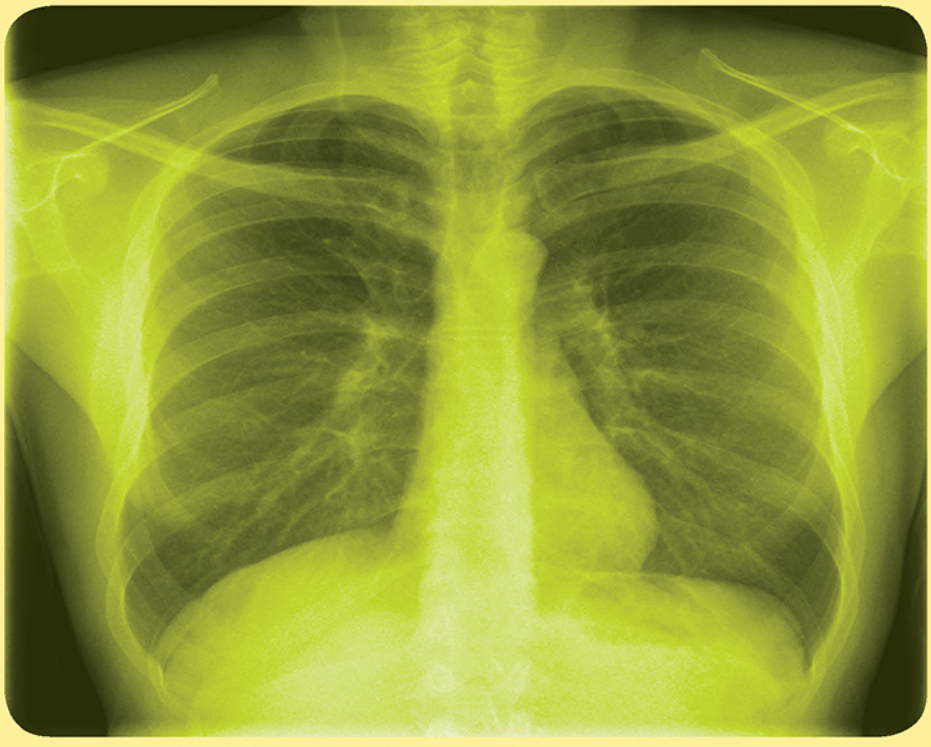
MRCP SCE in Respiratory Medicine: 300 SBAs

SECOND EDITION

Laura-Jane Smith
James Murray
Amar J Shah



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Chapter 4

Lung cancer and thoracic surgery

Questions

For each question, select the single best answer from the five options listed.

1. A 64-year-old man is referred to the lung cancer clinic on the basis of a CT and positron emission tomography-computed tomography (PET-CT) arranged at a gastroenterology outpatient appointment 2 months previously. He presented with weight loss of 4 kg and there has been a delay in the chest clinic appointment as the patient went on a month long trip abroad following his PET scan. He has a 20 pack-year smoking history and his World Health Organisation (WHO) performance status is 0. His case is discussed at the lung cancer multidisciplinary team meeting and the imaging shows a 5.1 cm fluorodeoxyglucose (FDG) avid lesion in the apex of his right upper lobe and a 1.1 cm FDG-avid ipsilateral peri-bronchial lymph node.

What is the single next most appropriate management step?

A Endobronchial ultrasound examination of the mediastinum
B Referral to cardiothoracic surgery for urgent lobectomy
C Referral to oncology for chemoradiotherapy
D Referral to oncology for stereotactic radiotherapy
E Repeat the PET-CT scan

2. A patient is diagnosed with T3 N0 M0 squamous cell carcinoma of the lung (left lower lobe).

What is the single least appropriate combination for lobectomy?

A FEV1 45% predicted/TLCO 65% predicted/Type 2 diabetes mellitus (T2DM)
B FEV1 50% predicted/TLCO 55% predicted/Mild ischaemic heart disease (IHD)
C FEV1 55% predicted/TLCO 45% predicted/Mild IHD
D FEV1 50% predicted/TLCO 45% predicted/Mild IHD
E FEV1 45% predicted/TLCO 40% predicted/T2DM

3. A 61-year-old heavy metal worker has a CXR as part of occupational health screening. A lesion is noted in her right upper lobe and a CT scan is arranged. The report reads '*There is a 5-cm spiculated lesion in the right upper lobe and both adrenals appear bulky – suggest PET-CT*'. Her WHO performance status is 0, her FEV1 is 81% predicted and her TLCO is 99% predicted. Her PET-CT is displayed in **Figure 4.1**.

