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285. Imaging, functional evaluation and staging for lung cancer patients

P2746

Is an EGFR mutation associated with lower glucose metabolism in the FDG-PET?

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Background/Aim: In non-small cell lung cancer (NSCLC), new therapies that target specific oncogenic pathomechanisms like the epidermal growth factor receptor (EGFR) were developed. Positron emission tomography (PET) using fluorodeoxyglucose (FDG) is routinely implemented in the diagnosis and staging of NSCLC. In this study, we analysed the correlation between molecular markers like EGFR and the glucose metabolism of NSCLC.

Methods: 80 patients with NSCLC were examined with FDG-PET/CT using standard scanning protocols; routinely the maximal standardized uptake value (SUVmax) of the tumour was determined. The demographic criteria of all patients were similar; all underwent surgical excision of the tumour. The tumour tissue was characterized histological and by molecular typing, including the EGFR status. The SUV was correlated with diverse parameters.

Results: The tumour histology showed in 36 patients a squamous cell carcinoma (45%), in 33 an adenocarcinoma (41%) and in 11 other tumour entities (14%), the average SUVmax were 12.1±4.8 (±SD), 9.0±4.4 and 11.9±4.8, respectively. In only 5 patients an activating EGFR-mutation was found, all others showed the EGFR wild-type. All but one mutation were found in patients with adenocarcinoma (12.1% of that histology); these tumours showed a very low SUVmax of 4.1±0.9. In contrast, the one EGFR-mutated squamous cell carcinoma showed a very high SUV of 20.3.

Conclusion: In our patient cohort with NSCLC, all patients with adenocarcinoma and EGFR mutation showed a low glucose metabolism. This finding may suggest that these tumours have down regulated metabolism and may be anticipated by lower SUV in FDG PET scans.

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P2747

An analysis of EGFR expression and tumour imaging in non-small cell carcinomas of lung

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Introduction: Non-small cell carcinomas (NSCLC) accounts for 80% of all lung cancers. Epidermal growth factor receptor (EGFR) is frequently overexpressed in NSCLC and it plays a significant role in tumour cell proliferation and progression. The correlation of EGFR expression with radiological features may reveal their possible relationship.

Aim: To evaluate EGFR expression in NSCLC and correlate with their radiological features.

Material and method: Twenty-two cases of NSCLC were histologically subcategorized based on WHO classification of lung carcinomas. Immunostaining for TTF-1, p63 and EGFR were performed on paraffin embedded tissue sections and their expression evaluated. Chest tomography was reviewed to assess for tumour location, diameter, contours, margins, cavitation and lymph node enlargement. Findings of radio-imaging and EGFR immunorexpression were correlated.

Results: Fourteen cases of adenocarcinoma and 8 cases of squamous cell carcinoma were identified. Epidermal growth factor receptor expression was noted in 86.3% of tumours. About 92.8% of adenocarcinomas and 75% of squamous cell carcinomas were EGFR positive. On radiology, mean diameter of lesion was found to be 36.4mm and 6.1mm in EGFR positive and negative tumours respectively. Fourteen EGFR positive cases were well defined and five poorly defined. Each of all the eight cases with pleural effusion and regional lymphadenopathy were EGFR positive.

Conclusion: Major percentage of NSCLC showed EGFR expression reinforcing its utility for targeted therapy. A positive EGFR correlation was noted with tumour size, regional lymphnode enlargement and pleural effusion which reflect biologically aggressive property of EGFR positive tumours.

P2748

Integrated ¹⁸F – FDG PET dynamic contrast enhanced CT to phenotype non-small cell lung cancer

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Objectives: To apply molecular and functional imaging to the pre-treatment assessment of disease using combined Dynamic Contrast enhanced CT (DCECT) and ¹⁸Fluoride- Fluorodeoxyglucose -positron emission tomography computed tomography (¹⁸F –FDG PET), in lung carcinoma to define the cancer phenotype.

Methods: Seventy four consecutive patients with potentially curable lung cancer were prospectively recruited for combined positron ¹⁸F-FDG PET/DCECT using an integrated 64-detector PET/CT. There were 10 technical failures leaving a study population of 64 patients (35 males; 29 females. Mean age 67.5). Studies were using an integrated 64-detector PET/CT. The uptake of ¹⁸F-FDG quantified as the Standard Uptake Value (SUVmax) assessed tumor metabolism.

