

Respiratory SBA Questions

Questions were made by students on behalf of The Peer Teaching Society. We hope there are no mistakes but are not liable for any false or misleading information.

1. Which of the following is not a risk factor for COPD?
 - a) Smoking
 - b) Asbestos exposure
 - c) Owning birds
 - d) Alpha-1 antitrypsin deficiency
 - e) Occupational exposure

2. Which gene is mutated in cystic fibrosis?
 - a) Transmembrane conductance regulator gene
 - b) JAK2
 - c) STRC
 - d) Sonic the Hedgehog gene
 - e) Aquaporin 2

3. Which drug is used in the treatment of tuberculosis and may cause red tears / sweat / saliva?
 - a) Isoniazid
 - b) Rifampicin
 - c) Ethambutol
 - d) Rocephin
 - e) Pyrazinamide

4. What is the pattern of inheritance of cystic fibrosis?
 - a) Autosomal dominant
 - b) X-linked recessive
 - c) Autosomal recessive
 - d) X-linked dominant
 - e) None of the above

5. A 34-year-old man diagnosed with chronic asthma comes to your GP practice. He's been on salbutamol and a low dose budesonide for the last few months, however recently he's been getting wheezier and shorter of breath. You decide to measure his peak flow, which turns out to be 80% of his best PEF.

What is the first step in the management of this patient?

- a) Add montelukast
- b) Increase the dose of budesonide
- c) Check adherence and inhaler technique
- d) Add terbutaline sulfate
- e) Add formoterol fumarate

6. What's the most common type of lung cancer?

- a) Small cell lung cancer
- b) Squamous cell cancer
- c) Large cell lung cancer
- d) Adenocarcinoma
- e) Bronchial cancer

7. In bronchiectasis, what's the common finding on CT?

- a) Tree-in-bud sign
- b) Bronchus sign
- c) Polo mint sign
- d) Split pleura sign
- e) Signet ring sign

8. Which of these is a restrictive cause of lung disease?

- a) Tuberculosis
- b) Asthma
- c) COPD
- d) Bronchiectasis
- e) Bronchiolitis

9. A 63-year-old woman presents to A&E with confusion after a fall. She has a productive cough and is short of breath. Her respiratory rate is 32, temperature 37.8C, heart rate 90 regular, blood pressure 85/65 and sats are 94% on air. Chest x-ray reveals right lower zone consolidation and blood results come back with a urea of 8 mmol/L.

What is the patient's CURB-65 score?

- a) 5
- b) 3
- c) 4
- d) 8
- e) 3.5

10. A 62-year-old man present to a general practice. He complains of increased shortness of breath over the last year or so and a persistent cough. He smokes 20 cigarettes a day and has done so for the last 40 years. On examination his chest is hyperexpanded bilaterally and you hear wheezing on auscultation. All other examination findings are normal.

What is most likely causing these signs and symptoms?

- a) Asthma
- b) Cystic fibrosis
- c) Pneumothorax
- d) Chronic obstructive pulmonary disease
- e) Collapsed lung

11. An 80-year-old ex-miner presents to A&E with confusion and increased respiratory rate. ABG reveals low O₂ and high CO₂.

Given the type of respiratory failure and history, what's the most likely underlying cause?

- a) Nephrotic syndrome
- b) Pulmonary embolism
- c) COPD exacerbation
- d) Asthma
- e) COVID-19

12. A 75-year-old man was admitted into hospital a week ago. Yesterday, he developed pleuritic chest pain, fever and is coughing up greenish phlegm. His covid-19 swab came back negative.

What is the most likely organism causing his symptoms?

- a) Streptococcus pneumoniae
- b) Staphylococcus aureus
- c) Pseudomonas aeruginosa
- d) Chlamydia pneumoniae
- e) Legionella pneumophila

13. A patient presents to A&E with worsening shortness of breath that came on that morning while sat at their desk at work.

Which type of patients are most likely to develop a spontaneous pneumothorax?