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What is the single most appropriate next step in management?

A Biopsy adrenal glands
B Refer to cardiothoracic surgery for lobectomy
C Refer to oncology for adjuvant radiotherapy
D Refer to oncology for neoadjuvant chemotherapy
E Repeat PET scan



Figure 4.1

4. A 70-year-old man is diagnosed with non-small cell lung cancer (NSCLC) stage III. You see him in clinic to break the news of the biopsy result. He asks about prognosis.

Based on the most up-to-date data, which of the following is the most accurate 1-year survival for this group?

A 10%
B 20%
C 50%
D 60%
E 80%

5. A 55-year-old man presents with a persistent cough. He is a smoker with a 25 pack-year history. CT shows a 3.5-cm mass invading the bronchus intermedius 2 cm from the carina. PET-CT shows uptake in ipsilateral peribronchial and hilar lymph nodes, but no pathological uptake outside the thorax.

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What is the single best assessment of TNM classification, assuming this is a NSCLC?

A T1b N1 M0
B T2a N1 M0
C T2a N2 M0
D T3 N1 M0
E T3 N2 M0

6. A 70-year-old ex-smoker and retired plumber has a persistently abnormal CXR following an episode of community acquired pneumonia. He undergoes a CT which shows a 1.8-cm mass partially occluding the left main bronchus. Enlarged lymph node stations include a 2-cm left hilar node, a 1.5-cm subcarinal node and a 1.2-cm left supraclavicular node. There is a further 1 cm nodule more peripherally in the left upper lobe and some atelectasis of this lobe. A T5 vertebral body is partially destroyed without spinal cord compression. There is an area of abnormality within the 6th rib on the left. His WHO performance status is 3.

What is the single best assessment of TNM classification, assuming this is a NSCLC?

A T1a N3 M1b
B T2a N2 M1b
C T3 N2 M1a
D T3 N3 M1c
E T4 N3 M1c

7. A 54-year-old smoker attends her GP with a cough and weight loss. She arranges a CXR and subsequently CT scan of the chest and abdomen. The CT scan reveals a 2-cm tumour behind the right hilum, not visible on the chest radiograph. The tumour does not invade a major bronchus and there is no evidence of lymph node or distant metastases. A CXR with a raised R hemidiaphragm is required for this question.

What is the single best assessment of stage TNM classification, assuming this is a NSCLC?

A T1b N0 MO
B T1b N1 MO
C T2a N1 M0
D T3 N0 M0
E T3 N1 MO

8. A 47-year-old smoker presents to the emergency department with cough and haemoptysis. Inflammatory markers are normal and she has no fever or sputum production. A CXR is flagged as abnormal by the radiographer and a CT of the chest is arranged. It shows a 3.5-cm tumour in the left lower lobe with an additional small nodule in the same lobe. No nodes are enlarged by size criteria.

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What is the single best assessment of stage based on the CT, assuming this is a NSCLC?

A Stage IA
B Stage IB
C Stage IIA
D Stage IIB
E Stage IIIA

9. A 56-year-old man has undergone PET-CT and CT-guided biopsy of a lung lesion. He has been diagnosed with a T1c N1 M0 adenocarcinoma of the lung. At his appointment with the cardiothoracic surgeon, the specialist nurse suggests he stop smoking. He is resistant as he does not see what difference it can make now, and is feeling understandably stressed.

In relation to smoking and surgery for lung cancer, which ONE of the following is true?

A Continued smoking increases the risk of post-operative air leak
B Patients who do not abstain from smoking in the perioperative period have increased long-term mortality
C Surgery should be postponed to allow patients to stop smoking
D There is no difference in length of stay between current smokers and those who stopped 4 weeks prior to surgery
E Varenicline is contraindicated in those undergoing surgery

10. You refer a patient to your local cardiothoracic service for consideration of resection of an early stage lung cancer. The surgeon is concerned about the risk of post-operative dyspnoea and requests a shuttle walk test for further assessment.

For patients who have a moderate to high risk of post-operative dyspnoea being considered for surgery what is the minimum shuttle-walk distance considered a surrogate for 'good function'?