Results: The mean tumor SUVmax, PE and SPV were 13.8, 37.6 HU and 6.5. No statistically significant relationships between tumor metabolism and vascular parameters. There were significant associations between tumor size and vascular-metabolic parameters- SUVmax v size ($r=0.4$, $p=0.001$), SUV/PE v size ($r=0.4$, $p<0.001$), SUVmax/SPV v size ($r=0.4$, $p<0.001$). SUVmax and SUV/PE were higher in SCC than in adenocarcinoma (17.4 versus 11.8; $p=0.026$ and 0.57 versus 0.35, $p=0.021$ respectively). A phenotype with low metabolism and high vascularity was significantly more common amongst adenocarcinomas ($p<0.01$), whilst high metabolism with high vascularity was more common amongst SCC ($P<0.005$).

Conclusion: Vascularity and metabolism are uncoupled in NSCLC. Since some lung cancer patients have inadequate tissue sampling metabolic flow data could be helpful clinically in managing lung cancer patients to targeted therapy using non-invasive ¹⁸F-FDG PET/DCECT scan.

P2749

FDG-PET SUVmax is an independent prognostic indicator in patients with non-small cell lung cancer

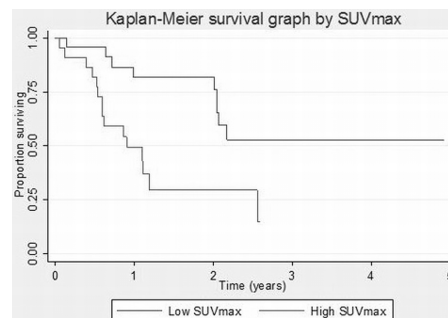
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Background: FDG-PET is a commonly used non-invasive tool for diagnosis and staging of lung cancer, the leading cause of cancer death. SUVmax has been suggested to be an independent prognostic factor in patients with operable non-small-cell lung cancer (NSCLC). However, PET-CT is not recommended in patients with advanced disease.

Aim: Evaluate the utility of SUVmax of the primary lesion as an independent predictor of overall survival in patients with NSCLC, including advanced disease.

Methods: Retrospective analysis of 47 patients (29 male, median age 69 years) with NSCLC (stage I 38%, stage II 9%, stage III 34%, stage IV 18%) who underwent FDG-PET at diagnosis. Cox regression analysis was applied to examine the effect of SUVmax on survival. This was then adjusted for stage, treatment, age, sex and histology.

Results: There was a significant difference in survival between patients who had a low vs high SUVmax, hazard ratio 3.31 ($p=0.006$), such that an increase in SUVmax of the primary of 5 points conferred a hazard ratio of 1.49 ($p=0.013$).



This relationship was maintained when multiple factors were adjusted for, with a hazard ratio for an increase in SUVmax of the primary of 5 points of 2.8 ($p=0.03$).

Conclusion: FDG-PET provides additional information about prognosis in NSCLC, independent of stage at presentation. The relationship between SUVmax of the primary and survival is maintained, even in patients with advanced disease.

P2750

Late-breaking abstract: Is primary tumour standardized uptake value (SUV) an independent prognostic factor for non small cell lung cancer (NSCLC)? A meta-analysis based on individual data

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Background: ¹⁸F-fluoro-2-deoxy-D-glucose positron emission tomography has an important role in staging lung cancer. In addition, its prognostic value has been studied in numerous studies as well as in two literature based meta-analyses. To assess further its independent value, we carried out a meta-analysis based on individual data.

Methods: Following literature search, we contacted the authors of identified studies and tried to identify some unpublished data with a written protocol for the meta-analysis. Primary outcome was overall survival (OS) and data analysis used Cox regression models stratified for study. SUV was used as a binary covariate (cut-off: median value for each study).

