUS-TBNA.
Materials and methods: - NPV of EBUS-TBNA for the identification of mediastinal spread of LC was calculated in patients staged with EBUS-TBNA and treated surgically, performed lymph node dissection during surgery.
Results: 145 patients with T1 (n=55), T2 (n=80) and T3 (n=10) were studied. 48 patients (33.1%) showed mediastinal lymphadenopathy (ML) at computed tomography (CT). EBUS-TBNA got a representative sampling of ipsilateral low laterotracheal and subcarinal regions in 127 patients (87.6%), and 4R, 4L and 7 in 105 patients (72.4%). The result was false negative regarding mediastinal lymph dissemination in 20 patients (13.8%). The identification of mediastinal lymph nodes on CT was significant predictor of false negative EBUS-TBNA exploration (22.9 versus 9.3%, p=0.02). Unrepresentative ipsilateral mediastinal sampling (50 Vs 8.7%, p<0.001) and unrepresentative sampling in 4R, 4L and 7 (32.5% Vs 6.7%, p<0.001) were significant predictors of a FN. In multivariate analysis, ML on CT (OR 3.39,95%CI 1.15-10) and insufficient sampling (OR 10.66,95%CI 3.29-34.55) were independent variables of a low NPV.
Conclusions: EBUS-TBNA achieved a successful lymph node sampling of mediastinal regions ipsilateral to the tumor in over 85% of patients.
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P4402
Relationship between qualitative analysis of lung tumors using integrated backscatter-intravascular ultrasound (IB-IVUS) and pathological diagnosis
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Introduction or background: End-bronchial ultrasound is used by a supersonic wave image to confirm the position relations of a tumor and the participation bronchus through a bronchoscope. However, the diagnosis of the organization property of the tumor is difficult. We used integrated backscatter(IB) value which analyzed the reflection wave of the supersonic wave signal in the coronary arteries of human, and was calculated, and enabled a vascular wall organization property diagnosis.
Aims and objectives: The purpose of the study measures integrated backscatter (IB) by end-bronchial ultrasound for the diagnosis of the lungs tumor and analyzes it by comparing a tumor and the distinction of the normal tissue with surgical resection.
Methods: We analyzed lungs tumor and normal lungs organization provided from an operation specimen. We observed relations with the structure of the organization about the lungs tumor.
Result: Surgery excision lungs tumor were 35 non-small-cell lung cancer (squamous cancer 9 examples, non-squamous cancer 26 examples). IB value showed lower value in non-small cell lung cancer tissue compaired with normal lung tissue. The necrosis had low IB value, and IB value showed a high value at fibrosis tissue. High cell density tumor showed lower IB level than low cell density tumor.
Conclusion: If the distinction of the normal tissue and tumor tissue is possible and applies it to an endoscopic diagnosis by measuring lungs tumor, normal lung, IB value of the pathology organization diagnosis and invasive level of the tumor may be enabled by bronchus endoscope echo examination.

P4403
Diagnostic yield, clinical impact and cost aspect of EBUS-TBNA in mediastinal staging in lung cancer
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Background: In lung cancer minimally invasive staging of the mediastinum with endobronchial ultrasonography with transbronchial needle aspiration (EBUS-TBNA) has become an important alternative to the gold standard of mediastinoscopy.
Aims: First: To determine the diagnostic yield of EBUS-TBNA and calculate the reduction in number of mediastinoscopies that can be achieved when this technique is used as initial modality for mediastinal staging in lung cancer. Second: Calculate the reduction in health care costs when EBUS-TBNA is used in this setting.
Methods: In a retrospective cohort study all patients in our hospital in whom EBUS-TBNA was performed for mediastinal staging in lung cancer from September 2008 until January 2011 were identified and the results of EBUS-TBNA were analysed. If metastatic tumour cells were found there was no indication for additional mediastinoscopy. Diagnostic yield of EBUS-TBNA and the number of mediastinoscopies that were avoided were calculated, as well as the achieved cost reduction.
Results: EBUS-TBNA was performed on 77 patients for mediastinal staging: 47 male and 30 female, average age 62.1 years (extremes 39-81). In 51% of patients (39/77) mediastinal lymph node metastasis were found and mediastinoscopy could be avoided. Sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy were 91%, 100%, 100%, 80% and 93% respectively. The achieved cost reduction was € 321 per patient (31%).
Conclusion: Mediastinoscopy can be avoided in more that 50% of lung cancer patients when EBUS-TBNA is used as initial staging modality for mediastinal staging, leading to a significant reduction of health care costs.

