

2nd
Edition



MCQs in CRITICAL CARE

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Chitra Mehta, Poulomi Chatterjee

A Type Questions

(Select One Best Answer)

1. Which of the following statements is correct?
 - a. The alveolar PO_2 and PCO_2 are determined by the relationship between alveolar ventilation and perfusion
 - b. A V/Q mismatch always results in low PaO_2 coupled with elevated PaCO_2
 - c. Alveoli with high V/Q ratios can compensate for alveoli with low V/Q ratios
 - d. A doubling of alveolar PO_2 has an impact on oxygen content of the blood
2. Which of the following statements is true?
 - a. Normal PaO_2 varies with age and supine position
 - b. Normal PaCO_2 varies with age but not body position
 - c. The normal pH is close to 7.4 and is likely to vary with age
 - d. Normal PaO_2 is about 90 mm Hg and normal PaCO_2 is 40 mm Hg
3. Which of the following pathophysiological mechanisms does not result in hypercapnia?
 - a. Low V/Q mismatch
 - b. Hypoventilation
 - c. Right to left shunt
 - d. Diffusion impairment
 - e. High partial pressure of inspired CO_2
4. A 62-year-old gentleman, reformed smoker, known case of Chronic Obstructive Pulmonary Disease (COPD) presented to Emergency Room (ER) with history of increased cough, dyspnea and high fever (39°C). His presenting arterial blood gas (ABG) showed PaO_2 :182 mm Hg, PaCO_2 : 88 mm Hg, pH: 7.27, HCO_3^- : 32. X-ray of chest showed hyperinflated lungs. Which of the following interventions would you not do to bring down the CO_2 ?
 - a. Nebulized bronchodilators and steroids
 - b. Apply bi-level positive airway pressure
 - c. Give paracetamol to control the temperature
 - d. Give high caloric diet to build up his respiratory muscles
5. A 45-year-old gentleman is brought to ER in a stuporous state. ABG on room air shows PaO_2 of 58, PaCO_2 of 68 and pH of 7.21. An X-ray of chest does not show any abnormality. On auscultation patient has noisy breathing. Following steps are important in the management:
 - a. Patient has acute asthma, should be started on bronchodilators and steroids
 - b. Patient should be given noninvasive ventilation (NIV)
 - c. Patient should undergo Computerized Tomographic Pulmonary Angiography (CTPA) to rule out pulmonary embolism (PE)
 - d. A drug overdose should be suspected
6. What is not true about PE in a pregnant patient?
 - a. It has been attributed to hypercoagulable state associated with pregnancy
 - b. Incidence increases with caesarian section, increased maternal age, multiparity, obesity, suppression of lactation with estrogen
 - c. D-dimer is very useful in this setting
 - d. CT angiography is now recommended as the first screening examination
7. A 51-year-old morbidly obese lady, known asthmatic, was received in ICU after laparoscopic cholecystectomy. She was

successfully extubated the next day. But within few hours she looked lethargic, and ABG done at that time showed pH of 7.24, PO_2 of 56, PCO_2 of 98 mm Hg (patients baseline $PaCO_2$ was 50 mm Hg). Patient was immediately put on NIV with 16/6 settings, and nebulization was ordered. ABG done after an hour showed pH of 7.25, PaO_2 of 70, PCO_2 of 86 mm Hg. Patient still looked fatigued. What is the next best step?