Results: Data were collected for 1462 patients (out of 2596 identified patients) from 10 publications and 1 unpublished series (median age: 64 years, gender: 61% male, 35% squamous cell, 45% adenocarcinoma, stage I: 49%, II: 8%, III: 32%, IV: 12%). Lower SUV was significantly associated with female gender, smaller tumour size, earlier stage and adenocarcinoma. Analyzing OS, univariate hazard ratio for SUV was 1.44 (95% CI: 1.23-1.68) without important heterogeneity in subgroups except for stage IV. When adjusted for stage, histology, age, tumour size and gender, HR estimate for SUV effect was 1.62, statistically significant (95% CI: 1.28-2.04, p<0.001).

Conclusions: This meta-analysis based on individual patients data shows that SUV is an independent prognostic factor for OS, at least in non metastatic stage. Selection bias and methodological differences are however present and further prospective studies are needed.

P2751

Is our preoperative TNM staging reliable?

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Introduction: Agreement between preoperative and surgical TNM staging is usually <50%.

Aim: To compare our preoperative staging (cTNM) with surgical-pathological staging (pTNM).

Methods: Cross-sectional study of patients with lung cancer surgically treated from 1-1-08 to 31-12-09, excluding relapses or neoadjuvant therapies. Preoperative stag-

	ALL N=166	FEMALE N=31 (19%)	MALE N=135 (81%)	P
Age	62.0±9.3	58.7±11.7	62.8±8.6	p<0.05
Tobacco (packs.yr)	49.5±22.1	38.5±18.6	51.0±22.2	p<0.05
Non smokers	18 (10.8%)	13(41.9%)	5(3.7%)	p<0.001
Pathological type				
- Squamous cell	74 (44.5%)	4 (12.9%)	70 (51.8%)	p<0.001
- Adenocarcinoma	72 (43.3%)	24 (77.4%)	48 (35.5%)	
- Other	20 (12.0%)	3 (9.6%)	17 (12.5%)	
Diagnostic procedure				p<0.05
Bronchoscopy	41 (24.6%)	3 (9.6%)	38 (28.1%)	p<0.05
Percutaneous biopsy	60 (36.1%)	10 (32.2%)	50 (37.0%)	
Thoracotomy	60 (36.1%)	15 (48.3%)	45 (33.3%)	
Others	5 (3.0%)	3 (9.6%)	2 (1.4%)	

		pTNM							Total
		Ia	Ib	IIa	IIb	IIIa	IIIb	IV	
cTNM	Ia	31	21	3	1	1	0	0	57
	Ib	3	36	8	16	11	2	2	78
	IIa	0	0	4	3	1	0	0	8
	IIb	0	0	0	6	10	0	0	16
	IIIa	0	0	0	0	1	0	0	1
	IIIb	0	1	0	0	0	2	0	3
	IV	0	0	0	0	0	0	3	3
	Total	34	58	15	26	24	4	5	166

ing based on: CT scan, positron emission tomography (PET-CT), endobronchial ultrasonography (EBUS), endoscopic ultrasonography (EUS), mediastinoscopy. Agreement between cTNM and pTNM (according to 1997 TNM classification) was analyzed.

Results: 166 cases (characteristics in table 1). In table 2, concordance between cTNM and pTNM.

cTNM and pTNM matched in 80 cases (48,2%), understaging occurred in 5 cases (3%) and overstaging in 81 (48,8%). But in most cases, this lack of agreement would not suppose changes in the therapeutic decision, just in 21 cases (12,5%) the cTNM carried out a wrong therapeutic procedure (18 N2 found in thoracotomy and 3 T4 unresectables). TC and PET-TC used in all cases, EBUS in 35, EUS in 2 and mediastinoscopy in 3. In N staging, PET-CT was cN0 in 133 cases (where 7 were pN2, 5,2%) and cN1 21 (8 pN2, 25,8%). We performed 35 EBUS (33 cN0, 2 cN1) and final pN was N2 in 3 cases (FN rate 8,5%).

Conclusions: 1. Low agreement between cTNM and pTNM (48,2%), but only in 12,5% of cases would suppose a change in the treatment. 2. 25% of pN2 when cN1 by PET-CT (EBUS should be done). 3. When EBUS negative for N2, only 8,5% pN2.

