QUESTION 49 Respiratory
A 47-year-old male presents with haemoptysis on a background of a 47 pack year smoking history. A chest X-ray shows an irregular mass lesion in the right lower lobe, and sputum examination reveals large undifferentiated malignant cells.
Which of the following is the most sensitive method of determining if the mediastinal lymph nodes are involved with the disease?
A. Gallium scan.
B. Standard thoracic computed tomographic (CT) scanning.
C. High resolution computed tomographic (CT) scanning.
D. Magnetic resonance imaging (MRI).
E. Positron emission tomography (PET).

Learning issues:
Modes of imaging for detecting LN metastasis

CT
IV constrast can help to distinguish mediastinal structures and assess potential vascular invasion.
Segregates normal from abnormal LN based upon their size
- average normal LN is < 10mm
- normal subcarinal region can be 13-15
- normal LN rarely seen in the retrocrural region and in pericardial fat
Sensitivity: 65%
Specificity: 80%
Accuracy: 75%

PET
Use FDG (18-fluro-2-deoxyglucose)
Increased metabolic activity due to malignancy
Evidence of its use:
  a) improves detection rate of malignancy compared to CT /bone scan
  b) decreases the frequency of mediastinoscopy
  c) less likely to undergo unnecessary surgery
Sensitivity 89%
Specificity: 92%
Accuracy: 90%

Comparison between PET and CT
PET assesses functional or metabolic characteristics of the tumour,
CT assesses the tumor's anatomical or morphologic features
Differentiation between malignant and benign processes is generally inferior to metabolic assessment by PET.

MRI
Used in adjunct to CT
More accurate than CT in delineating mediastinal or chest wall invasion
More readily identify tumours involving the superior sulcus or abutting the diaphragm because of its ability to directly visualize the lung apices and diaphragmatic surfaces

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1 NEJM Feb 2 2006 345; 5 PET and assessment of cancer therapy (review article)
PET detects clinically relevant changes even when no changes or minimal ones are detected by morphologic imaging.

**Not in the question but new advances**

Integrated PET/CT
- improve detection of intrathoracic LN metastasis
- good negative predictive value
- poor positive predictive value
- sensitivity 98%
- specificity 44%

If this was an option in the question, then PET/CT will be the answer.

Answer is E, PET – most sensitive method