- a. Intubate the patient
 - b. Increase the IPAP to 20 and repeat ABG after an hour
 - c. Continue the same setting and observe
 - d. Change to full face mask
8. Acute obstruction of the trachea is a life-threatening emergency. The critical narrowing of trachea occurs at:
- a. Less than 30 mm
 - b. Less than 40 mm
 - c. Less than 10 mm
 - d. Cannot be quantified
9. What is not true for extracorporeal membrane oxygenation (ECMO) used for pulmonary reasons?
- a. In pure pulmonary pathology VV-ECMO is the procedure of choice
 - b. Incidence of neurological complication is about 50% if V-A ECMO is used
 - c. Incidence of neurological complication is 10% if ECMO is instituted for pulmonary reasons
 - d. V-A ECMO is initiated during cardiopulmonary resuscitation (CPR)
10. Sudden fall in respiratory compliance on ventilator can be due to all except:
- a. Pneumothorax
 - b. Pleural effusion
 - c. Pulmonary embolism
 - d. Lung collapse
 - e. Bronchospasm
11. A 68-year-old patient with massive hemoptysis presents to ER. He is immediately intubated and shifted to ICU. He has high FiO_2 requirement, the next step should be:
- a. Auscultation
 - b. X-ray of chest
 - c. Change the single lumen tube to the double lumen tube
 - d. Bronchoscopy
 - e. CT of chest
12. Under which condition is prone ventilation not advisable?
- a. Post cardiac surgery patients
 - b. Presence of contraindications
 - c. No benefit observed with the therapy
 - d. Early ARDS
13. A 56-year-old man, chronic smoker, presents with massive hemoptysis requiring intubation and mechanical ventilation. On CT angiography of chest, he is found to have blush around the left bronchial artery with a left lingular SOL. He is sent for arterial embolization. Next day when you examine the patient, he is found to have paraplegia. What may be the possible cause?
- a. Critical illness neuropathy
 - b. Eaton-Lambert syndrome
 - c. Anterior spinal cord infarction
 - d. Paraneoplastic Guillain-Barré syndrome
14. Which of the following would you associate with acute PE?
- a. Warburg effect
 - b. Anton's syndrome
 - c. Sign of Leser-Trélat
 - d. McConnell's sign
15. A lung transplant recipient may be asymptomatic while having acute rejection. Which of the following makes you suspect the presence of acute rejection?
- a. Basophilic predominant inflammatory response
 - b. Monocytic predominant inflammatory response
 - c. Lymphocytic predominant inflammatory response
 - d. Eosinophilic predominant inflammatory response
 - e. Neutrophilic predominant inflammatory response
16. Which of the following sign is more predictive of re-expansion pulmonary edema (REPE) in a patient undergoing thoracentesis?
- a. Cough
 - b. Shortness of breath
 - c. Hemoptysis
 - d. Chest pain

17. A 55-year-old man presents with acute febrile illness with respiratory failure. His X-ray of chest shows bilateral mid zone and lower zone infiltrates. He needed intubation, and was found to have refractory hypoxemia, despite open lung approach, recruitment maneuvers and prone ventilation. He is initiated on VV- ECMO. Few days later he suddenly desaturates (on constant blood flow and sweep gas flow parameters). Clinically his left hemithorax is found to be moving less. Which single test would help us in diagnosing pneumothorax?
 - a. X-ray of chest
 - b. CT of chest
 - c. Ultrasound of chest
 - d. Bronchoscopy
18. Following are true for postoperative complications except:
 - a. It is pulmonary abnormality that produces clinically significant and identifiable disease in the postoperative period
 - b. It does not adversely affect the clinical outcome
 - c. It has a prevalence of 2–40%
 - d. It is associated with hospital readmissions
19. Perioperative atelectasis can be made out in ICU with the help of following except:
 - a. Plain radiograph
 - b. HRCT chest
 - c. Lung ultrasound
 - d. MRI lung
 - e. Pulmonary function test (PFT)
20. What is the current status on use of pulmonary clearance medications in the acutely ill patient?
 - a. It is now a standard of care and universal recommendation
 - b. It is harmful as it may induce bronchospasm in an acutely ill patient
 - c. It is meant to be used as a part of long term care of patients with chronic lung disease
 - d. It is not recommended for general use in critically ill patients
21. What all interventions are different in managing a patient with refractory asthma in ICU as compared to a patient with acute asthma?
 - a. Nebulized bronchodilator therapy
 - b. Parenteral steroids
 - c. Mepolizumab and Reslizumab
 - d. Specialist physiotherapy
22. A 45-year-old lady, known asthmatic, presented to ER with acute asthma. She was recently diagnosed to have rheumatoid arthritis and was prescribed aspirin on SOS basis. She was treated with standard treatment of bronchodilators, steroids, parenteral intravenous fluids and supplemental oxygen. What further instruction would you leave with the ICU resident for the night?
 - a. To procure a HRCT chest in case dyspnea persists
 - b. To record peak expiratory flow rates 2 hourly
 - c. To add a mucolytic agent
 - d. To avoid use of aspirin in this patient
23. A 30-year-old man, intravenous drug abuser presents to the ER with pleuritic chest pain and dyspnea of few days duration. He had complaints of nonproductive cough, weight loss and a growth in his groin for last few weeks. Patient was hypoxic, normotensive. He required 40% FiO₂ for oxygenation. CECT chest showed diffuse mediastinal lymphadenopathy with multiple pulmonary nodules, septal thickening and patchy interstitial opacities. Ultrasound of pelvis and scrotum showed a complex mass at the right edge of mons pubis extending up to the inguinal region. His total WBC counts were 6.26 K/ μ L. Appropriate next step would be to:
 - a. Start him on high flow nasal cannula therapy (HFNC)
 - b. Start him on Inj. Tecpime and Vancomycin
 - c. Start him on antitubercular therapy
 - d. Initiate mechanical ventilation and EBUS guided FNA of the lymph node
 - e. Perform the biopsy of inguinal mass
24. A 70-year-old man, reformed smoker, hypertensive, with old CVA was shifted to ICU from the ward with acute respiratory distress and hypotension. He was being treated for community acquired pneumonia for last few days. He was not receiving deep venous thrombosis prophylaxis. On arrival, his temperature was 37°C, HR was 50 beats/min, BP 97/56 mm Hg, respiratory