P2752

Prevalence of silent brain metastasis (BM) in the initial staging of non-small cell lung carcinoma (NSCLC)

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Introduction: Positron emission tomography (PET) can detect up to 15% of distant metastases in lung cancer, but it has a low sensibility in detecting BM. Guidelines recommend performing MRI only if there are neurological symptoms (NS). Our aim was to assess the role of MRI in detecting silent BM in the initial staging of NSCLC.

Material and methods: Retrospective analysis of new cases of NSCLC without distant metastasis by PET. MRI was performed in all of NSCLC patients as initial work up, except those in stage IV.

Results: MRI was made in 95 patients with NSCLC. 39%, 40% and 21% had squamous cell carcinoma, adenocarcinoma and other histology respectively.

		Total (n)	Metastasis			
			M0		M1	
			n	%	n	%
Age (years)	≤ 65	42	34	81,0	8	19,0
	> 65	53	50	94,3	3	5,7
Gender	Female	13	8	61,5	5	38,5
	Male	82	76	92,7	6	7,3
Smoking history	No	6	3	50,0	3	50,0
	Yes	89	81	91,0	8	9,0
ADK	No	57	54	94,7	3	5,3
	Yes	38	30	78,9	8	21,1
Size (mm)	≤ 30	20	19	95,0	1	5,0
	>30	69	59	85,5	10	14,5
Stage N	Without lymph nodes	43	37	86,0	6	14,0
	With lymph nodes	52	47	90,4	5	9,6
SUV classification (g/mL)	≤ 13	48	41	85,4	7	14,7
	>13	47	43	91,5	4	8,5
Location	Central	42	35	83,3	7	16,7
	Peripheral	53	49	92,5	4	7,5
Symptoms	No	89	83	93,3	6	6,7
	Yes	6	1	16,7	5	83,3

Table 1 Characteristics of patients with NSCLC.

20%, 21% and 59% were stage I, II and III respectively. BM were diagnosed by MRI in 11,6% (11/95) of the patients, and six of them (6/95, 6.35%), did not present NS. A stratified binary logistic regression analysis showed that there were not any clinical variable associated with the presence of silent BM in the asymptomatic subgroup, whereas central tumours (p=0,005) and ADK (p=0,01) were associated to BM in patients with NS. In both subgroups; staging, SUVm, tumour size and lymph nodes were not statistically indicative of BM.

Conclusions: Prevalence of silent BM at initial staging was 6.35%. Neither clinical nor radiological variables could predict silent BM. We concluded MRI is justified as a routine procedure in NSCLC patients without BM in the PET. Partially funded by SOCAP.

P2753

Assessment of physical functioning in surgical candidates with non-small cell lung cancer: Preliminary comparison of performance status to symptom-limited cardiopulmonary exercise testing

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Background: Performance status (PS) scoring systems are used routinely by clinicians to guide management of patients with non-small cell lung cancer (NSCLC). However, PS scoring systems are subjective with poor inter-rater reliability and do not provide an objective measure of functional status. The aim of this study was to compare the variability in an objective measure of cardiorespiratory fitness (VO_{2peak}), among surgical candidates with histologically confirmed NSCLC across different PS categories as assessed by the Eastern Cooperative Oncology Group (ECOG) score.

Methods: Using a cross-sectional design, 389 subjects underwent an incremental cardiopulmonary exercise test with expired gas analysis to determine VO_{2peak} prior to surgical resection.

Results: Mean VO_{2peak} significantly declined across increasing ECOG categories (Table 1). There was a wide range in VO_{2peak} in each ECOG category with similar ranges in VO_{2peak} within groups, in particular in subjects classified as ECOG 1 and 2.

Table 1. Comparison of VO_{2peak} to ECOG PS in NSCLC

Variable	(n=187)	(n=174)	(n=28)
ECOG	0	1	2
Mean VO_{2peak} (ml kg ⁻¹ min ⁻¹)	17.2±4.5	15.0±3.7	13.5±3.1
VO_{2peak} Range (ml kg ⁻¹ min ⁻¹)	5.0–31.5	4.3–24.8	8.9–21.9

Conclusions: VO_{2peak} may provide a more sensitive evaluation of physical functioning than ECOG. Accurate assessment of functional status may have important implications for mortality risk and therapeutic management in the oncology setting.

