Case 2364

Radionuclide noninvasive determination of lung cancer
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Section: Chest imaging
Imaging Technique: CT
Imaging Technique: SPECT
Case Type: Clinical Cases
Authors: Birchall JD, Ganatra RH, Gregson RH, Perkins AC
Patient: 61 years, female

Clinical History:

Former smoker with past history of rheumatoid arthritis presented with a solitary pulmonary nodule on chest radiograph.

Imaging Findings:

The patient, a former smoker with past history of rheumatoid arthritis, presented with a solitary pulmonary nodule on chest radiograph (Figure 1). Thorax CT (figure 2) was performed to categorise the lesion further. A percutaneous CT guided lung biopsy revealed inflammatory changes alone, hence SPECT radionuclide imaging was performed with a somatostatin receptor types 2, 3 and 5 analogue depreotide labelled with technetium-99m (figure 3).

Chest radiograph demonstrated a 3cm solitary pulmonary nodule (SPN) in the left mid zone (figure 1). Thoracic CT confirmed that the SPN was in the apical segment of the left lower lobe and demonstrated lymphadenopathy at the left hilum with minor small volume nodes within the mediastinum (figure 2). Depreotide study showed avid uptake within the SPN, the left hilum and mild increased uptake within the subcarinal area. Hence upstaging on imaging from T2 N1 MO on CT to T2 N2 MO following the depreotide study. Subsequent surgical histology following left lower lobe lobectomy confirmed bronchogenic carcinoma (adenosquamous) with involvement of the left hilar, subcarinal and subaortic arch lymph nodes.

Discussion:

99m Tc depreotide was in this case able to predict the involved hilar and mediastinal lymph nodes, this has the potential advantage in anticipating when chemotherapy for non-small cell carcinoma will be needed in addition to surgical treatment. Depreotide is a somatostatin receptor analogue that selectively attaches to receptor types 2, 3 and 5. These receptors in particular type 2 have been demonstrated on a range of tumours including bronchogenic carcinoma, lymphoma and breast carcinoma in addition to neuroendocrine tumours such as carcinoid. Benign processes such as lung granuloma only rarely express them. Hence 99m Tc depreotide has potential for accurate non-invasive diagnosis of the SPN with a reported accuracy of 91% similar to fluoride-18 FDG PET. Depreotide has been suggested as having a role in the determination of associated thoracic lymphadenopathy and pulmonary metastases although such a technique would be currently limited by the spatial resolution of dual head gamma camera systems of approximately 5 to 8mm. Fluoride-18 2-fluoredoxglucose (FDG) is more effective in the determination of extrathoracic disease than depreotide. However interest in somatostatin receptors analogues continues with the development of fluoride-18 analogues of octreotide. This enables assessment of potential somatostatin receptor analogue therapy and to monitor response to therapy once commenced. These fluoride
labelled agents may have a role in the future characterisation of the SPN.

**Differential Diagnosis List:** Bronchogenic adenosquamous carcinoma

**Final Diagnosis:** Bronchogenic adenosquamous carcinoma

**References:**

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Somatostatin receptor imaging of non-small cell lung cancer with 99mTc depreotide.


Prospective investigation of positron emission tomography in lung nodules


Wester HJ, Schottelius M, Scheidhauer K, Meisetschl?ger G, Herz M, Rau FC, Reubi JC, Schwaiger M.

PET imaging of somatostatin receptors: design, synthesis and preclinical evaluation of a novel 18F-labelled, carbohydrated analogue of octreotide.


PMID not available yet.
Description: 3 cm solitary pulmonary nodule in left midzone Origin:
Figure 2

a

Description: 1 cm left hilar lymph node

Origin:

b

Description: 3 cm solitary pulomonary nodule in apical segment left lower lobe

Origin:
**Description:** Coronal reference image and axial reconstructions demonstrate avid increased uptake in the SPN in the left lower lobe and the left hilum. Milder increased uptake with the subcarinal region (slice 23) **Origin:**