- a) Male, Aged 20-40, Low BMI
- b) Female, Aged 60-70, High BMI
- c) Male, Aged 50-70, High BMI
- d) Female – Aged 15-25, Low BMI
- e) Male, aged 80+, Low BMI

14. A 25-year-old man is diagnosed with a left-sided tension pneumothorax following a motorcycle accident.

What is the most appropriate site for a needle thoracostomy to treat this tension pneumothorax?

- a) 5th intercostal space, midclavicular line, on the same side as the pneumothorax
- b) 2nd intercostal space, mid-axillary line, on the same side as the pneumothorax
- c) 2nd intercostal space, midclavicular line, on the same side as the pneumothorax
- d) 5th intercostal space, midclavicular line, on the opposite side as the pneumothorax
- e) 2nd intercostal space, sternal edge, on the same side as the pneumothorax

15. A bubble wrap like texture is palpated under the skin of the neck during examination of a patient with a history of chest trauma, which is diagnosed as subcutaneous emphysema.

Which of the following signs would further support a diagnosis of tension pneumothorax?

- a) Tracheal deviation towards the affected lung, hypotension and hypoxia
- b) Tracheal deviation towards the affected lung, hypotension and hypoxia
- c) Tracheal deviation away from the affected lung, hypertension and hypocapnia
- d) Tracheal deviation away from the affected lung, hypotension and hypoxia
- e) Tracheal deviation away from the affected lung, normal BP and hypercapnia

16. What is the Gold-standard imaging technique for diagnosing a PE?

- a) X-Ray
- b) CT pulmonary angiography (CTPA)
- c) Magnetic resonance imaging (MRI)
- d) D-Dimer Blood test
- e) Spirometry

Respiratory SBA Answers

Question	Answers
1. C	Owning birds is a risk factor for hyposensitivity pneumonitis, and some interstitial and occupational lung diseases. Smoking is a risk factor for just about anything you can think of, asbestos exposure is a risk factor for asbestosis and mesothelioma, and Alpha-1-antitrypsin deficiency can cause COPD.
2. A	The Transmembrane Conductance Regulator (CFTR) Gene is mutated in Cystic Fibrosis, causing dysregulation of salt and fluid movement across cell membranes, this leads to really thickened secretions, affecting the respiratory, GI and reproductive systems. Respiratory symptoms include wheeze, persistent cough productive of thick mucus, exercise intolerance, recurrent sinusitis / respiratory infections.
3. B	Rifampicin can cause red secretions (tears, sweat etc.). Isoniazid can cause fever, jaundice and nausea. Pyrazinamide can cause hyperuricaemia (and gout), and hepatotoxicity. Ethambutol can cause optic neuritis / eye symptoms such as colour-blindness.
4. C	Cystic fibrosis is inherited by autosomal recessive inheritance
5. C	NICE guidelines recommend always checking the adherence and an inhaler technique before increasing the dose or adding a new drug. If both adherence and technique are correct, the next step would be to increase the dose of inhaled corticosteroid (in this case- budesonide). Terbutaline sulfate is an example of SABA and as the patient is already on Salbutamol, there is no need to prescribe it. Montelukast is a leukotriene receptor antagonist and formoterol fumarate is a LABA- they are added further down the management ladder if needed. (Check the NICE guidelines for chronic asthma!)
6. B	Squamous cell cancer is the most common type (40% of all lung cancers). Smokers tend to get this type. Small cell lung cancer occurs in 20-30%. It arises from endocrine cells and in rare cases secretes ACTH. Large cell lung cancer is found in about 25% of cases- it is poorly differentiated. Adenocarcinoma is the most common lung cancer in non-smokers. Bronchial cancer is very rare, it starts in the mucous glands and ducts of bronchi or trachea.
7. E	All of these signs can appear on a CT scan of lungs <ul style="list-style-type: none"> • Tree-in-bud sign- multiple centrilobar nodules arranged in a linear branching pattern, indicates atypical pneumonia, bronchiolitis or aspiration pneumonitis • Bronchus sign- airway leading directly to a peripheral lung nodule or mass, indicative of bronchogenic cancer • Polo mint sign- partial filling defect in a blood vessel surrounded by a rim contrast material in a CT angiogram, indicative of PE • Split pleura sign- contrast enhancement of parietal or visceral pleura separated by an exudative effusion, indicative of empyema, malignant effusions • Signet ring sign- prominently dilated airway compared to accompanying vessel, indicative of bronchiectasis
8. A	Asthma, COPD, bronchiectasis and bronchiolitis are all obstructive (FEV1/FVC < 0.7). Tuberculosis presents with a restrictive image.
9. C	This patient has community acquired pneumonia - CURB-65 is a 6 point score based on the following: C - confusion U - urea >7mmol/l Respiratory rate > 30/min Blood pressure <90 mmHg systolic O R <60 diastolic Age - over 65 She scores 1 point for the following: confusion, urea >7, respiratory rate >30 and systolic pressure <90 mmHg.