P4404
Adequacy of endobronchial ultrasound transbronchial needle aspiration samples in the sub-typing of non small cell lung cancer
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Introduction: The histological sub-typing of non small cell lung cancer (NSCLC) has become increasingly important due to advances in systemic therapy. There are now important differences in the treatment of squamous and non-squamous cancers. Non-squamous cancers (particularly adenocarcinomas) are also suitable for targeted therapy if the epidermal growth factor receptor (EGFR) genetic mutation is present.
Diagnosis is frequently made by fine needle aspiration from lymph node metastases.
Objectives: To analyse endobronchial ultrasound transbronchial needle aspiration (EBUS TBNA) data to establish our NSCLC not otherwise specified (NOS) rate and determine the technical success of EGFR testing.
Methods: All EBUS TBNA procedures performed at Leeds Teaching Hospitals between February 2009 and November 2011 were analysed. Data was collected on the indication, final histological diagnosis and whether EGFR mutation testing was possible.
Results: Data from 391 procedures was analysed. The indication was staging of malignancy in 345 patients and suspected non-malignant disease in 48 patients.
Malignant disease was diagnosed in 204 patients (52.2%), small cell 43, squamous cell 64, adenocarcinoma 40, adenosquamous 2, large cell 12, NSCLC NOS 31 and malignant disease of non lung primary 12.
The number of cases of NSCLC NOS was 31 of 149 NSCLCs. The NOS rate was 20.8%.
EGFR testing was requested in 36 patients. The sample was sufficient to allow testing in 32 patients (88.8%).
Conclusion: This data shows that EBUS TBNA samples are of adequate size to allow the determination of NSCLC sub-type and EGFR mutation status provided appropriate laboratory techniques are used.

P4405
How do cytology samples compare with histology specimens when used for EGFR testing in patients with NSCLC?
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Background: With the evolution of individualised treatment strategies in non small cell lung cancer (NSCLC), it is becoming increasingly important to obtain adequate tissue for accurate pathologic sub-typing and molecular testing. In most

cases diagnosis and staging is done using small biopsies or cytology specimens obtained by minimally invasive techniques.
Aim: To compare the adequacy of cytology and histology samples used for epidermal growth factor receptor (EGFR) mutation screening.
Methods: Retrospective study of 135 consecutive samples obtained from NSCLC patients between Jan 2010 and Dec 2011.
Results: Of the 135 samples sent for EGFR testing, 13 were positive, 115 negative and 7 were considered inadequate or failed molecular testing. 106 had adenocarcinoma, 11 adenosquamous, 13 NSCLC-NOS(not otherwise specified), 4 squamous and 1 small cell. Positive EGFR was noted in 4 cytology and 9 histology samples (p=0.27).
Cytology samples include 46 endobronchial ultrasound (EBUS) guided fine needle aspiration (FNA), 8 pleural fluid, 7 ultrasound guided or superficial FNAs from lymph nodes or masses, 1 transbronchial (mini-probe), 2 bronchial washings and 2 brush biopsies. Histology biopsies include 29 endobronchial biopsies, 19 CT guided lung biopsies, 8 thoracoscopic and 1 ultrasound guided pleural biopsies, 1 renal biopsy, and 11 surgical excision samples (bone, brain, lymph node and groin mass).

	Cytology (n=66)	Histology (n=69)	
Insufficiency rate	3 (5)	4 (6)	P=0.902, 95% CI –8.4% to 10.3%

n (%), Chi-square test.

Conclusion: The overall adequacy rate from both groups was 95% with no difference, suggesting that the cytology samples can be reliably used for molecular testing.