rate of 36 breaths/min. He had O₂ saturation of 70% through nonrebreather mask. He was immediately intubated, and started on vasopressors after fluid challenge failed. Bedside ultrasound revealed a severely dilated right ventricle with flattened septum. A portable anteroposterior chest radiograph did not show any opacity. An electrocardiogram showed ST-T changes in the inferior leads and troponin was greater than 10 ng/mL. What will be your appropriate next step?

- Perform a CT pulmonary angiography
 - Immediate thrombolysis for suspected pulmonary embolism (PE) in a hemodynamically unstable patient
 - Formal echocardiography
 - Intra-aortic balloon pump (IABP) insertion
25. A 60-year-old man, awaiting liver transplant for hepatitis C-related cirrhosis, presented to ER with 3 weeks history of shortness of breath, nonproductive cough and pleuritic chest pain. There was no history of fever, sore throat, abdominal pain. He was a reformed smoker. He deteriorated within 2 days of admission and required to be put on mechanical ventilation. CT of chest and abdomen showed multiple pulmonary nodules with ground glass opacities with interstitial predominance. There were two lesions in the liver showing arterial hyperenhancement, and were thought to be hepatocellular carcinoma. He had normal white cell count, stable thrombocytopenia, and elevated bilirubin of 4.5 mg/dL. What holds most true in this situation?
- He should have detailed bubble echocardiography for diagnosis of hepatopulmonary syndrome
 - He should be started on steroids
 - An extensive work up is essential in this case
 - He should be given broad spectrum antibiotics and empiric anti tubercular therapy
26. Following are the extrapulmonary causes of hypercapnic respiratory failure except:
- Primary alveolar hypoventilation
 - Thoracoplasty
 - Polymyositis
 - Vocal cord tumor
 - Sepsis and capillary leak syndrome

27. About 10–20% of patients having obstructive sleep apnea (OSA) have a coexistent obesity hypoventilation syndrome (OHS). The prevalence of OHS in ICU is not exactly known.

Most patients having OHS have OSA as well. Sleep related hypoventilation is present in about 10% of patients without OSA. Evaluation for OHS should start in obese individuals in all except:

