A 58-year-old male is referred with breathlessness on exercise. He has \textit{smoked 20 cigarettes}/day since the age of 13. He completed his electrician's apprenticeship at a \textit{naval dockyard}, and worked in the construction industry until sustaining a back injury and retiring at the age of 50 years. A chest X-ray is reported as abnormal and a thoracic computed tomography (CT) scan (shown above) is performed.

The CT scan appearances are most characteristic of which one of the following conditions?
A. Emphysema.
B. Asbestos-related pleural disease.
C. Pulmonary fibrosis.
D. Silicosis.
E. Asbestosis

**Learning Issues:**
1) Basics of Asbestosis
2) How should a CT look.

**Asbestosis**
Characterized by pulmonary disorders associated with asbestos exposure:
1) Asbestosis
2) Pleral disease
3) Malignancies (NSC, SCC, malignant mesothelioma)

Asbestos fibres: fibers composed of hydrated magnesium silicates
2 categories:
1) Chrysotile - long, curly strands (less toxic)
2) amphibole - long straight, rod like structures (more toxic because structure allows them to deposit more efficient in distal lung parenchyma and reduces rate of clearance)

**Exposure to asbestos**
1) Mining and milling of fibres
2) Industrial application of asbestos (textiles, cement, insulation, shipbuilding)
3) Nonoccupational exposure - renovation, demolition

**Pathogenesis**
Alveolar macrophages & alveolar type I cells engulf fibres → inflammatory reaction in bronchioles and adjacent alveolar interstitium → fibroblast proliferation and collagen accumulation
Smoking increases the attack and/or progression rate of asbestosis

**Clinical signs**
Asymptomatic for 20-30 years after initial exposure
Symptoms: insidious onset of dyspnoea on exertion (Cough, sputum production and wheezing are unusual.
Signs: fine end inspiratory cracles, clubbing, cor pulmonale

**Respiratory function test**
1) Reduced FVC & TLC
2) Diminished single breath DLCO
3) Decreased pulmonary compliance
4) No obstruction on spirometry

**Radiological changes**
1) **Cxr:**
   - small bilateral par enchymal opacities with a multinodular or reticular pattern
   - interstitial process begins in the lower lung zones → bilateral mid lung zone plagues on the parietal pleura
   - early stage: hazy ground glass appearance that may blur diaphragm and heart border
   - Advanced stages: Honeycombing and upper lobe involvement
   - benign exudative pleural effusions
   - pleural adhesions

**Plerual involvement**
* hallmark of asbestos exposure*
- 50% of persons exposed to asbestos develop pleural plaques
- preferentially involve the parietal pleura adj to ribs
rarely occur on the visceral pleura
commonly found along the 6th to 9th rib along diaphragm
2) **CT scan**

- HRCT more sensitive than plain films
- 30% demonstrate an abnormal HRCT with normal Cxr
- Characteristic findings
  a) subpleural linear densities of varying length parallel to pleura
  b) basilar and dorsal lung parenchymal fibrosis
  c) coarse honeycombing in advanced disease
  d) Pleural plaques – help differentiate asbestos-induced parenchymal disease from other interstitial lung diseases

**Diagnosis:**
1) Hx of exposure to asbestos + proper latency period from onset of exposure to time of presentation
2) Evidence of interstitial fibrosis – reduced lung volumes, end-inspiratory crackles, HRCT findings of interstitial lung disease (parenchymal bands or long scars and fewer ground-glass opacities than IPF), histologically: asbestos fibers or bodies in BAL fluid.
3) Absence of other causes of diffuse parenchymal lung disease

**Management:**
1) Smoking cessation
2) Prevent further airborne asbestos exposure
3) Supplemental O2 if resting hypoxemia or exercise induced O2 desaturation
4) Prompt treatment of respiratory infections
5) Pneumococcal & influenza vaccination

**Back to the question:**

Information given:
1) worked on the dockyard
2) smokes
3) latency period between stopping working and onset of symptoms → consistent for asbestosis related lung disease

Narrows the answer to B and E

Looking at the CT chest, there are some L basal changes with pleural involvement, cystic changes on the R base. The fact that there are pleural involvement and it is the hallmark of asbestos exposure, B is the answer.