P4406
Is the EBUS TBNA cytology adequate for EGFR analysis?
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Background: Endobronchial ultrasound (EBUS) guided transbronchial needle aspiration (TBNA) allows safe and reliable sampling of mediastinal and hilar lymph nodes with excellent specificity and good sensitivity. It is a well established technique in the diagnosis and staging of lung cancer including pathologic sub-typing and recent studies have shown that the samples may also be adequate for molecular testing.
Aim: To evaluate the adequacy of EBUS TBNA samples used for epidermal growth factor receptor (EGFR) mutation screening.
Methods: Retrospective study of 46 consecutive EBUS-TBNA samples obtained from lymph nodes > 5mm short-axis and central lung parenchymal lesions. Fisher's exact test was used to compare the 2 groups.
Results: Of the 46 EBUS TBNA samples sent for EGFR testing, 38 were obtained from lymph nodes (19 subcarinal, 9 right paratracheal, 4 left paratracheal, 10 right hilar and 4 left hilar) and 8 from central lung parenchymal masses.
In the lymph node group, 35 (92%) samples were negative for EGFR mutation, 3(8%) failed testing and none were positive for EGFR; 30 had adenocarcinoma, 1 adenosquamous, 2 squamous and 5 NSCLC-NOS(not otherwise specified). In the central lung mass group (n=8), one positive with exon19 deletion, 6 negative and one failed testing or was inadequate; 3 had adenocarcinoma, 3 NSCLC-NOS, 1 squamous and 1 adenosquamous.
The overall EBUS-TBNA adequacy from both lymph nodes and central lung masses was 91% and there was no difference between the groups.
Conclusion: Molecular testing of EBUS TBNA samples obtained from mediastinal and hilar lymph nodes is feasible and our study shows a higher proportion of 92% adequacy. The common reason for failed testing was paucicellular specimen and degraded DNA.

P4407
Factors related to the diagnostic yield of ultrathin bronchoscope for peripheral pulmonary lesions
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Introduction: The global diagnostic yield of peripheral pulmonary lesions (PPL) not candidates for CT-FNA, is 20-80%. Our aim is to evaluate the factors that affect the diagnostic yield of the fluoroscopy guided ultrathin bronchoscope.
Materials: We performed biopsy and brushing if a lesion was seen and only brushing when it was only detected by fluoroscopy. Bronchial washing (BW) was always sent.
Results: 30 patients were included (77% men) with a mean age of 66 (SD 9). Median size of the PPL was 27 mm. Endobronchial lesion was viewed in 63%: mucosal change (6), tumor (5), compression (7) and secretions (1); in 79% of them a final diagnosis was obtained. The diagnostic yield for malignancy was 37%: adeno (3), squamous (3), NSCLC (2), mesenchymal tumor (1) and atypia (2). BW was diagnostic for malignancy in 23%, brushing in 27% and biopsy in 23%. After multivariate analysis the only significant variable was the presence of endoscopic vision.

	POSITIVE (n=15)	NEGATIVE (n=15)	P
ENDOSCOPIC VIEW	11 (73.3%)	8 (53.3%)	0.02
DIAMETER (mm)	35.8 (SD 28)	26 (SD 11.2)	NS
BRONCHUS SIGN	10 (66.7%)	4 (28.6%)	0.04
FLUOROSCOPY VIEW	11 (73.3%)	8 (53.3%)	NS
LOCALIZATION	UPPER LOBES=9	UPPER LOBES =11	NS
	MEDIUM LOBES=3	MEDIUM LOBES=0	
	LOWER LOBES=3	LOWER LOBES=4	

Conclusions: Fluoroscopy guided ultrathin bronchoscope obtains specific diagnosis in 43% of the patients, 85% of them with endobronchial abnormality. In 42% of patients with an endobronchial abnormality we were not able to reach a diagnosis. In 37% (11/30) of patients we could not see any endobronchial abnormality. Dedicated needles and more accurate methods to locate and reach the PPL are needed.
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P4408
Role of bronchoscopy in patients with haemoptysis and a normal CT scan
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Aims and objectives: To investigate the merits of conducting bronchoscopies in patients with haemoptysis and normal or non-diagnostic CT scan.
Methods: Using the in-hospital bronchoscopy reporting tool, a retrospective analysis was carried out of the bronchoscopies performed on patients with haemoptysis but non-diagnostic CT scan.
Results: Between September 2008 and December 2011, a total of 450 bronchoscopies were performed. After excluding the patients with CT scan abnormalities which could explain the haemoptysis, medical notes of the remaining 99 patients were analysed. Out of these, 74 patients had a significant smoking history. 79 bronchoscopes were normal with the remaining 20 examinations revealing benign pathologies. No new diagnosis of malignancy was made.