P2754

Comparison of predictive respiratory function parameters of lung cancer patients having COPD diagnosis with postoperative values and relation with mortality and morbidity

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Introduction and aim: Lung cancer with COPD increases surgical morbidity and mortality. In this research, non-small cell lung cancer (NSCLC) patients with/without COPD were investigated:

1. When preoperative predictive respiratory function parameters take place during postoperative period?

2. Which parameters are more valuable at prediction of morbidity and mortality?

Method: This research was planned in a prospective manner. 46 NSCLC patients having pulmonary resection were grouped into 2.

Group A: 23 moderate COPD patients.

Group B: 23 non-COPD patients.

We checked patients for respiratory function tests, DLCO and arterial blood gases. Group A was also checked for ventilation/perfusion scintigraphy and VO_{2max} .

We calculated predictive preoperative FEV1 and DLCO. We repeated respiratory function and DLCO tests during postoperative 1st, 3rd and 6th months.

Results and conclusion: There wasn't any significant difference between 2 groups over demographic datas, operative skill, stage of cancer and type of resection. ($p>0.05$) Morbidity and mortality rates of Group A were significantly higher than Group B. Group A patients reached predicted results in 1st month and FEV1, DLCO results gained at 6th month were higher than predicted. In both groups, especially in Group B, best remarkable indicator for prediction of postoperative complications was DLCO%.

Every patient going on pulmonary resection, should be tested for DLCO for determination of postoperative complication risk. It should not be forgotten that parameters checked for preoperative evaluation (FEV1% and DLCO) are not always enough for decision of surgery.

P2755

Effect of adjuvant chemotherapy on lung function in early stage NSCLC

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Introduction: Pulmonary function can decline after induction chemotherapy and

be predictive of perioperative complications in NSCLC. However, the influence of adjuvant chemotherapy on lung function is undetermined yet.

Methods: In a phase 2 trial on adjuvant therapy (TREAT), 132 patients with R0 resected NSCLC stage IB-T3N1, were randomized to 4 cycles Cisplatin/Vinorelbine (CVb, n=65) (C 50 mg/m² d1+8; Vb 25 mg/m² d1,8,15,22) q4 weeks or to 4 cycles Cisplatin/Pemetrexed (CPx, n=67) (C 75 mg/m², Px 500 mg/m², d1) q3 weeks. Pulmonary function tests (forced expiratory volume in 1 s [FEV1], vital capacity [VC], total lung capacity [TLC], diffusing capacity [DLCO], blood gas analyses [BGA]) were analyzed before and 30 days after therapy. Parameter changes were calculated (Δ =mean differences) and statistically analyzed.

Results: Overall, VC increased significantly (Δ +290 ml, n=76; $p<0.0001$), while TLC did not change significantly (Δ +220 ml; n=41, $p=0.174$). For CPx, FEV1 increased significantly (Δ +150 ml, n=47; $p=0.0017$), but not for CVb (Δ 3 ml; n=30). DLCO decreased only for CVb (-8%, n=6) but not for CPx (-0.39%, n=17) ($p=0.58$). BGA did not change ($p=0.99$). In a Cox regression analysis, baseline lung function did not influence treatment failure (time until withdrawal from therapy due to adverse events, relapse, death, treatment refusal, non-compliance).

Conclusions: Adjuvant chemotherapy does not result in a decrease of lung function parameters but in a significant VC increase, probably due to ongoing postoperative improvement. Still, a non-significant difference between a DLCO decline under CVb but not for CPx warrants further attention. Moreover baseline lung function parameters do not impact treatment failure.

P2756

Radiofrequency ablation of lung neoplasms in patients being no candidates for surgery. The impact of the intervention on the pulmonary function

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Introduction: CT guided percutaneous Radio Frequency Ablation (RFA) of pulmonary lesions is an alternative option for patients being no candidates for surgery. The pulmonary function should not be impaired substantially by the procedure. In this study the pulmonary function subsequent to RFA of lung neoplasms as well as the morbidity related to the intervention was analyzed.

