

SUNDAY, SEPTEMBER 16TH 2007

---

## 42. Diagnosis and staging of lung cancer: existing and new techniques

---

205

**Missed lung cancer on chest radiography – does it affect the outcome?**

M. Hasan<sup>1</sup>, S. Taggart<sup>2</sup>. <sup>1</sup>*Department of Respiratory Medicine, Royal Preston Hospital, Preston, United Kingdom;* <sup>2</sup>*Department of Respiratory Medicine, Trafford General Hospital, Manchester, United Kingdom*

**Introduction:** It is not unusual to find previous significant radiological abnormalities in patients in whom a diagnosis of lung cancer is later made (Turkington, PM *et al.* Postgrad Med J 2002; 78:158–160)

**Aims:** We investigated the incidence of missed lung cancer on chest radiography (CXR) and its impact on the outcome in lung cancer patients.

**Methods:** All histologically proven primary lung cancer patients from November 2004 to January 2006 who had at least one CXR in the twelve months preceding the diagnosis were studied. A radiologist who was blinded to the site of the lesion and time of diagnosis reviewed the CXR.

**Results:** Sixty CXR from 44 patients were studied. Lesions were accurately reported in 45/55 CXR (82% sensitivity). On review lesions were visible in 10/15 CXR (9 patients). There were 5 errors of perception (failure of the reporting radiologist to see the lesion), 5 errors of interpretation and no lesion was seen in 5 CXR (true negative). Five of the missed lesions were in the hila. One patient in the missed-cancer group and 3 patients in the non-missed group had surgical treatment.

**Conclusion:** Missed lung cancer significantly delayed the time to diagnosis and treatment (or palliation) but had no significant effect on the final outcome in this study group.

Group	Median (days) from abnormal CXR to diagnosis (p=0.0001)	Median (days) from abnormal CXR to treatment (p=0.0001)	Median (days) from diagnosis to death (p=0.69)	Patients alive (n:10)
Missed cancer	173 (50–379)	203 (50–398)	104 (27–327)	3
Non-missed	16 (1–85)	44 (4–103)	209 (17–451)	7

Difference of time between groups

206

**Use of PET scans in respiratory multidisciplinary meetings: an audit**

S.L. Tan<sup>1</sup>, Y. Jain<sup>2</sup>, A. Lal<sup>1</sup>, A. Rajasekaran<sup>1</sup>, O.A. Khair<sup>1</sup>. <sup>1</sup>*Respiratory Unit, City Hospital, Birmingham, United Kingdom;* <sup>2</sup>*Radiology Department, City Hospital, Birmingham, United Kingdom*

The use of Positron Emission Tomography (PET) in lung cancer is regulated by National Institute for Clinical Excellence (NICE) guidelines via specialist multidisciplinary team (MDT); it provides improved patient treatment and outcomes. Our aims were to review the use or lack of use of PET, assess its compliance with NICE guidelines, determine if PET had changed the radiological staging and establish its outcomes.

SUNDAY, SEPTEMBER 16TH 2007

We conducted a retrospective analysis of all patients reviewed in our respiratory MDT meeting from July to December 2006. 141 patients were reviewed. 15 PET scans were performed, 11 were males, mean age 68 (range 46 to 89). 8 were performed for cancer staging, 4 for solitary nodules and 3 for evaluation of mass. 10 patients had bronchoscopy providing histological diagnosis in 3. 3/15 scans (20%) did not comply with NICE guidelines (requested to differentiate infection/inflammation from neoplasm).

After PET scan, 6/15 had revised staging (3 up-staged, 1 down-staged, 1 benign nodule and 1 resolved). 7 additional investigations were suggested (2 bone scans, 1 dermatology referral and 4 colonoscopies).

Out of the 141 patients, we found that 16 should have had PET (11%) and only 12/16 had it (75%). Of those missed, 2 were for surgery and 2 for radical radiotherapy. Of those not requiring PET, the majority were for palliative care (50), non-lung cancer (7), infection/inflammation (18), declined (6), wait and watch (15), reassured (12), surgical biopsy (7), migrated (2), deceased (2) and no data (6).