A 200 metre
B 400 metre
C 500 metre
D 600 metre
E 800 metre

11. A 51-year-old smoker has a CT scan performed. The reports states 'There is a 10-mm pure ground-glass nodule in the middle lobe.'

What is the single most likely histological finding?

A Adenocarcinoma in situ (AIS)
B Atypical adenomatous hyperplasia (AAH)
C Bronchoalveolar carcinoma (BAC)
D Invasive adenocarcinoma
E Minimally invasive adenocarcinoma (MIA)

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12. You receive an email alert from the radiology department for an abnormal CT. Indications are *'smoker, previous dock worker, breathless.'* The report states:

'There is right-sided nodular pleural thickening covering posterior, mediastinal and posterior pleural surfaces. There is caudal extension into the diaphragmatic muscle. In addition, there is a significant enlarged station 11 node (1.2 cm) with pathological appearances by CT criteria. No distant metastases are seen.'

If biopsy confirms this to be a mesothelioma, what is the single most accurate TNM (8th edition) stage?

A IA
B IB
C II
D IIIA
E IIIB

13. A 49-year-old patient is referred by the cardiology team after a 7-mm nodule is detected on a CT angiogram. He has a two pack-year smoking history. The CT report states *'a sub-pleural/peri-fissural solid nodule with a lentiform appearance is noted in the left upper lobe measuring 7 mm in maximum diameter.'*

What is the single most appropriate plan for follow-up?

A Discharge and reassure
B PET-CT at earliest opportunity
C Repeat volumetric CT at earliest opportunity
D Repeat volumetric CT at 3 months
E Repeat volumetric CT at 6 months

14. You are called by a junior doctor working on geriatrics, who asks for advice on the management of a single pulmonary nodule found on a CTPA. In preparation for discussion at the lung cancer multidisciplinary team meeting you wish to calculate the risk of malignancy for this nodule.

What is the single patient characteristic that is NOT required for the Brock calculation for risk of cancer in pulmonary nodules?

A Age
B Emphysema
C Family history of lung cancer
D Gender
E Pack-years smoking

15. A 64-year-old woman is diagnosed with stage IIIB lung cancer based on a PET-CT and an EBUS -TBNA biopsy of her subcarinal lymph node. The biopsy reveals adenocarcinoma with >50% expression of PD-L1. Her WHO performance status is 1.

Which of the following is the most appropriate biological therapy?

A Crizotinib
B Erlotinib
C Nivolumab

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D Pembrolizumab
E Ramucirumab

16. A 59-year-old smoker has a pulmonary nodule detected on a routine CXR. A CT scan is performed which is reported: *'There is a 7-mm solid nodule in the left upper lobe, suggest repeat CT in 3 months in line with national guidance.'* The CT scan is repeated at 3 months and is discussed at the pulmonary nodule radiology meeting. A volume-doubling time of 422 days is calculated.

What is the single most appropriate next step in management?

A CT scan at 6 months from baseline
B CT scan at 1 year from baseline
C CT-guided biopsy
D Discharge and reassure
E PET-CT

17. You are asked to give a presentation as part of a service review on lung cancer at your trust. You wish to include some up-to-date epidemiological data to provide important context to your local audit results, and add weight to your requests for extra resources.

What is the single most accurate statement regarding the epidemiology of lung cancer?

A Late stage of diagnosis is not associated with ethnicity in England
B Lung cancer incidence has increased in men and women since the 1990s in the UK
C Lung cancer makes up 26% of all cases of cancer in the UK
D Peak rate of lung cancer diagnosis is in the 65–69 years age group in the UK
E The majority of cases of lung cancer (49%) are stage IV at diagnosis in the UK

18. You see a patient in clinic as a follow-up. They have a sub-solid nodule measuring 6 mm, stable in size on a 3-month thin section CT scan. You calculate a Brock model risk of malignancy of 9%.

What is the single most appropriate follow-up?

A CT at 6 months, 1 year, 2 years from baseline
B CT at 1 year, 2 years, 3 years from baseline
C CT at 1 year, 2 years, 4 years from baseline
D Immediate PET-CT
E Reassure and discharge

19. A 71-year-old male presents with chest pain and weight loss. A right hilar mass is sampled at endobronchial ultrasound-guided (EBUS) which reveals 'malignant cells in sheets with a flat shape and scanty cytoplasm, staining is positive for CD56 and thyroid transcription factor 1 (TTF-1)'.