Methods: A total of 26 CT guided percutaneous RFA procedures were performed (in a total of 16 patients) after discussion in the national comprehensive cancer centre due to limited pulmonary reserve or other co-morbidities. Histology was proofed by CT-guided percutaneous biopsy (NSCLC: n=22; pulmonary metastasis: n=4) prior to the RFA procedure (in general anaesthesia, double lumen intubation). Morbidity related to the intervention and the pulmonary function subsequent to the intervention was analyzed.

Results: The median forced expiratory volume (FEV1) pre RFA was 1.7l (range 0.7-2.9l; 65%, range 38%-129%). It was unchanged post RFA: 1.6l (range 1.1-2.4l; 64%, range 38%-118%) during median 168d follow-up (range 28- 393d). Pneumothorax requiring drainage as solely major complication occurred in 6/26 procedures (23%). Median hospitalization time was 5 days (range 4-12 days). Local control by CT was reached in all cases; systemic disease progress was verified by PET in 4 patients.

Conclusions: Mid-term change in pulmonary function due to pulmonary RFA has a negligible clinical impact. Therefore RFA seems to be suitable especially in patients with severely limited pulmonary function, if other local strategies are unreasonable.

P2757

Is radiologic evidence of interstitial infiltrate enough to predict FEV1 and DLCO disparity in lung cancer patients?

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Guidelines have been established for the physiological evaluation of lung cancer patients considered for surgery. While some recommend routine measurement of DLCO, others require this measure if there is evidence of interstitial disease, relying on FEV1 alone in most cases. Our objective in this study was to evaluate if radiologic evidence of interstitial disease is a good predictor of disparities between FEV1 and DLCO.

We studied a sample of 50 patients with NSCLC referred to perform lung function measurement. Based on chest CT, patients were divided into two groups according to presence of interstitial disease. The correlation between FEV1 and DLCO was tested.

48 individuals completed the study. 11 patients had diffuse interstitial disease in CT (Group ICT) while 37 patients had no signs of interstitial pattern (Group NCT). Both groups were similar in terms of age, gender and BMI. Mean DLCO predicted was lower in ICT group 42 x 61% ($p<0.01$). VEF1 and TLC were also significantly lower in ICT. 7 patients in ICT and 32 in NCT had an obstructive pattern on spirometry ($p=NS$).

FEV1 and DLCO had a significant correlation ($R=0.376$ $p=0.009$). The same analysis for both groups showed that FEV1 and DLCO correlated better in ICT ($R=0.630$ $p=0.03$) than in NCT ($R=0.249$ $p=NS$). In NCT group, 10 from 14 patients with normal FEV1 had impaired diffusion capacity. Interstitial infiltrate predicts impaired lung function and diffusion capacity but disparities between FEV1 and DLCO are more frequent in lung cancer patients without diffuse interstitial pattern. These findings support the routine assessment of DLCO in patients who are candidates for surgical treatment of NSCLC.

P2758

Lung function in lung cancer – Room for improvement?

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COPD and lung cancer both have clear associations with cigarette smoking and frequently present late. The aim of the study was to identify whether newly diagnosed lung cancer patients had spirometry consistent with undiagnosed COPD or had COPD which was under treated.

The clinic and discharge letters of all patients diagnosed with lung cancer at Southend University Hospital in 2010 were reviewed for a previous diagnosis of COPD and their spirometry at the time of diagnosis. Of the 189 patients diagnosed with lung cancer in 2010, 136 (52.2% female) had documented spirometry at the time of diagnosis and were therefore included in the database. Of these, 43 patients (31.6%) had been previously diagnosed with COPD, and 90.7% of these were on appropriate treatment for their COPD. 59 patients (43.4%) had spirometry consistent with COPD but had not been diagnosed or treated for COPD; 11 (18.6%) mild COPD, 31 (52.5%) moderate COPD and 17 (28.8%) severe COPD.

Many patients with lung cancer have undiagnosed COPD. The high rate of undiagnosed COPD in this population is suggestive of either an unwillingness to attend primary care with their respiratory symptoms or the inability of primary care to diagnose COPD and other respiratory disease. Both may be associated with the late presentation in the UK of many patients with lung cancer. Earlier diagnosis and management of COPD might result in improved lung function and performance status thus allowing more aggressive management of lung cancer and also lead to a greater awareness of symptoms thus resulting in earlier presentation.