Cross-Tabulation of CT and bronchoscopy results

Bronchoscopy results	Normal CT scan (n=75)	Non diagnostic CT scan (n=24)
Neoplasia	0	0
Benign	12	10

Conclusions: Results of our study suggest that a normal CT scan examination has a high negative predictive value for lung cancer. Further studies would be beneficial to ascertain the role of bronchoscopy in the investigative pathway of lung cancer in patients with normal CT scan.

P4409
Overview of safety and efficacy of CT guided biopsy for the diagnosis of lung cancer in a district general hospital (DGH)
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Background: Obtaining conclusive histology to diagnose lung cancer is an important part of the management of potential lung cancer patients. The 2 main methods used to get tissue diagnosis are bronchoscopy with biopsy and CT guided biopsy. Due to recent advancement in the techniques CT guided biopsy is becoming increasingly important in obtaining histology samples. The main complications of the procedure are bleeding and pneumothorax. We describe our experience of numbers and complications of CT guided biopsy over 4 years in a DGH in Northwest England.
Results: We collected samples over 4 years (2008-2011) of CT guided biopsy booked in our hospital. 314 procedures were planned in 313 patients. 292 procedures were carried out. The main reason for not carrying out the procedure was shrinkage of the mass seen on the day of the procedure.
Post procedure pneumothorax was observed in 82 (28.1%), out of which 6/82 (7%) lead >10% lung collapse (visual estimate). 102 (34.9%) procedures resulted

in parenchymal haemorrhage, out of which 8/102 (7.8%) were visually classed as substantial.
None of the patients required insertion of chest drain or transfusion, although 6 patients were kept in the hospital for observation (maximum stay 4 days).
Conclusion: We have shown that CT guided biopsy is a safe procedure and can be carried out without major complications in a DGH. In our sample the complication rate (usually described as 2% patients requiring chest drain insertion) was very low. We are at present in the process of re-writing hospital guidelines regarding post procedure observation and patient guidelines.

P4410
EUS-FNA for mediastinal lesions of unknown aetiology: A 4-year experience from a single centre
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Aim: Endoscopic ultrasound guided fine needle aspiration (EUS-FNA) allows access to the posterior mediastinum and tissue acquisition under real-time ultrasound guidance through the oesophageal wall. The aim of this study was to report the experience of mediastinal EUS-FNA in a large UK tertiary centre.
Methods: The study included all patients who underwent mediastinal EUS-FNA in our institution from January 2008 to December 2011. Patient and procedure related data were collected from endoscopy reports. Cytology and microbiology culture reports were compared to the final clinical diagnoses made during the follow-up. We calculated sensitivity, specificity, positive and negative predictive value (PPV&NPV) of mediastinal EUS-FNA for most common conditions.
Results: 195 patients (n=195, males 65%, mean age 58.6) underwent mediastinal EUS-FNA during the study period. Mean size of the lesions was 15.82mm (range 3.9-43) in short axis and 28.23mm (range 8-60) in long axis. Sub-carinal lymph nodes (LN) were the commonest (145/195, 70.3%) target lesion.

Table 1. Overall and condition specific results of mediastinal EUS-FNA

	EUS-FNA result (n)	Final clinical diagnosis (n)	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)	PPV (%)	NPV (%)
Malignancy	61	74	82.4 (71.4–89.9)	100	100	90.2
Sarcoidosis	40	49	83.3 (69.2–92)	99.3 (95.7–99.9)	97.5	94.8
Tuberculosis	15	24	62.5 (40.7–80.4)	98.8 (95.3–99.7)	88.2	94.9
Overall	116	147	79.4 (71.8–85.5)	93.8 (82.1–98.4)	97.4	60.5

Conclusion: Our large series shows that mediastinal EUS-FNA has high sensitivity and specificity for malignancy and sarcoidosis. With overall high sensitivity & specificity, it should be a useful tool in the assessment of mediastinal pathology.