What is the single most likely diagnosis?

A Adenocarcinoma
B Large cell carcinoma

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C Sarcomatoid carcinoma
D Small cell carcinoma
E Squamous cell carcinoma

20. A 56-year-old woman is seen in clinic on the 2-week wait pathway with pain in his right chest and axilla. Her CT scan is seen in **Figure 4.2**. Subsequently, CT biopsy demonstrates a poorly differentiated adenocarcinoma. PET-CT shows intense fluorodeoxyglucose (FDG) uptake in the mass (SUV 11.2) and similar uptake (SUV 10.5) in the subcarinal lymph node (station 7).

What is the single best management plan?

A Refer to a clinical oncologist for chemotherapy and radiotherapy
B Refer to a medical oncologist for chemotherapy
C Refer to cardiothoracic surgeon for right upper lobectomy
D Refer to palliative care
E Refer to spinal surgeon for resection

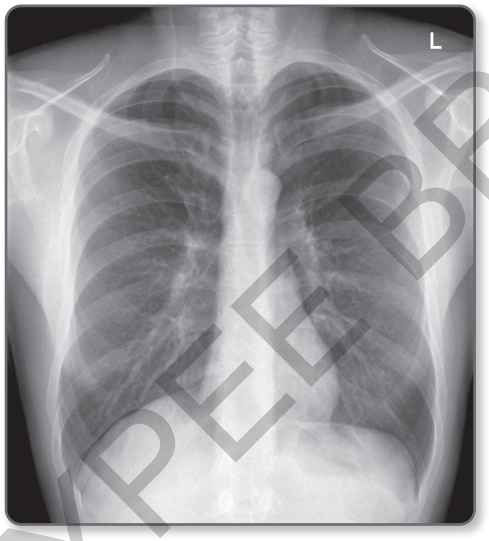


Figure 4.2

21. A 72-year-old man has a growing right upper lobe lung nodule over a period of 9 months and is diagnosed with a T2a N0 M0 tumour on PET-CT. The lesion has a standardised uptake value (SUV) of 13.2. He has hypertension, ischaemic heart disease and chronic kidney disease. He has an anaesthetic review and is deemed ASA III and not fit for surgical treatment. At the lung multidisciplinary team meeting it is noted that he has an area of paraseptal emphysema in the right upper lobe and the interventional radiologist is unwilling to biopsy the lesion due to the risk of pneumothorax and air leak.

What is the single best management plan?

A Continuous hyperfractionated accelerated radiotherapy (CHART)
B Endobronchial brachytherapy
C External beam radiotherapy

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D Radiofrequency ablation (RFA)
E Stereotactic ablative radiotherapy (SABR)

22. A 64-year-old is referred to clinic with haemoptysis. A CT scan of her chest reveals a 6-cm tumour in the right upper lobe. CT-guided biopsy confirms an adenocarcinoma of lung origin. FDG PET-CT and EBUS staging show no obvious mediastinal lymph node involvement or distant metastases. Her WHO performance status is 1.

Which one of the following is the single most appropriate next step?

A Perform contrast-enhanced CT scan of the head
B Perform non-contrast MRI scan of the head
C Perform Gallium-68 DOTATATE PET-CT scan
D Refer to clinical oncology for chemoradiotherapy
E Refer to thoracic surgery for resection

23. A 67-year-old man is discussed at the lung cancer multidisciplinary team meeting and it is decided he should be offered surgery with curative intent. Unfortunately, he is admitted with a non-ST elevation myocardial infarction (NSTEMI) shortly after to the trust in which you work. You go to see him to discuss lung cancer treatment. He is anxious to have his operation as soon as possible. He underwent percutaneous intervention without stenting for his NSTEMI and is now recovering.

What is the minimum number of days his surgery should be delayed after myocardial infarction?

A 7
B 14
C 21
D 30
E 60

24. A 64-year-old woman was diagnosed with adenocarcinoma of the lung stage IVB. Molecular markers are negative. She was treated with a standard treatment course of cisplatin and pemetrexed but unfortunately her disease progressed. She was then treated with second-line therapy. Shortly after her first cycle, she calls her lung cancer specialist nurse due to concerns about a new facial rash.

What is the single most likely causative agent?