- Unexplained awake SpO₂ on air less than 95% or an overnight Nadir saturation of 80%
 - A raised bicarbonate on venous blood sample
 - Right heart failure or pulmonary hypertension
 - Unexplained dyspnea on exertion
 - Snoring
28. Pulmonary artery hypertension (PAH) is characterized by elevated pulmonary vascular resistance. It progresses rapidly if left untreated leading to right heart failure and death. Drugs targeting the abnormalities in the prostacyclin pathway remain major therapeutic options to treat PAH. Following statements are true except:
- Inhaled treprostinil (tricyclic analogue of prostacyclin) is recommended for NYHA class III
 - Selexipag is FDA approved for NYHA class III PAH
 - Preferred treatment of choice for NYHA class II or III PAH is ambrisentan plus tadalafil
 - Oral calcium channel blocker (CCB) is the first drug of choice
 - All patients with pulmonary hypertension should receive influenza and pneumococcal vaccines
29. A large spontaneous, non-recurring pneumothorax resolves spontaneously in how much time?
- 6–12 weeks
 - 11–13 days
 - 4–6 weeks
 - Partial resolution only
30. A 30-year-old lady, known case of bronchial asthma gets admitted to ICU with severe asthma. Her ABG shows pH 7.36 PO₂ of 80,

PaCO₂ of 40 mm Hg. She has diaphoresis and her heart rate is 150 beats/min. A decision to intubate is taken. Within 20 minutes of intubation she goes into cardiac arrest. What may be the most likely reason for it?

- a. Pneumothorax
- b. Acute coronary syndrome
- c. Aspiration
- d. Circulatory arrest with electromechanical dissociation
- e. Esophageal intubation

31. A 32-year-old gentleman, non-smoker, is admitted to ICU with left sided chest pain. X-ray of chest shows small left pneumothorax with less than 3 cm from apex to cupola. He is not in respiratory failure. How will you manage the patient?

- a. Observation with oxygen
- b. One time needle aspiration of air
- c. Chest tube insertion
- d. Chest tube drainage with negative pressure suction

32. A 45-year-old obese lady with long standing history of asthma undergoes gastric bypass surgery. She is extubated on OT table and transferred to ICU for observation. After few hours patient looks fatigued. An ABG done at this point shows a pH of 7.18 PaO₂ of 72 and PaCO₂ of 92. You order nebulized bronchodilators and connect her to NIV with IPAP of 16 and EPAP of 6 cm of H₂O. You check her preanesthetic check-up (PAC) chart and found her baseline PCO₂ to be around 55 mm Hg. ABG repeated an hour later shows pH of 7.22 and PCO₂ of 84 and PO₂ of 64. Patient is still drowsy. What should be your next step?

- a. Nebulize her aggressively and use parenteral steroids
- b. Increase noninvasive setting to 20/6 and repeat ABG
- c. Intubate the patient
- d. Continue current settings and repeat ABG after 1–2 hours

33. A 65-year-old alcoholic man, who stopped drinking 1 week ago, complains of malaise, anorexia, weakness and epigastric pain since 7 days. Antacids relieved the pain but other symptoms persisted. He was confused

when brought to the emergency. Physical examination revealed generalized muscle weakness and hyporeflexia. ABG specimen showed acute hypercapnic respiratory failure, the patient was intubated and mechanically ventilated. Which of the following treatments is likely to be most beneficial in correcting his ventilatory failure?

- a. Corticosteroids
- b. Folic acid supplementation
- c. Activated charcoal
- d. Phosphate supplementation
- e. Plasmapheresis

34. A 78-year-old male is admitted to the ER complaining about shortness of breath, fever, chills and cough with purulent expectoration since 2 days. He is a non-smoker with no known comorbidities. The patient looks tired but not confused. Vital signs are blood pressure 110/70 mm Hg, pulse rate 115 beats/min, breathing rate 34 breaths/min, and temperature 38.9°C. Bronchial breath sounds are heard on auscultation of the right chest. Blood tests reveal a white blood cell count of 9000 × 10⁹/L with toxic granules, hematocrit 46%, urea 22 mmol/L, creatinine 160 μmol/L, sodium 140 mmol/L and oxygen saturation (room air) 93%. A chest radiograph demonstrates moderate cardiomegaly and a right lower lobe infiltrate with air bronchograms. Which one of the following is the appropriate management decision for this patient?

