Single Best Answer Questions for Adult Thoracic Surgery

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To my late father who was a role model and influencer for his children and inspired us to pursue our dreams.

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PREFACE

Single Best Answer (SBA) examinations are an increasingly popular means of testing those undertaking postgraduate qualifications in a number of subject areas. Written by an experienced clinician and medical educationist, **Singles Best Answer Questions for Adult Thoracic Surgery** provides invaluable guidance from an author who understands from personal experience that detailed and accurate explanations are the key to successful revision.

The comprehensive collection of questions, coupled with the clear discussion of how the correct answer was reached and other options ruled out for every question, make this book an excellent learning aid during all stages of adult thoracic surgical training. **Single Best Answer Questions for Adult Thoracic Surgery** may be used both for examination practice and as a source of knowledge on many of the key topics in the syllabus. From the author of **Single Best Answer Questions for Adult Cardiac Surgery, 250 SBAs in Cardiothoracic Surgery, 200 Practice Questions in Cardiothoracic Surgery** and **Single Best Answer Questions in Cardiothoracic Surgery**, all outstanding exam preparation sources for postgraduate examinations, this book provides challenging questions and well researched explanations to help you through the exam. Candidates can work through the questions systematically or dip in and out of the book using the SBA index as a guide to where questions on a specific topic can be found.

With 150 questions and extensive answer explanations, it is the definitive resource for those attempting the Specialist Fellowship Examinations in Adult Thoracic or Cardiothoracic Surgery. The book is comprehensive and authoritative. It is the essential revision guide for those preparing for the exit fellowship examination.

Shahzad G. Raja, FRCS(CTh)
London
October 2024

QUESTIONS

SECTION 1

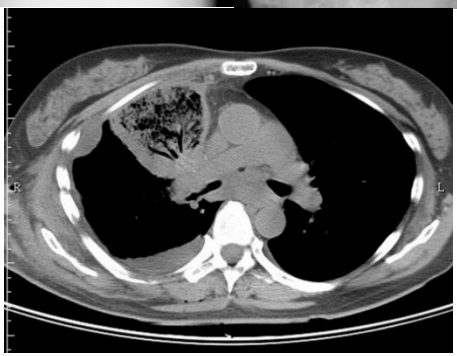
LUNGS & PLEURA

1.1 A 65-year-old gentleman with chest pain had a chest radiograph that revealed an ill-defined opacity in the left lung upper zone. CT chest (axial lung window shown below) reported a large, lobulated, spiculated left upper lobe mass measuring up to 4.8 cm. The mass had a broad base with the major fissure but no radiographic penetration into the left lower lobe. No satellite nodules. No pleural effusion or deposits. There was a 10 mm round lymph node in the AP window. No contralateral mediastinal or hilar lymphadenopathy. No supraclavicular lymph nodes.

Which is the correct TNM description for this patient's lung cancer according to IASLC (International Association for the Study of Lung Cancer) 8th edition lung cancer staging system?

A. T1cN2M0
B. T2aN2M0
C. T2bN1M0
D. T2bN2M0
E. T3N1M0

1.2 A 50-year-old woman underwent right upper lobectomy for non-small cell lung cancer (see preoperative chest radiograph). She developed fever and dyspnoea 5 days later, and another chest film and a CT were done (see 2nd and 3rd figures). Bronchoscopy at that time showed partial obstruction of the orifice to the right middle lobe with a fish-mouth appearance.



Which of the following actions most likely could have prevented this complication?

A. application of fibrin glue to the parenchymal staple lines
B. daily postoperative flexible bronchoscopy and endobronchial suctioning
C. intercostal muscle flap reinforcement of the bronchial stump
D. stapled pneumopexy of the middle and lower lobes
E. thoracic epidural catheter placement for better postoperative pain management

1.3 A 63-year-old woman presented with fever, cough, hemoptysis and dysphagia. Bilateral lower lobe pneumonia and a mediastinal mass were evident on a chest radiograph. An image from her bronchoscopy is shown, and biopsies revealed small cell lung cancer.