A Erlotinib
B Infliximab
C Nivolumab
D Pembrolizumab
E Sunitinib

25. You are asked by your Consultant to consent a patient for endobronchial ultrasound (EBUS). He has a radiological diagnosis of non-small cell lung cancer (NSCLC) in the right upper lobe measuring 5.5 cm (stage IIB). A PET-CT was inconclusive and showed mild uptake in a station 7 (subcarinal) node (which

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would upstage to IIIB if confirmed involvement). He asks what the point of EBUS is, and whether it makes a difference if the node is positive for cancer.

According to TNM8 what is the approximate difference in 5-year survival rate between a IIB and IIIB NSCLC?

A 10%
B 20%
C 30%
D 40%
E 50%

26. A 53-year-old ex-smoker is diagnosed with T4 N2 M0 adenocarcinoma. His primary tumour is adherent to the superior vena cava. Biopsy shows that his tumour is epidermal growth factor receptor (EGFR) mutation negative and PDL-1 expression is 12%. His WHO performance status is 1. He is discussed at the lung cancer treatment multidisciplinary team meeting.

Which of the following is the most appropriate management plan?

A Best supportive care with palliative care team input
B Chemoradiotherapy
C Immunotherapy with pembrolizumab
D Lobectomy and post-operative chemotherapy with carboplatin
E Stereotactic ablative radiotherapy

27. A patient is discussed at the lung cancer multidisciplinary team. They have had a CT and positron emission tomography (PET) which have shown a 3.2-cm right upper lobe (RUL) mass with a satellite nodule more peripherally in the same lobe. There are enlarged subcarinal and right hilar lymph nodes (LNs) as well as a left-sided supraclavicular node, all of which have an SUVmax > 5 on PET scan. No distant metastases are identified on the CT or PET.

What is the single best next investigation?

A Bronchoscopy for endobronchial biopsy
B EBUS TBNA of subcarinal LN
C Percutaneous CT-guided biopsy of RUL mass
D Sputum cytology
E US-guided biopsy of supraclavicular LN

28. A 59-year-old recent ex-smoker with no comorbidities and a good performance status is discussed at the lung cancer multidisciplinary team meeting. She was found to have a 3.1-cm spiculated right upper lobe mass, and a 3-cm left lower lobe mass on CT, both of which were FDG avid on PET scan. There was also uptake in both hilar lymph node areas, but at no other lymph node or distant sites. There was debate at the MDT as to whether these should be treated as metastatic disease, or as synchronous primary tumours. A decision was taken to biopsy both masses under CT guidance. Both were found to be adenocarcinomas, but the pathologist commented that the growth patterns of the two biopsies were significantly different.

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What is the single most accurate TNM staging classification for this patient?

A T1b N2 M0 and T1c N1 M0
B T1c N1 M0 and T2a N1 M0
C T1c N3 M1a
D T2a N3 M1a
E T4 N3 M0

29. A 71-year-old male presents with chest pain and weight loss. A CT scan of the chest and abdomen shows a 2-cm tumour surrounding, but not invading, the right main bronchus with enlarged station 7 lymph node. He undergoes endobronchial ultrasound of the lymph nodes and biopsy reveals morphology and immunohistochemistry consistent with small cell lung cancer. His WHO performance status is 1.

What is the single best treatment modality?

A Concurrent chemoradiotherapy (carboplatin and etoposide)
B Concurrent chemoradiotherapy (carboplatin and vinorelbine)
C Sequential chemoradiotherapy (carboplatin and vinorelbine)
D Sequential chemoradiotherapy (carboplatin and etoposide)
E Thoracic surgery

30. A 57-year-old recent migrant to the UK is investigated for chest pain. Her partner was, until their move to the UK, an asbestos factory worker in Western Australia. She is diagnosed with malignant pleural mesothelioma on the basis of video-assisted thoracoscopic surgery pleural biopsy. She has a small right pleural effusion and is mildly breathless on strenuous exertion. Her case is discussed in the lung cancer multidisciplinary team meeting.

What is the single most appropriate first-line combination chemotherapy regimen?

A Carboplatin and Etoposide
B Carboplatin and Pemetrexed
C Carboplatin and Vinorelbine
D Cisplatin and Bevacizumab
E Cisplatin and Pemetrexed

31. A patient undergoes image-guided pleural biopsy and 12Fr Seldinger chest drain insertion. They drain 1.3 L of fluid and the chest drain is removed. The pleural fluid cytology shows malignant mesothelial cells. Immunohistochemistry supports the diagnosis of malignant pleural mesothelioma. You see the patient in clinic. They are asymptomatic. They have been doing some internet research on mesothelioma, and ask about the role of radiotherapy.