- a. Treat as an outpatient, take blood and sputum cultures, start empirical antibiotic therapy
- b. Treat as an outpatient, start empirical antibiotic therapy
- c. Admit to hospital, take blood and sputum cultures and Gram stains, start antibiotic therapy according to results
- d. Admit to hospital, start empirical antibiotic therapy within 4 hours of admission
- e. Admit in the intensive care unit, start empirical antibiotic

35. A 43-year-old male patient on mechanical ventilation for acute respiratory distress syndrome (ARDS) develops a left-sided

pneumothorax. Which of the following measures should be taken at this time?

- Insertion of a small-bore chest tube
 - Pleural puncture and aspiration of the air
 - Double-lumen intubation and reduction of positive end-expiratory pressure
 - Increase in inspiratory oxygen fraction by 10%
 - Surgical closure of the leak by video-assisted thoracoscopic surgery
- 36. A 60-year-old former smoker with COPD is referred to the ICU because of an acute exacerbation, presenting with increased dyspnea and purulent sputum. Inhalation of salbutamol, intravenous antibiotics and corticosteroids, did not help and his condition worsens gradually over 30 minutes. He has not eaten or drunk for the last 5 hours. On ABG analysis, pH is 7.25, PaO₂ is 6.6 kPa (49.5 mm Hg) and PaCO₂ is 8.0 kPa (60 mm Hg). He is agitated but cooperates with inhalation and opens his eyes on request. His respiratory rate is 26 breaths/min. Which therapeutic option is most appropriate in this situation?**
- Add inhaled short-acting anticholinergic and low-dose (2.5 mg) morphine IV
 - Start BIPAP and oxygen
 - Intubate and start mechanical ventilation
 - Start CPAP and oxygen
 - Add salbutamol IV and low-dose (2.5 mg) morphine IV
- 37. A middle aged otherwise healthy male presents to the ER with new onset of shortness of breath on mild exertion and a 5-day history of right calf swelling. His blood pressure is 80/55 mm Hg; his pulse rate is 140 beats/min but regular. ABG reveal a PaO₂ 7.0 kPa (50 mm Hg), PaCO₂ of 3.7 kPa (28 mm Hg) and pH of 7.48. NT ProBNP and D-dimer are both elevated three-times above normal. A CT angiogram (angio-CT) confirms massive embolism of the common pulmonary artery. Which of the following is the appropriate initial therapy for this patient?**
- Surgical embolectomy of the pulmonary artery.
 - 10-mg bolus of recombinant tissue-type plasminogen activator (rTPA) intravenously, then 90 mg over 2 hours
 - 15,000 IU low molecular weight heparin subcutaneously once daily
 - 5,000 IU heparin intravenously, followed by 25,000 IU over 24 hours
 - Pulmonary artery catheter and selective intra-arterial thrombolysis.
- 38. A 65-year-old male, well controlled diabetic, presents to his primary care physician with cough, sputum production and fever up to 39.5°C in the past 36 hours. He has COPD (Global Initiative for Chronic Obstructive Lung Disease grade 4), and uses daily tiotropium and salbutamol as needed. He is allergic to amoxicillin. On examination, he has a respiratory rate of 30 breaths/min and pulse of 110 beats/min, with a blood pressure of 130/90 mm Hg. He is oriented. On auscultation, he has bilateral rhonchi and crepitation on the right lung base. His laboratory tests show a TLC of 16,000 cells/ μ L, C-reactive protein 50 mg/L, blood urea concentration 20 mmol/L and SpO₂ 84%, at room air. Chest X-ray shows consolidation in the right upper and lower lung zones. Which is the most appropriate antibiotic regimen for this patient?**
- Intravenous aztreonam and moxifloxacin
 - Intravenous moxifloxacin and azithromycin
 - Oral ciprofloxacin
 - Oral azithromycin
 - Intravenous ceftriaxone and azithromycin
- 39. Which one of the following correctly defines oxygen delivery (DO₂)?**
- $Hb \times 1.34 \times SaO_2$
 - $DO_2 = (MAP - PCWP) / CO$
 - $DO_2 = CaO_2 \cdot CO$
 - $DO_2 = (MAP - RAP) / CO$
- (MAP: mean arterial pressure; RAP: right atrial pressure; CO: cardiac output; PCWP: pulmonary capillary wedge pressure; CaO₂: arterial oxygen content)
- 40. A 68-year-old male with COPD was admitted to the hospital 3 days ago with right lower lobe pneumonia accompanied by dyspnea. A sputum Gram stain showed Gram-positive cocci in pairs. He required oxygen (3 L/min) and was treated with intravenous ceftriaxone. He is afebrile (for the past 24 hours), has no cough or sputum, and is not dyspneic. His oxygen saturation on room air is 95%. A repeat chest radiograph**

shows a slight increase in the size of his right lower lobe infiltrate. What is the best clinical approach in the management of this patient?