Appropriate initial management of this patient will include
A. airway Y-stent placement under general anesthesia.
B. endotracheal brachytherapy.
C. high-dose mediastinal irradiation.
D. right carinal pneumonectomy.
E. tracheal metallic stent insertion.

1.4 A 70-year-old man underwent a left pneumonectomy and adjuvant chemotherapy for Stage II squamous cell carcinoma 6 months ago. He now has fever, a cough productive of thin brown fluid and a white blood count (WBC) of 20,000. A CT reconstruction slice is shown. Bronchoscopy demonstrated partial breakdown of a portion of the left mainstem bronchial stump. Inspection and biopsy of the airway revealed no evidence of recurrent lung cancer. Culture of the left pleural fluid revealed polymicrobial growth.

The appropriate next step in this patient's management is

A. A Clagett procedure alone

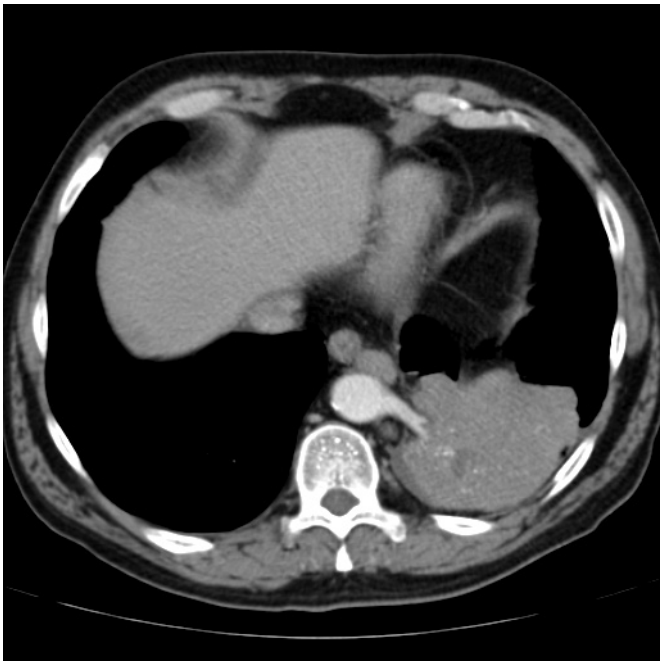
B. A Clagett procedure, then midline sternotomy to repair the bronchial stump

C. Broad-spectrum antibiotic alone

D. Left thoracotomy and intercostal muscle flap coverage of the bronchial stump, a Clagett procedure and eventual reclosure of the left chest

E. Placement of a left-sided chest tube

1.5 A 31-year-old woman was referred after treatment for recurrent pneumonia. Her health was generally good, but she experienced 3-4 episodes of pneumonia every year for the last decade that have been treated with oral antibiotics with good results. Selected CT scan slice is shown.

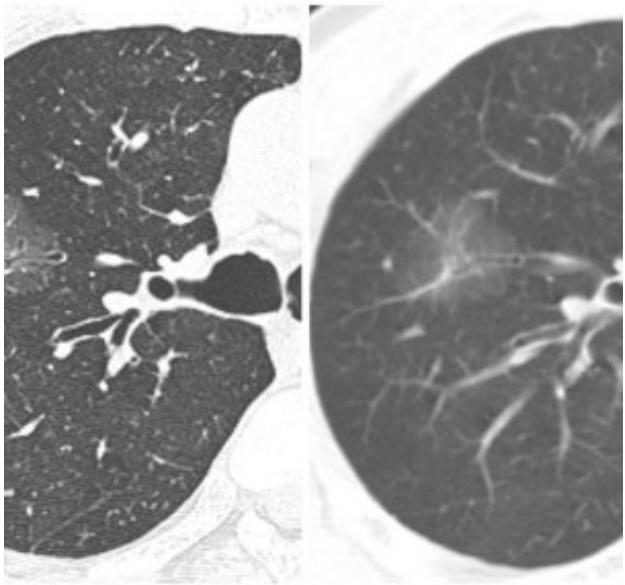


Which of the following treatment plans is most appropriate?
A. broad-spectrum antibiotic
B. bronchoscopy with bronchoalveolar lavage for culture-directed antibiotic therapy
C. lobectomy and lymph node dissection
D. observation because malignant transformation is rare
E. VATS wedge resection, if possible, after arterial control is achieved