P4411
Performance of fiberbronchoscopy in patients with neoplasia endoscopic findings
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Objective: Knowing the profitability of fiberbronschoscopy (FB) and the samples taken in patients with endoscopic findings of neoplasia.
Methods: During 63 months (october/06-december/11), we performed 642 FB with signs of neoplasia. We repeated 34 FB, so the final number of FB analized was 676. Mediastinal masses were excluded. We considered a) direct signs of neoplasia (DSN) when there was endobronchial mass or mucose infiltration, and b) indirect signs of neoplasia (ISN), when there was extrinsic compression of the bronchial wall or very hyperemic mucosa areas. According to endoscopic findings, bronchial biopsy, brushing and blind transbronchial needle aspiration (TBNA) of linfadenopathies were carried out. We always took a sample of bronchial secretion and if it was possible, a postFB sputum. We considered as positive samples which allowed to make a therapeutic decision, and negative samples those reported as "carcinoma" without specifying the type and presence of "malignant" or "atypical" cells.
Results: From this 676 FB, DSN were found in 439 (65%) patients and ISN in 237 (35%). There were 588 (86.9%) diagnostic FB, 410 (93.3%) of those with DSN and 178 (75.1%) with ISN.

Results of the different types of sample

	No. samples	Positive (%)
Biopsy	593	439 (74.0%)
Brushing	640	432 (67.5%)
Bronchial secretion	673	219 (32.5%)
TBNA of adenopathy	184	122 (66.3%)
PostFB sputum	108	19 (17.5%)
Total	2.198 (3.2/FB)	1.231 (2.1/FB+)

Conclusions: 1) The FB profitability is within the reference values mentioned in the bibliography and we consider a good result in the patients with DSN. 2) The biopsy has been the most profitable sample although very similar to brushing and TBNA of linfadenopathies.

P4412

P4413
Performance of transbronchial needle aspiration (TBNA) of mediastinal lymphadenopathies in the diagnosis of pulmonary neoplasms
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Objectives: To know the contribution of TBNA of mediastinal lymphadenopathies in the diagnosis of extension and anatomopathologic diagnosis of lung neoplasms.
Methods: During 63 months (october 2006-december 2011) we made 184 fiberbronchoscopies (FB) with TBNA to patients with mediastinal lymphadenopathies suspected of neoplastic origin. We performed a "blind" TBNA of the lymphadenopathies larger than 1cm, using a 19 or 21ga neddle, in the presence of the anatomopathologist. We took samples from the ganglionar stations 4R, 7, 10R, 11R and 11L. We take samples until we got a positive result or we did 3-4 perforations, depending on tolerance of the patient. We considered as positive samples which allowed to make a therapeutic decision and negative samples those reported as "carcinoma" without specifying the type, presence of "malignant" or "atypical cells". The non hospitalized patients were observed 3 hours after the procedure.
Results: The TBNA was (+) for neoplasia in 122(66.3%) patients, giving the diagnosis of extension (N2). The average number of punctures per patient was 1.8; in 58 patients (59.7% of TBNA positives) only one puncture was required. In 41 cases (33.6%) was the only positive sample of FB, and gave the extension and pathological diagnosis. The only complications during FB were small hemorrhages. We did not detect significant clinical or radiological complications following the procedure.
Conclusions: 1.TBNA of mediastinic adenopathies was useful in the extension diagnosis in 122(66.3%) of patients and resulted in diagnosis of lung cancer in 41(33.6%) patients. 2.TBNA was well tolerated and without significant complications.

P4414
Results of echoendoscopic ultrasound in mediastinal nodal staging of lung cancer
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Aim: To evaluate the sensitivity and predictive negative value (PNV) of endobronchial ultrasound (EBUS) in patients with non small cell lung cancer (NSCLC).
Methods: Descriptive retrospective transversal study of all performed EBUS in a tertiary hospital during a 3 year period, for mediastinal nodal staging of NSCLC with fluorodeoxyglucose positron emission tomography positive nodes. Cases were considered positive (PC) when nodal metastases was demonstrated. If not, were considered as non-positive cases (NPC) and a mediastinoscopy was performed, if the clinical situation of the patient allowed the procedure.
Results: A total number of 41 patients were evaluated, 34 of them male and 7 female. Mean age was 65,39 years old. EBUS results were: 22 PC and 19 NPC. Mediastinoscopy was performed to the NPC supporting thenegative result in 14

cases, but showed a positive result in other 3 cases. In 2 cases no additional testing was done.
We found 3 false negative cases (17,64%), a VPN of 82% and a sensitivity of 88% for EBUS in our patient series. EBUS was able to stage 20 cases as N2 and 2 cases as N3. In four N2 staged cases a neoadyuvant therapy was applied and then a mediastinoscopy was performed previous to the surgery.
Conclusions: In this patient series EBUS allowed us to avoid more than a 50% of prognostic mediastinoscopies in NSCLC, given the high NPV and sensitivity we obteined with this technique. In cases staged as N2 responding to neoadyuvant therapy, a mediastinal reevaluation can be performed through a mediastinoscopy.