- a. Switch to oral therapy with amoxicillin
- b. Order a CT scan of the chest
- c. Continue IV ceftriaxone
- d. Do a bronchoscopy
- e. Change therapy to IV erythromycin and imipenem

41. A 52-year-old woman with COPD and diabetes is admitted to the hospital with an exacerbation. The clinical examination and the chest radiograph show a consolidation of the left lower lobe. She is admitted to the ICU and intubated in view of worsening respiratory acidosis. She is treated with an intravenous antibiotic, steroids and inhaled bronchodilators. The lung consolidation resolves after 14 days but several attempts to resume spontaneous breathing fail because of tachypnea, unbearable dyspnea and elevation of PaCO₂. Which is the most appropriate test for identifying the cause of weaning failure?

- a. Electrophysiological studies of peripheral nerves and muscles
- b. Body composition analysis
- c. Hypercapnic response test
- d. Hypoxic response test
- e. Muscle biopsy

42. A 35-year-old obese female, a known asthmatic, is admitted to hospital with severe dyspnea with a cough, wheeze. The patient is treated for an asthmatic exacerbation with corticosteroids and nebulized bronchodilators. She shows progressive increase of dyspnea, cough and expectoration, and bilateral consolidation on X-ray. Gram stain is negative. She got intubated, transferred to the ICU and placed on broad-spectrum antibiotics. Despite assisted ventilation, she continues to deteriorate over the next few hours with severe hypoxemia (PaO₂ 46 mm Hg on FIO₂ 60.0). Which one of the following is the next, most appropriate additional treatment?

- a. Vancomycin
- b. ECMO
- c. Prone ventilation
- d. High-dose inhaled corticosteroids

43. A 67-year-old male with LV dysfunction is admitted with acute pulmonary edema. He has a blood pressure of 140/100 mm Hg, SpO₂ of 87%, PaO₂ 56 mm Hg, PaCO₂ 25 mm Hg and pH of 7.33 in room air. After starting therapy with nitrates, oxygen and diuretics, the emergency department team request your advice on the use of NIV or CPAP therapy. Which of the following statements is true?

- a. NIV increases the risk of acute myocardial infarction
- b. Intubation rate is reduced by use of NIV
- c. NIV reduces breathlessness
- d. NIV reduces mortality as compared to CPAP

44. A 54-year-old man is admitted to the hospital with complaints of recurrent hematemesis and syncope. He has history of no other serious diseases. Endoscopy reveals a gastric ulcer with no active bleeding. Lab results show severe anemia with a Hb of 4.4 g/L. Coagulation studies are normal. He receives 10 units packed red blood cells and 8 units fresh frozen plasma. The total amount of fluid replaced is 6.5 L in 9 hours. After transfusion of the last unit of packed red blood cells, the patient becomes severely dyspneic, febrile (39°C) and hypoxemic (oxygen saturation on 5 L oxygen by face mask 88%). An echocardiogram shows normal left ventricular function but the pulmonary arterial pressure is elevated (PASP 50 mm Hg), and the right atrium and ventricle are dilated. A CT angiogram of the chest rules out PE but reveals diffuse infiltrates. What is the likely diagnosis?

- a. Diffuse alveolar hemorrhage secondary to coagulopathy after high-volume transfusion
- b. Volume overload
- c. Activation of granulocytes by transfused biologically active substances
- d. Transfusion-associated systemic infection

45. A 28-year-old female has suffered severe peripartum bleed. She received 25 packed red blood cell transfusions and six fresh frozen plasma transfusions. After delivery, she required mechanical ventilatory support for severe type 1 respiratory failure.