1.6 A 69-year-old woman with a longstanding history of smoking was found to have a small peripheral lesion in her left upper lobe. A frame from her PET study is shown and demonstrates uptake in the left hilum and level 5/6 nodes. The patient underwent left VATS exploration with wedge resection of the lesion and mediastinal nodal dissection. On postoperative day 3, the patient developed noticeable hoarseness and a weak voice.

The next step in management should be
A. a CT scan to rule out mediastinal hematoma
B. a trial inhaled steroids and racemic epinephrine
C. formal thyroplasty
D. laryngoscopy to evaluate the position of her vocal cords
E. speech pathology evaluation

1.7 A 64-year-old woman underwent preoperative evaluation prior to elective knee surgery. She is a lifelong non-smoker, but a routine chest radiograph revealed an incidental density. Selected CT slices are shown. CT guided biopsy revealed atypical adenomatous hyperplasia.



Which of the following is the most appropriate next step in management?
A. Navigational bronchoscopic biopsy
B. PET/CT scan
C. Repeat CT guided biopsy
D. Surveillance CT scan in 6 months
E. VATS lobectomy

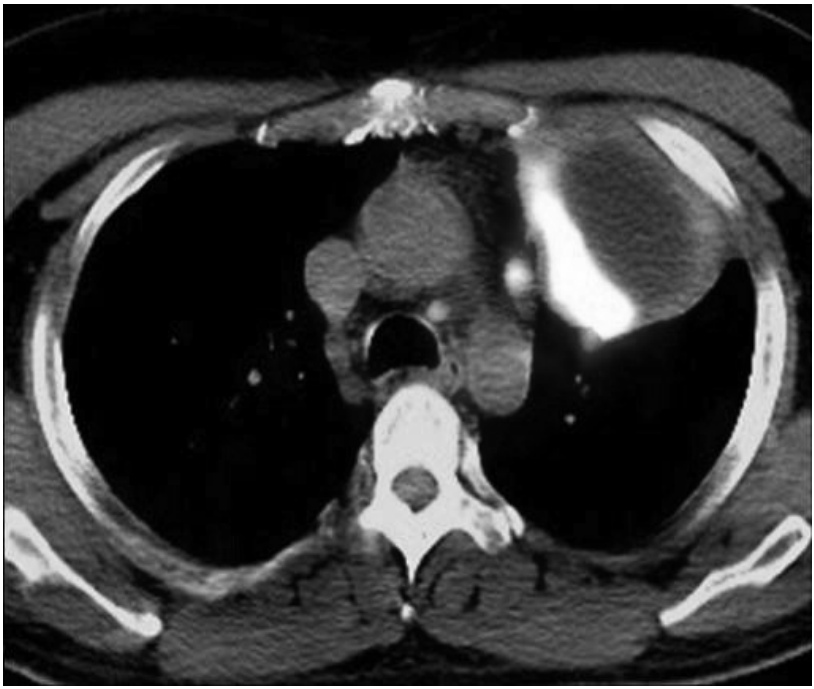
1.8 A 55-year-old man has a 1.1 cm left upper lobe apical lesion. His history includes resected colon cancer 2 years ago, and his current serum CEA level is 2.0. He has a 40 pack-year smoking history, is medically fit for an operation and his FEV_1 is 75% predicted. FDG-PET demonstrates mild uptake in the lesion and no metastatic disease. Transthoracic FNA cytology is positive for adenocarcinoma, and cytokeratin 7 (CK7) and thyroid transcription factor-1 (TTF-1) are positive. The cells are negative for CK5/6 and p63.
The best recommendation for treatment is
A. bronchoscopy and a lingual-sparing upper lobectomy (trisegmentectomy) with mediastinal lymph node dissection
B. bronchoscopy and VATS wedge resection of the left upper lobe lesion
C. bronchoscopy and VTS left upper lobectomy with mediastinal lymph node dissection
D. chemotherapy for metastatic colon cancer
E. radiotherapy for metastatic colon cancer