P2759

Lung cancer size and thoracic lymph nodes metastatic involvement: A correlation

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Objective of the study was to determine the frequency of lymph node metastases depending on the lung cancer size.

Material of the investigation included 136 lung resection samples obtained on surgery of the lung cancer patients, 114 males and 22 females, at the mean 54.8 years of age.

Results and discussion: Squamous carcinoma was the most frequent lung cancer type (66.9%), followed by adenocarcinoma (27.2%), while small-cell (4.4%) and large-cell (1.2%) cancer types were more rarely found. Metastatic involvement of the lymph nodes was discovered in 80 (56.7%) of 136 examined lung resection samples. The total of 489 thoracic lymph nodes were examined and metastases found in 207 (40.3%). The tumors sized 1.1-2 cm metastasized in 47% of the lymph nodes; the tumors sized 2.1-3 cm involved 32.7% of the lymph nodes by metastases; the tumors sized 3.1-4 cm metastasized in 36.3% of the thoracic lymph nodes; the tumors sized 4.1-5 cm involved 36% of the lymph nodes by metastases; the tumors in the size of 5.1-6 cm metastasized in 28.6% of the lymph nodes while those of over 6 cm in diameter involved 69% of the lymph nodes by metastases.

Conclusion: The number of lymph nodes involved by metastases does not increase with the size of the tumor of up to 6 cm; however, a further increase of the tumor size (over 6 cm in diameter) significantly increases the number of metastatic lymph nodes.

P2760

FNA of palpable supraclavicular lymph nodes in lung cancer: Comparison between palpation and ultrasound

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Introduction: Clinical evaluation of the supraclavicular region is important for patients with suspected lung cancer as it is estimated that 26-42% of them had metastases to supraclavicular lymph nodes at diagnosis. Fine needle aspiration (FNA) cytology provides an easy method of obtaining both a diagnosis and staging.

Aim: To compare the accuracy of FNA of palpable supraclavicular lymph nodes using palpation and ultrasound (US) among patients with suspected lung cancer.

Methods: Over a 30 month period (6/2008 – 12/2010) we examined 71 consecutive patients (54 males, 64.3±11.5 years) suspected for lung cancer with

palpable supraclavicular lymph nodes. All patients underwent US and palpation guided FNA at the same time. Samples were studied by immunohistochemical tests.

Results: Sixty-four out of 71 patients had positive cytology by US (sensitivity: 93%) while the sensitivity of palpation was 90% (62/69). Seven patients underwent surgical sampling of lymph nodes and the diagnoses were: 3 patients with adenocarcinoma, 2 with small cell lung cancer (SCLC) and 2 M. tuberculosis. Cytological diagnoses by FNA were: SCLC (23 patients), adenocarcinoma (22), squamous (7), undifferentiated non-small cell lung cancer [NSCLC] (6), unknown origin (2), lymphoma (2), sarcoma (1), and large cell lung cancer (1). Among patients with NSCLC TNM classification was: stage IIIb (24) and IV (12). Patients with SCLC demonstrated: limited (16) and extensive disease (7). No adverse event was observed with both methods.

Conclusion: FNA of palpable supraclavicular lymph nodes using clinical examination among patients with suspected lung cancer is a safe, cost-effective and as accurate as US guided method.

P2761

Is mediastinoscopy necessary in patients with negative EBUS-TBNA – A challenge to the ESTS Guidelines for staging of lung cancer

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Objective: Mediastinoscopy is the golden standard for mediastinal staging of lung cancer. The aim of the present study was to examine whether mediastinoscopy may be avoided if a standardized EBUS-TBNA procedure using the same criteria as required during mediastinoscopy with representative biopsies without malignant cells from lymph nodes in station 4R, 7 and 4L, is performed.

Methods: Patients with known or suspected lung cancer underwent a standardized EBUS-TBNA procedure. All patients with EBUS-TBNA from station 4 R, 4L and 7 without cancer cells or a specific diagnose were further referred for a VATS/thoracotomy.