In summary, 80% of PET scans complied with NICE guidelines and it changed the staging in 40%. They were not performed in 25% of the required cases. More work is needed to improve compliance with NICE guidelines.

### 207

#### The comparison of virtual and fiberoptic bronchoscopy in patients with indication of endobronchial evaluation

F. Adali<sup>1</sup>, A. Uysal<sup>2</sup>, S. Bayramoglu<sup>1</sup>, N. Guner<sup>1</sup>, V. Yilmaz<sup>2</sup>, T. Cimilli<sup>1</sup>.

<sup>1</sup>Radiology, Bakirkoy Sadi Konuk Training and Research Hospital, Istanbul, Turkey; <sup>2</sup>Clinic 4, Yedikule Teaching Hospital for Chest Diseases and Thoracic Surgery, Istanbul, Turkey

Virtual Bronchoscopy (VB) application is a popular method for evaluation of tracheobronchial abnormalities recently.

We aimed to compare the results between VB and fiberoptic bronchoscopy (FOB). In our study, totally 22 patients with clinically established indication for endobronchial evaluation were studied between May 2006 and January 2007.

VB, has been done by using multi-slice computed tomography with thoracic axial plane Somatom Sensation 40 (Siemens Medical Systems, Forchheim Germany). Axial computed tomography scans have been simultaneously evaluated with coronal-sagittal multiplanar reconstruction (MPR) using shaded surface software. In tracheobronchial forwarding was performed by "syngo fly through" software. The evaluation of tracheobronchial system was defined by luminal bulging, narrowing, obstruction and outer pressure in both FOB and VB. FOB was done by two endoscopist within 24 hours after VB.

VB compared to FOB, the results were 90.9% concomitant with FOB.

VB showed endobronchial narrowing in agreement with FOB. VB was superior in visualising the airway distal to the narrowing. The degree of narrowing to detect was different between VB and FOB.

That a biopsy can not be taken in order to establish the definite diagnosis is the main disadvantage of VB

Additional disadvantages are the inevitability of detection of mucosal details (fragility, color difference, vascularity) and submucosal spreading and submucosal infiltration. The specificity is low and real time evaluation is lacking.

### 208

#### Scintigraphy with <sup>99m</sup>Tc-depreotide has a high sensitivity in detecting lung cancer

M. Bääth<sup>1</sup>, G. Herlin<sup>1</sup>, P. Aspelin<sup>1</sup>, K.-G. Kölbek<sup>2</sup>, R. Danielsson<sup>1</sup>. <sup>1</sup>Division of Radiology, CLINTEC, Karolinska Institute, Stockholm, Sweden; <sup>2</sup>Division of Allergy and Pulmonary Medicine, Department of Medicine, Karolinska Institute, Stockholm, Sweden

**Purpose:** To evaluate the diagnostic value of the somatostatin analogue, <sup>99m</sup>Tc-Depreotide in patients with suspected lung cancer.

**Material and Methods:** We included ninety-nine consecutive patients referred to the chest unit on suspicion of lung cancer. In addition to routine evaluation, a scintigraphy was performed following the administration of 740 MBq <sup>99m</sup>Tc-Depreotide with tomographical imaging of the thorax and whole-body scanning using a gamma camera. The diagnostic outcome of the scintigrams was compared to CT using pathology or clinical outcome as endpoint.

**Results:** Depreotide uptake was found in 62 of 66 malignancies and in 57 of 58 cases of primary lung cancer. Two cases of lung metastasis (one from a colon cancer and one from an adenoid cystic carcinoma originating in the palate) and one rib chondrosarcoma did not show depreotide uptake. Sixteen out of 33 benign cases displayed false positive Depreotide uptake, of which 11 had pneumonia. No hamartoma showed significant uptake.