1.9 A 68-year-old previous marathon runner was evaluated for knee surgery. The preop chest radiograph showed loss of right cardiac border and hemidiaphragm definition, a prominent right hilum, and an elevated right hemidiaphragm. A CT scan revealed a tumour in the right middle lobe bronchus with atelectasis of the lobe. PET confirmed strong uptake in the tumour and mild activity in the hilar lymph nodes. Bronchoscopic biopsy showed adenocarcinoma and EBUS-directed biopsies at levels 4R, 7, and 10 all showed nodal tissue negative for malignancy.
Which of the following statements is correct?
A. The elevated hemidiaphragm is a reflection of volume loss in the right middle lobe.
B. The findings indicate mediastinal invasion and neoadjuvant therapy protocol should be proposed.
C. The patient has phrenic nerve involvement, indicating stage IIIA disease, which is unresectable.
D. The patient's cancer may be resolved by en bloc resection.
E. The patient is a candidate for palliative chemotherapy and radiation.

1.10 A 54-year-old former smoker with normal lung function presents had a 3 cm spiculated mass in the right upper lobe. A needle biopsy demonstrated small cell carcinoma. After treatment with cisplatin, etoposide, and 45 Gy of radiation, follow-up imaging shows a significant reduction in the size of the lesion, but a residual mass remains.
The most appropriate next step in management is
A. ablate the mass with a radiofrequency probe
B. do a right upper lobectomy
C. extend the radiation dose to 90 Gy
D. palliate with chemotherapy and radiation dose of 90 Gy
E. switch the chemotherapy to carboplatin and etoposide

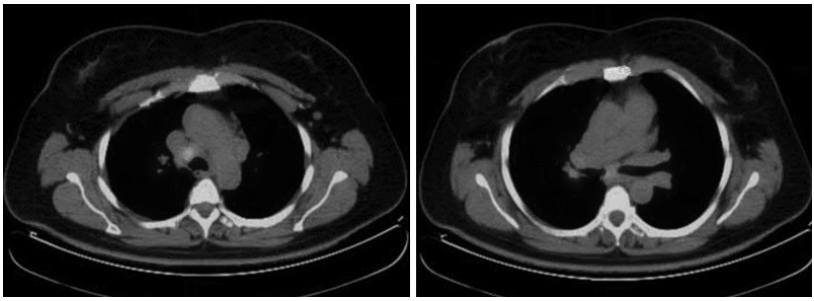
1.11 A 67-year-old, 50 pack-year smoker underwent a screening CT scan. Bilateral spiculated lung lesions in the upper lobes were identified. The left upper lobe lesion measures 2.5 cm and the right upper lobe lesion measures 2.1 cm. Several mediastinal nodes are up to 1.0 cm on short-axis diameter. Biopsies of each lesion shows adenocarcinoma.
Which of the following should be done next?
A. bilateral thoracoscopy and wedge resection of both lesions
B. clamshell thoracotomy and bilateral upper lobectomies
C. mediastinoscopy
D. radiation to a maximum 90 Gy
E. systemic chemotherapy

1.12 A 76-year-old actively smoking man presented with a cough and anterior chest wall pain. Chest CT shows an 8 cm left upper lobe mass and percutaneous transthoracic biopsies confirm squamous cell carcinoma. FDG-PET (see figure) demonstrates no extrathoracic metastases. The patient has an FEV_1 of 83% predicted and DLCO is 63% predicted. He is otherwise physically fit to tolerate any planned therapy.