P4415
Transthoracic needle biopsy
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Introduction: Transthoracic needle biopsy (TNB) is a safe method used to achieve diagnosis for most thoracic lesions, whether the lesions located in the pleura, the lung parenchyma or mediastinum. TNB are performed on an autpatient basis by using only 1% lidocain local anesthesia.
Methods: TNB was performed in 148 patients, 44 (29,7%) women and 104 (71,3%) men, age 28- 82, average 74 years; changes in the thoracic wall, pleura, parenchyma et the lung and mediastinum.
Needles that were used in the procedure were BardMagnum 18-19G x 200mm, and sample length was 19 mm. Needles were activated using BardMagnum automatic trigger, under RT control with the C-arm Ziehm-Vision.
Results: In 148 patients the TNB was done:

Table 1. Results

Localization/Size	20–50 mm	50–100mm	>100mm	Total / Efficiency
Parenchyma changes	39 (35)	54 (52)	11 (10)	104 (97) – 93,2%
Anterior mediastinum	6 (5)	13 (11)	1 (1)	20 (17) – 85%
Posterior mediastinum	2 (2)	7 (6)	3 (3)	12 (11) – 91,6%
Thoracic wall	1 (1)	9 (9)	2 (2)	12 (12) – 100%
Total / efficiency	48 (43) – 89,5%	83 (78) – 93,9%	17 (16) – 94,1%	148 (137) – 92,8%

Success of the procedure was greater if the changes were bigger and closer to the thoracic wall. Total diagnostic success is 92,8%.
Carcinoma bronchogenes was proven in 134 (90,5%) patients: carcinoma squamocelulare 62 (46,2%), adenocarcinoma 52 (38,8%), carcinoma macrocelulare 5 (3,7%), SCLC 15 (11,1%).
Lymphoma – 5 (3,3%)
TB – 2 (1,3%)
Thymoma malignum – 1 (0,6%)
Carcinoma metastaticum – 4 (2,7%)
Mesothelioma – 2 (1,3%)
Complications: pneumothorax – 4 (2,7%), hemoptysis – 8 (5,4%).
Conclusion: TNB is safe and cheap diagnostic procedure for histological and/or cytological confirmation of changes in the lung and mediastinum. Sensitivity of TNB is 92,8% and specificity 100%.

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Negative predictive value of EBUS in lung cancer staging
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Introduction: EBUS (endobronchial ultrasound) is a technique developed for mediastinum diagnosis and staging. A negative puncture in lung cancer staging remains uncertain in current guidelines.
Objective: To evaluate the negative predictive value of EBUS in the lung cancer algorithm when adequate lymph node sampling is achieved.
Method: Patients with a definitive pathological diagnosis of lung cancer nodal staging after EBUS were analyzed. Clinical characteristics, final diagnosis and treatment of patients with negative EBUS were investigated.
Results: A total of 100 definitive diagnostic EBUS were analyzed. A definitive pathologic diagnosis of malignant disease was obtained in 56 (56%), whereas 44 procedures were representative of lymph node with no evidence of malignant disease. 20 patients with negative diagnosis underwent surgery, 8 were treated with quimio and/or radiotheraphy, and 16 were not treated or had a final diagnosis of benign disease. Two out of the 20 patients that underwent surgery showed a final diagnosis of malignant disease in a N2 lymph node station (adenocarcinoma and non-small undifferentiated cell lung cancer), which gives a predictive negative value of 90% for EBUS (that reaches 95,45% considering the final outcomes in all the patients with negative samples). Positron emission tomography scan was positive for N2 in one of the two false negative cases. The diagnostic accuracy of EBUS if an adequate sample is achieved is 98%.
Conclusion: EBUS is a reliable and accurate diagnostic tool for the staging of lung cancer. Considering that an appropriate lymph node sample is obtained, a negative result has a negative predict value of at least 90%, which can reassure a change in the lung cancer algorithm.