The sensitivity to detect malignancy was 94% and to detect lung cancer 98%. The specificity was calculated on two sets of data. When all cases are used, the specificity was 52%. If the 12 pneumonias are excluded the specificity was 77%.

**Conclusions:** Scintigraphy using the somatostatin-analogue Depreotide has a very high sensitivity for lung cancer. The method also has an acceptable specificity for malignant lung lesions.

### 209

#### Assessment with STIR MR imaging and PET-CT for malignant or benign lesion in the mediastinal and hilar lymph nodes

M. Morikawa<sup>1</sup>, Y. Demura<sup>1</sup>, D. Uesaka<sup>1</sup>, T. Ishizaki<sup>1</sup>, H. Itoh<sup>2</sup>. <sup>1</sup>Department of Respiratory, University of Fukui, Fukui, Japan; <sup>2</sup>Department of Radiology, University of Fukui, Fukui, Japan

**Background:** Positron emission tomography(PET) with 2-[fluorine-18] fluoro-2 deoxy-D glucose(FDG) established utility about diagnosis of lung cancer metastasis in mediastinal lymph node, but poor specificity is reported.

**Objectives:** We assessed short inversion time inversion-recovery(STIR) magnetic resonance(MR) imaging for detection of malignant lymph node, comparing detection by PET-computed tomography (CT).

**Methods:** Seventy three mediastinal and hilar lymph nodes were detected in 43 patients, who were examined with STIR MR imaging and PET-CT. Ratios of signal intensity in a lymph node to that in a 2% copper sulfate phantom(lymph node-phantom ratios[LPRs]) for all lymph nodes were evaluated and compared with the pathologic diagnosis. The ability to diagnose was assessed with quantitative by LPR and qualitative by visual score and compared with that by standardized uptake value(SUV).

**Result:** 42 of 73 lymph nodes were pathologically diagnosed as malignant. Mean LPR in the malignant group was significantly higher than the benign group(P<0.001). When an LPR of 0.1 and SUV of 3.4 were adopted as the threshold at quantitative analysis, sensitivity, specificity, and accuracy per lymph nodes were 92.9/95.2, 64.5/64.5, and 80.8/82.2%(STIR/PET-CT), respectively. Qualitative analysis was similar. When a lymph node with PET-CT positive and LPR<0.1 was defined as benign, accuracy increased significantly.

**Conclusion:** Diagnosability of STIR MR imaging was equal to that of PET-CT. Causes of false positive are different, water content in MR imaging and increase of glucose metabolism in PET. STIR MR imaging can differentiate false positive of PET-CT and raise accuracy.

### 210

#### EBUS TBNA compared to mediastinoscopy

M. Krasnik, B. Skov, R. Eberhardt, F. Herth. Thoracic and Cardiovascular Surgery, Gentofte University Hospital, Copenhagen, Denmark; Pathology, Gentofte University Hospital, Copenhagen, Denmark; Interventional Pulmonology, Thorax-Clinic Heidelberg, Heidelberg, Germany; Interventional Pulmonology, Thorax-Clinic Heidelberg, Heidelberg, Germany

**Objective:** The aim of the present study was to compare the results from EBUS-TBNA with standard mediastinoscopy in the evaluation of mediastinal lymph nodes in patients with lung cancer or undiagnosed solid lesion in the mediastinum

**Methods:** The combination of EBUS TBNA and mediastinoscopy was prospective performed in 66 patients during the same general anaesthesia.

**Results:** A total of 66 patients (29 females and 37 males mean age 60 years) underwent EBUS TBNA and Mediastinoscopy combined. In 61 patients (93%) EBUS TBNA the result was consistent with the final diagnosis and the mediastinoscopy was correct in 53 patients (80%). In one patient both mediastinoscopy and EBUS TBNA was false negative.