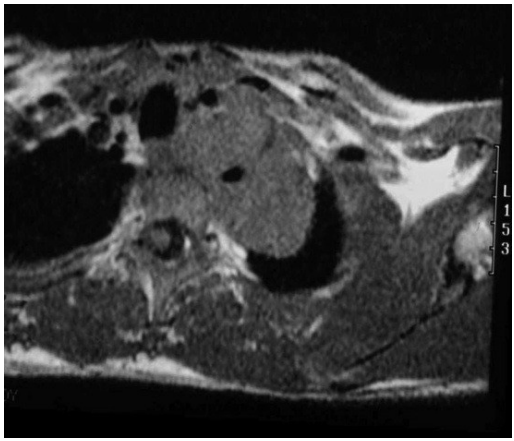
Which of the following should be done next?
A. chemotherapy and radiotherapy followed by repeat FDG-PET to assess response prior to surgical resection
B. definitive chemotherapy and radiation therapy
C. endobronchial ultrasound with mediastinal lymph node sampling or operative mediastinoscopy
D. left upper lobectomy (possible pneumnectomy) with chest wall resection and mediastinal lymph node dissection
E. palliative treatment

1.13 A patient had prominent right hilar and mediastinal adenopathy on a CT scan of the chest, but there were no parenchymal lung lesions. PET showed uptake at stations 7, 4R, and 4L, but no extrathoracic disease. Mediastinoscopy and biopsy found adenocarcinoma in 4R and 4L consistent with a lung primary by immunohistochemistry.



The best treatment option is
A. definitive chemoradiation
B. right pneumonectomy with mediastinal lymph node dissection
C. right-sided VATS or thoracotomy to localize and biopsy the primary lesion
D. radiation to a maximum 90 Gy
E. triple endoscopy and work up for occult head and neck malignancy

1.14 A 67-year-old man complained of left shoulder pain. Imaging demonstrated an apical mass in the left upper lobe (see CT slice). MRI showed no brachial plexus involvement. FDG-PET scan revealed no positive mediastinal nodes and no metastatic disease. The patient was felt to be a good operative candidate with adequate pulmonary function reserve to tolerate a lobectomy. He received 2 cycles of cisplatin and etoposide concurrent with 45Gy of external beam radiation, which finished 4 weeks ago.



Which of the following is the best option for his management now?
A. anterior thoracotomy with exploration of the subclavian vessels and curative resection – Dartevelle approach
B. bronchoscopy and mediastinoscopy
C. no further therapy
D. posterolateral thoracotomy with curative resection – Shaw-Paulson incision
E. radiation to a maximum 90 Gy

1.15 An otherwise healthy 38-year-old man complained of shortness of breath. Bronchoscopy showed a red, fleshy mass involving the right upper lobe orifice. A pediatric bronchoscope was able to be advanced past the mass and the bronchus intermedius appeared pristine, as did the middle and lower lobes. The mass was biopsied, resulting in bleeding that was controlled with iced saline lavage. The biopsy was nondiagnostic. The correct action is:
A. repeat bronchoscopy with laser ablation of the mass.
B. right pneumonectomy.
C. right upper and middle bilobectomy.
D. right upper lobe sleeve resection.
E. right upper lobectomy.