What is the single most accurate statement regarding radiotherapy in malignant pleural mesothelioma?

A Pre-operative radiotherapy will improve survival
B Post-operative radiotherapy will improve survival
C Prophylactic radiotherapy is required at the drain site

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D Radical radiotherapy alone will improve survival
E The only role for radiotherapy is for pain relief

32. You are preparing a teaching session for the Regional Respiratory Teaching programme. You have been asked to provide an update on the epidemiology and treatment of malignant pleural mesothelioma.

Which of the following statements is most accurate regarding malignant pleural mesothelioma?

A Median age at diagnosis is 85 years
B Overall median survival is <12 months
C The majority of patients do not receive any treatment
D There are 5,000 deaths a year in the UK
E There is a 60 (M):40 (F) sex distribution

33. A patient is discussed at the regional mesothelioma multidisciplinary team (MDT) meeting. He presented with breathlessness and imaging revealed a large pleural effusion with pleural thickening. The effusion was drained via Seldinger chest drain, and since the cytology showed malignant cells a slurry talc pleurodesis was performed. The cytology and immunohistochemistry later confirmed malignant pleural mesothelioma. The patient has a performance status of 1. CT shows no obvious nodal disease or distant metastases. There is debate at the MDT over T stage.

What is the single most appropriate imaging modality to accurately stage the mesothelioma?

A 18-FDG PET-CT
B Iodine-123 SPECT
C MRI thorax
D Octreotide scintigraphy (Indium-111)
E Thoracic ultrasound

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Answers

1. E Repeat the PET-CT scan

The British Thoracic Society guidelines on the radical management of lung cancer state that contemporaneous imaging (i.e. < 4 weeks old) must be available for decisions regarding radical treatment. A 5.1-cm right upper lobe lesion with ipsilateral peri-bronchial node involvement is T3 N1 M0 (Stage IIIa) according to the 8th edition of TNM in lung cancer staging classification (TNM8). If the imaging was up-to-date he may be suitable for surgical resection or multimodality treatment with radical intent, however given the time lag it is essential to repeat the PET-CT scan to ensure his disease has not progressed.

Further reading

Lim E, Baldwin D, Beckles M, et al. British Thoracic Society; Society for Cardiothoracic Surgery in Great Britain and Ireland. Guidelines on the radical management of patients with lung cancer: revised 2010. Thorax 2010; 65:iii1–27.

National Institute for Health and Care Excellence (NICE). Lung Cancer: diagnosis and management, NICE Clinical Guideline NG122. London: NICE, 2019. https://www.nice.org.uk/guidance/ng122 [Last accessed 25 March 2022.]

2. E FEV1 45% predicted/TLCO 40% predicted/T2DM

Although this question initially looks difficult, in fact the only information that is important in determining suitability for lobectomy here is the TLCO.

British Thoracic Society (BTS) 2010 guidelines utilise a 'tripartite risk assessment' which takes into account risk of operative mortality, risk of peri-operative cardiac events and the risk of post-operative dyspnoea.

- *Operative mortality*: Thoracoscore is the recommended global risk tool for assessing peri-operative mortality and takes into account multiple variables to predict risk of in-hospital death in those undergoing thoracic surgery. The comorbidities in the options above contribute to the thoracoscore but none are contraindications in themselves.
- *Post-operative dyspnoea*: Patients with a predicted post-operative FEV1 and TLCO of 40% are considered high-risk for post-operative breathlessness and require functional assessment. A pre-operative TLCO of 40% predicted [E] would *guarantee a* post-operative TLCO of < 40% and therefore carries a high risk of post-operative dyspnoea. The left lower lobe contributes 5 of a possible 19 segments. National Institute for Health and Care Excellence guidance differs from BTS in that a pre-operative cut off of 30% TLCO is used.
- *Perioperative cardiac risk*: According to the American College of Cardiology guidelines 2014 patients without an 'active' cardiac condition (unstable coronary syndrome, heart failure, arrhythmias, severe valvular heart disease) should be offered surgery if they have ≤ 2 risk factors, according to the revised cardiac risk index. These risk factors are: ischaemic heart disease, congestive cardiac failure,

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MRCP SCE in Respiratory Medicine: 300 SBAs

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