Results: A total of 76 out of 95 consecutive patients, 48 males, 28 females were enrolled. Mean age 65 years (range 40-85). The mean sizes of the lymph nodes in all 3 stations were 9mm (range 2 - 35mm). The final primary diagnosis was cancer in 67 patients and benign diagnoses in 8 patients. In 4 patients mediastinal metastases were found by surgery (5%). One patient had a metastasis in station 4 R and 2 patients in station 5 and one patient in station 6. The NPV was 0.95 and with a specificity of 1

In total the false negative rate of EBUS-TBNA in mediastinal staging of lung cancer was 4 out of 67 (6%).

Conclusions: The results of the present study seem to challenge mediastinoscopy as the gold standard. When EBUS-TBNA is performed under the same standardized conditions as described by the ESTS guidelines for mediastinoscopy with demonstration of lymphatic tissue from relevant lymph node stations, our study shows that very little, if anything, is gained by an additional mediastinoscopy and can be avoided.

P2762

CT guided biopsy: Predictors of outcome and complication rate

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Background: With a drive towards early diagnosis of lung cancer and aim for curative treatment, CT guided biopsy is being used increasingly. While it is a relatively safe procedure, institutions performing this should audit its practice against recommended standards.

Objective: Measuring this procedure's complication rate and positive results to ascertain if there are any predictors for these outcomes.

Method: A retrospective study was undertaken to collect data for all CT guided biopsies done in last 2 years (2009-10) in our hospital.

Result: 66 biopsies were reviewed. Mean (SD) age of patients was 69 (11) years. Conclusive histology was obtained in 38 (56%). Complication rate and the British Thoracic Society (BTS) standards are shown below.

Table 1

Complication	Study population	BTS standard
Pneumothorax	10 (15%)	20.5%
Chest drain	2 (3%)	3.5%
Hemoptysis	0	5.3%
CT evident hemorrhage	6 (9%)	

The mean size and depth from chest wall of lesions in patients with and without PTX, hemorrhage and conclusive biopsies are shown in Table 2.

In lesions with a size of >3cm (n=43), 31 (72%) results were conclusive as opposed to 8 (35%) conclusive results in lesions <3cm (n=23). Positive results for lesions at a depth of >1.5 cm (n=13) was 46% while the same for lesions at depth <1.5 cm (n=53) was 61%.

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Table 2

	PTX	No PTX	p value
Mean size	19	47	<0.02
Mean depth	13	4	0.01
	Hemorrhage	No hemorrhage	
Size	45	44	NS
Depth	15	6	0.02
	Conclusive biopsy	Inconclusive	
Size	51	33	<0.001
Depth	5	8	NS

Conclusion: Good pick up rate with complications well within acceptable standards were achieved in our study population. Depth of the lesion correlated well with pneumothorax and hemorrhage while size correlated with pneumothorax. Size was also a good predictors of conclusive biopsies.

P2763**The frequency and significance of radiologically detected indeterminate pulmonary nodules in patients with colorectal cancer**Yelda Varol¹, Umut Varol², Burçak Karaca², Rüçhan Uslu², Recep Savas³.¹Chest Diseases, M. Enver Senerdem Government Hospital, Izmir, Turkey;²Medical Oncology, EGE University, Izmir, Turkey; ³Radiology, EGE University, Izmir, Turkey

Background: This study aims to investigate the frequency and significance of indeterminate pulmonary nodules in patients with non-metastatic CRC.

Methods: We retrospectively evaluated 1344 patients with CRC who underwent thoracic CT scans between the years January 2003-December 2009. Those with evident metastatic disease or already known to have pulmonary malignancies were excluded.

Results: Among all patients assessed, 55 (0.4%) of them had nodules that met the criteria of indeterminate pulmonary nodule. We analyzed the cases by size and number of nodules. A multivariable analysis demonstrated that indeterminate pulmonary nodules with irregular border ($p=0.002$), parenchymal localization ($p=0.016$) and being multiple in number ($p=0.006$) were predictives of metastatic disease.

Conclusion: The characteristics of indeterminate pulmonary lesions in CRC cases with no evidence of metastasis elsewhere have to be defined more comprehensively. We believe that for appropriate decision of the frequency for follow-up interval, further studies are required.