1.16 A 56-year-old man with a history of colon cancer resected three years ago had a chest CT scan that demonstrated a new one cm right upper lobe nodule. Metastatic workup was negative. Video assisted wedge resection of the nodule demonstrated a squamous cell carcinoma. The appropriate action is:
A. conclude the procedure and administer adjuvant 5-FU based chemotherapy
B. conclude the procedure with no adjuvant treatment
C. perform a completion lobectomy
D. perform a larger wedge resection to achieve a minimum of 3 cm margins
E. perform a mediastinal lymph node sampling

1.17 A 55-year-old man underwent bronchoscopy for evaluation of a bronchogenic carcinoma of the left hilum. There is a mass at the lobar carina. CT demonstrates no mediastinal adenopathy. Just after the bronchoscopy, the patient coughs up 700 ml of dark blood. The pulmonary angiogram demonstrates a circumferential narrowing of the pulmonary artery in proximity to the left upper lobe bronchus. In the setting of massive haemoptysis these findings are diagnostic of a fistula between pulmonary artery and bronchus. The best management is:

A. bronchial stent
B. emergent pneumonectomy
C. endobronchial brachytherapy
D. left lower lobectomy with bronchial sleeve resection
E. radiotherapy

1.18 A 48-year-old patient has sputum cytology that is positive for cancer, and a normal chest radiograph and chest CT. The correct next step is:
A. fiberoptic bronchoscopy
B. head and neck examination
C. MRI of the chest
D. repeat chest radiograph in 3 months
E. repeat sputum cytology in 2 months

1.19 The chest radiographs from two different patients below demonstrate popcorn calcification in solitary well defined thoracic lesions.

The most likely diagnosis is:
A. bronchogenic cyst
B. carcinoid
C. hamartoma
D. hydatid cyst
E. pericardial cyst

1.20 A 68-year-old man was diagnosed with non-small cell lung cancer and underwent a left pneumonectomy and complete thoracic lymphadenectomy one month ago. He returns to the outpatient clinic with complaints of reddish brown, watery sputum for one week. He brings it up especially at night when he is laying down. He feels weak and has had fever for last 4 days. A chest radiograph done two days ago shows an air-fluid level in the postpneumonectomy space.
Which of the following diagnostic tests will establish a definitive diagnosis?
A. Airway laminogram
B. Bronchoscopy
C. Chest CT
D. Sputum cytology
E. Thoracentesis

1.21 A 66-year-old woman underwent right pneumonectomy for squamous cell lung carcinoma one year ago. She now presents with stridor and progressive dyspnea for the past three months. Representative images from her workup show excessive mediastinal shift.
Which of the following is the best management?
A. Endobronchial stenting
B. Lung transplantation
C. Medical management
D. Right intrathoracic tissue expander
E. Right pleural space pneumothorax

1.22 A 68-year-old otherwise healthy man presented with a five centimeter left upper lobe mass. His smoking history was 60 pack-years. Flexible bronchoscopy with transbronchial biopsy was done. Now one hour following that procedure, he is complaining of left-sided chest pain with inspiration. Blood pressure is 132/74 and pulse is 86. Oxygen saturation on room air is 96%.
Which of the following is the most appropriate initial diagnostic evaluation?
A. Cardiac enzymes
B. Chest radiograph
C. Electrocardiogram
D. Repeat bronchoscopy
E. Transthoracic echocardiogram

1.23 A 78-year-old man has a one cm peripheral right upper lobe lung cancer. He is wheel chair bound and is on 3 L/min of oxygen at home. He has diabetes mellitus and had a myocardial infarction two years ago. A new stress echocardiogram shows an ejection fraction of 25% and no reversible ischemic defects. His FEV_1 is 50% of predicted, DLCO is 45% of predicted and his calculated maximum oxygen consumption (VO_{2max}) is 8 mL/(kg*min).
Which of the following factors predicts the highest risk of postoperative complications?
A. Age
B. DLCO of 45%
C. Ejection fraction of 25%
D. Performance status
E. VO_{2max} of 8 mL/(kg*min)