10. D	<p>Hyper-expansion is a sign of obstructive airways disease. Case of considering the overall patient history and remembering the question asks most likely.</p> <p>Asthma and cystic fibrosis can cause hyperinflation however it does not fit the patient profile as well as COPD. A pneumothorax and collapsed lung often present with unilateral decreased chest expansion.</p>
11. C	<p>This is a case of type 2 respiratory failure.</p> <p>Type 1 respiratory failure involves hypoxaemia (PaO₂ <8 kPa) with normocapnia (PaCO₂ <6.0 kPa). It occurs as a result of ventilation/perfusion (V/Q) mismatch</p> <p>Reduced ventilation and normal perfusion – e.g. pulmonary oedema (in Nephrotic syndrome), bronchoconstriction (asthma)</p> <p>Reduced perfusion with normal ventilation – e.g. pulmonary embolism</p> <p>COVID-19 is associated with type 1 respiratory failure.</p> <p>Type 2 respiratory failure involves hypoxaemia (PaO₂ is <8 kPa) with hypercapnia (PaCO₂ >6.0 kPa). It occurs as a result of alveolar hypoventilation, which prevents the patient from being able to adequately oxygenate and eliminate enough CO₂ from their blood.</p> <p>Increased resistance as a result of airway obstruction (e.g. COPD)</p> <p>Reduced compliance of the lung tissue/chest wall – (e.g. pneumonia/rib fractures/obesity) Reduced strength of the respiratory muscles (e.g. Guillain–Barré / motor neurone disease) Drugs acting on the respiratory centre reducing overall ventilation (e.g. opiates)</p>
12. C	<p>Pseudomonas is an uncommon cause of CAP but a common cause of HAP. It is a gram-negative bacillus. The key is in the time of hospitalisation. HAP after 5 days admission have a worse prognosis and tend to be Pseudomonas aeruginosa or MRSA. Within 4 days of admission, the causative organism is most likely the same as in CAP i.e. S. pneumoniae / S. aureus</p>
13. A	<p>Young males with a low BMI are the most likely to suffer from a spontaneous PE. Marfan’s syndrome also increases the risk (the have a low BMI)</p>
14. C	<p>A needle thoracostomy goes in the 2nd intercostal space, midclavicular line on the same side as the pneumothorax. Or you could place it in the 5th intercostal space in the anterior axillary line on the same side as the pneumothorax. They go as close to the rib below as possible as the vein artery and nerve sit just below the rib.</p> <p>You wouldn’t place it on the other side as that’s the healthy lung tissue and you do not want to collapse a lung on the other side too.</p>
15. D	<p>The trachea deviates away from the affected lung in a pneumothorax. The pressure from the air in the pleural cavity pushes the lung and thus the trachea away towards the healthy inflated lung.</p>
16. B	<p>CT pulmonary angiography is the gold standard technique of diagnosing a PE</p>

Authors – Beth Richards, Karolina Szarzanowicz, Ruth Oyenga, Yvonne Pearce

Editor – Chris Salmon csalmon3@sheffield.ac.uk