The final diagnose for the patients were 55 cancers, 1 tuberculosis, 1 lymphoma, 3 sarcoidosis and 6 inflammations. NPV and PPV for the two methods will be discussed

### 211

#### Fluoroscopic-guided percutaneous biopsy in diagnosis of pulmonary lesions

D. Stojanov<sup>1</sup>, P. Bosnjakovic<sup>1</sup>, D. Benedeto-Stojanov<sup>2</sup>. <sup>1</sup>Institute of Radiology, Clinical Centre Nis, Nis, Serbia; <sup>2</sup>Clinic of Gastroenterology, Clinical Centre Nis, Nis, Serbia

**Introduction:** Percutaneous lung biopsy (PLB) is well established diagnostic technique in differentiating malignant and benign pulmonary lesions. We present our results and complications of PLB in diagnosis of pulmonary lesions.

**Methods:** This is a retrospective study of 52 patients (40 male and 12 female, mean age 58.9 years) with lung lesions underwent PLB in a period of one year. Indications for performing PLB were pulmonary nodules, masses, or infiltrates when there was a reasonable suspicion of malignancy. The lung lesions were detected on chest-x ray and CT. Two patients had bilateral lesions. Cutting needle biopsies were performed under local anaesthesia under fluoroscopic control.

**Results:** Biopsies were diagnostic in 48 (92.30%) patients. Of these, 38 (79.16%) were malignant and 10 (20.84%) were benign. In the malignant case 28 (73.68%) patients had non-small cell carcinoma, 6 small cell carcinoma and 4 had metastatic disease. Of the benign cases 4 patients had organizing pneumonia, 4 had consolidation and one had undefined granuloma. Complications were rare. Haemoptysis was noted in 4 patients and follow-up was carried. Five patients had vaso-vagal episodes. There was no pneumothorax.

**Conclusion:** PLB is a safe and useful procedure with a low complication rate and high yield of positive results.

SUNDAY, SEPTEMBER 16TH 2007

212

**Success of EBUS TBNA in centrally located lung tumours after non-diagnostic bronchoscopy in patients with suspected lung cancer**

M. Krasnik, B. Skov, R. Eberhardt, F. Herth. *Thoracic and Cardiovasc. Surgery, Gentofte University Hospital, Copenhagen, Denmark; Pathology, Gentofte University Hospital, Copenhagen, Denmark; Pulmonology, Thoraxclinic Heidelberg, Heidelberg, Germany; Pulmonology, Thoraxclinic Heidelberg, Heidelberg, Germany*

**Objective:** To determine the ability of endobronchial, ultrasound-guided fine needle aspiration (EBUS-FNA) to successfully biopsy centrally located lung tumours in patients for whom conventional bronchoscopy has been non-diagnostic  
**Methods:** Patients (n=110) with suspected lung cancer and an intrapulmonary tumour located near or adjacent to the central part of the bronchial tree, or with suspected metastases to the mediastinum or to the hilar lymph nodes, and who had undergone a non-diagnostic bronchoscopy, underwent EBUS-FNA. Diagnoses based on EBUS-FNA biopsies were verified by mediastinoscopy or EUS FNA and if these procedures was non-diagnostic during surgical resection if the biopsy indicated non-small-cell lung cancer

**Results:** EBUS-FNA biopsies established a specific diagnosis in 103 of 110 patients (97%) and a diagnosis of lung cancer in 82 patients (72%). No complications occurred. The diagnoses made possible by EBUS-FNA were confirmed in all patients by mediastinoscopy, EUS FNA or thoracotomy. In 17 patients the malignant diagnose was obtained by puncture of N1 Lymph Nodes.

In 7 patients in whom EBUS-FNA was non-diagnostic because the cell types were not representative of this disease, a diagnosis was established at surgery.

**Conclusions:** EBUS-FNA qualifies as the next diagnostic step in patients with suspected lung cancer, if conventional bronchoscopy is non-diagnostic and when the intrapulmonary mass is located adjacent to or near the central parts of the bronchial tree or in whom metastases to the mediastinum or hilar lymph nodes is suspected. EBUS-TBNA may decrease the number of required mediastinoscopies and exploratory thoracotomies.