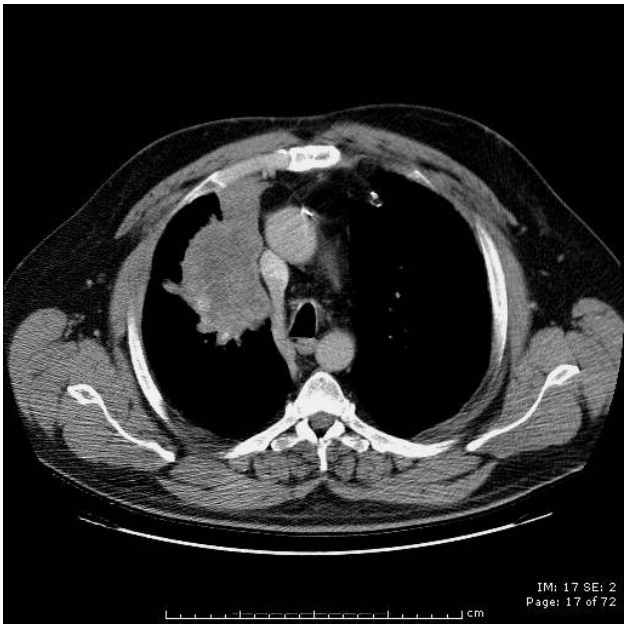
1.24 A 67-year-old woman with left upper lobe non-small cell lung cancer underwent neoadjuvant therapy. At operation, nodal disease involving the left main pulmonary artery mandates sleeve resection of the pulmonary artery. A left-sided double lumen tube is in position. It is apparent after resecting the complete circumference of the artery that a bronchial sleeve resection is necessary in order to prevent excessive tension as the arterial anastomosis is completed. The operation is going smoothly and the left mainstem and distal airways are divided. Clamps are on the proximal and distal left pulmonary artery. The anesthesiologist informs you that the arterial saturations have dropped to 40%, ventilation is now difficult, and the arterial blood pressure is now dropping as well.
The appropriate action is
A. Call for cardiopulmonary bypass
B. Deflate the tracheal and bronchial balloons
C. Institute jet ventilation
D. Move the oximetry to another location
E. Release the distal bronchial clamp and ventilate left lower lobe

1.25 A 67-year-old woman with a history of mitral valve replacement seven years ago was recently diagnosed with stage IV left upper lobe lung cancer. She presents now with progressive shortness of breath, but performance status two weeks ago was good. The chest radiograph shows a moderate left-sided pleural effusion. Transthoracic echocardiogram reveals a large posterior pericardial effusion with

tamponade physiology. The most appropriate treatment for this patient is admission and
A. left video-assisted thoracocsopy with pericardial window
B. pericardial catheter drainage and sclerosis with a left chest tube
C. pericardio-peritoneal shunt
D. pericardiocentesis and thoracentesis
E. subxiphoid window and a left chest tube

1.26 The treatment plan for a 54-year-old man with epithelioid malignant pleural mesothelioma was chemotherapy followed by extrapleural pneumonectomy followed by hemithorax external beam radiation therapy. His preoperative chest CT and PET studies indicated only ipsilateral pleural involvement and no mediastinal adenopathy or node avidity. Chemotherapy was completed and cervical mediastinoscopy was done to biopsy paratracheal and subcarinal lymph nodes. A single subcarinal lymph node shows a focus of metastatic mesothelioma in its subcapsular space. The appropriate response is
A. administer additional chemotherapy and reassess for extrapleural pnemonectomy.
B. alter the operative plan and change to a radical pleurectomy.
C. continue to thoracotomy to debulk the tumour and place brachytherapy mesh.
D. counsel against further operation and refer for additional non-surgical treatments.
E. proceed with extrapleural pneumonectomy and radical node dissection.

1.27 A 61-year-old man was found to have a central right upper lobe non-small cell lung cancer (see CT image). Preoperative FEV_1 was 2.8 L (118% predicted). Following a negative mediastinoscopy, the patient is now undergoing a resection via thoracotomy. The tumour is densely adherent to the mediastinal pleura at the level of the phrenic nerve. The surgeon

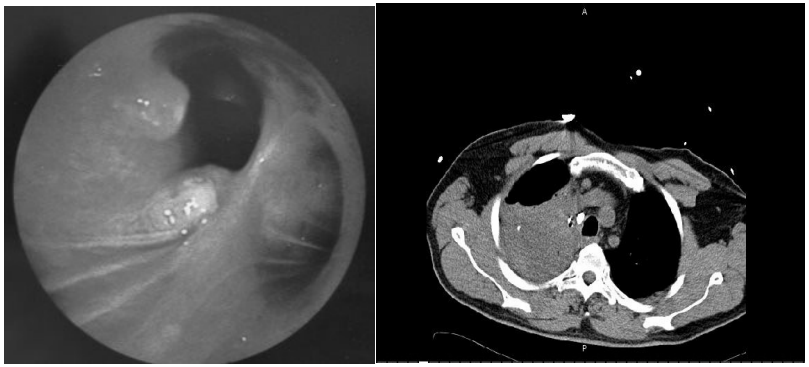


A. mark the tumour margins with clips for future radiation, but abort the operation because mediastinal invasion renders the cancer unresectable.
B. perform right upper lobectomy and resect a portion of the phrenic nerve *en bloc* with the specimen and leave a suture to mark the distal end of nerve for delayed placement of a diaphragm pacemaker.
C. perform right upper lobectomy, carefully dissect the tumour off the phrenic nerve and leave clips for postoperative radiation.
D. perform right upper lobectomy, resect a portion of the phrenic nerve *en bloc* with the specimen and plicate the hemidiaphragm.
E. perform right pneumonectomy, resect a portion of the phrenic nerve *en bloc* with the specimen and plicate the hemidiaphragm.

1.28 A 74-year-old man presented to the A&E with shortness of breath. Two years ago he had a right upper lobectomy for a stage IIB non-small cell lung cancer. On evaluation, HR was 122 and BP 107/66. He had difficulty laying flat for examination. Pulmonary congestion and small bilateral pleural effusions were obvious on the chest radiograph and ECG showed decreased amplitude but no signs of ischaemia. The transthoracic echo showed large pericardial effusion. The most appropriate next step in the management is

A. admission for observation.
B. aggressive dieresis and bilateral chest tubes.
C. cardiac catheterization.
D. IV heparin bolus followed by continuous infusion.
E. pericardial window.

1.29 A 56-year-old man had known pulmonary nodules and a past VATS biopsy that was diagnostic of histoplasmosis. A chest film done three months ago was minimally abnormal. He is an obese man in moderate respiratory distress, who coughed up a mouthful of fresh blood during his examination in the emergency room. A slice from his CT scan is shown. Bleeding slowed and bronchoscopy revealed scattered clots with oozing near his right middle lobe orifice. Saline lavage and epinephrine solution arrested the bleeding and an image is shown (taken from the right mainstem bronchus).



Which of the following is the best plan for his care?
A. bronchial artery embolisation.
B. intubation with balloon tamponade.
C. laser therapy to control the bleeding.
D. redo thoracotomy and possible bilobectomy.
E. rigid bronchoscopy with forceps removal of the lesion.

1.30 A 55-year-old obese, diabetic man underwent a right middle lobe resection for cancer four days ago. He was extubated in the operating room and was doing well until today. He was placed on metoprolol XL 25 mg preoperatively. After surgery he received metoprolol 5 mg q6 hours IV. He became tachycardic today to 120, with BP 130/80. Haematocrit is 39%, O_2 saturation is 97% on 100% oxygen by face

mask and his respiratory rate is 28. Other lab values are unchanged since his return from the operating room. A stat portable chest radiograph shows no infiltrate, effusion or pneumothorax. Which of the following is most appropriate?

A. Change to oral metoprolol and increase the dose
B. Increase his pain medication and offer an anxiolytic
C. Liberalize fluids and encourage oral intake
D. Obtain a D-dimer level
E. Perform flexible bronchoscopy urgently

1.31 A 67-year-old woman underwent right upper lobectomy for non-small cell lung cancer two days ago and is now febrile. The current chest radiograph and a ventilation/perfusion scan are shown.