She is deeply sedated and paralyzed. On the fourth day of mechanical ventilation, her arterial blood gas analysis shows a PaO_2 of 92 mm Hg, PaCO_2 of 45 mm Hg and pH of 7.34; on an inspiratory oxygen fraction (FIO_2) 0.9; assist control with tidal volume 430 mL and respiratory rate of 16 breaths/min; inspiratory time (tI)/expiratory time (tE) ratio 1/2; and PEEP 10 cmH_2O . Plateau pressure is 32 cmH_2O . She weighs 62 kg. Her chest X-ray shows bilateral diffuse infiltrates. What would be the most appropriate next step for this patient?

- Switch to inverse ratio ventilation (tI/tE 2/1)
- Decrease ventilator frequency to 15 breaths/min
- Decrease PEEP to 8 cmH_2O
- Decrease tidal volume to 360 mL

46. A 28-year-old primigravida woman in her 26th week of pregnancy is seen in the emergency with a complaint of sudden onset of shortness of breath, dry cough and sharp pain over the left chest. On examination, there are crepitations at the base of the left lung. Her left calf is tender and warm. Her arterial blood gas results are PaO_2 80 mm Hg, PaCO_2 32 mm Hg and pH 7.45. D-dimers are positive. What is the next test you should ask for in this patient?

- Conventional pulmonary angiography
- CTPA
- Compression ultrasound of the lower limbs
- Ventilation-perfusion lung scanning

47. A 38-year-old female presents to the emergency with fever high grade and dry cough since the last 48 hours. On physical examination, she presents end-inspiratory crepts at the left lung base on auscultation, with no other abnormal findings. Chest X-ray reveals a small consolidation in the left lower zone. Her SpO_2 was 95% at room air. Which of the following investigations should be done next for the management of this patient?

- No further tests are required
- Pneumococcal urine antigen test
- Sputum sampling for Gram stain and culture
- Blood cultures

48. A 50-year-old female received a platelet transfusion because of severe thrombocytopenia after chemotherapy for breast cancer. 2 hours later, she complains of an acute onset of shortness of breath. SpO_2 is 74%, and arterial blood gas analysis reveals PaO_2 of 48 mm Hg, PaCO_2 of 28 mm Hg and pH 7.48. Her blood pressure is 150/90 mm Hg, heart rate is regular at 124 beats/min and temperature is 38°C. The patient is transferred to the ICU and started on NIV (inspiratory oxygen fraction 0.6, spontaneous/timed mode, EPAP 8 cmH_2O , IPAP 14 cmH_2O , frequency 16 breaths/min).

The chest X-ray shows bilateral diffuse pulmonary infiltrates. Arterial blood gases after 1 hour on NIV are PaO_2 64 mm Hg, PaCO_2 30 mm Hg and pH 7.46.

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

- Increase IPAP to 16 cmH_2O
- Request an echocardiography
- Proceed with current management
- Intubate and place the patient on invasive mechanical ventilation

49. A 69-year-old woman with severe COPD on long-term corticosteroids is admitted to the hospital with type 2 respiratory failure. She was put on mechanical ventilation, on the 6th day of ventilation, the patient had a spike of fever with a temperature of 39°C and increased purulence of sputum. Her leukocyte count is 20,000/ μL . Chest X-ray shows new bilateral lower-zone patchy consolidation. She is treated with amikacin and imipenem. After 2 days, her fever is down and her sputum become slightly less purulent but her infiltrates persist and she still requires ventilatory support. A sputum culture obtained shows *Escherichia coli* that is sensitive to both medications. Which is the most appropriate decision in the further management of this patient?

- Continue amikacin and imipenem, and add fluconazole
- Discontinue amikacin and continue imipenem
- Continue amikacin and imipenem
- Continue amikacin and imipenem, add a macrolide

50. A 68-year-old female with very severe COPD (FEV₁ 30% predicted) is admitted to the hospital with a 5-day history of progressive dyspnea that has made it nearly impossible for his daily activities. He is already on long-term oxygen treatment at 2 L/min since 3 months, his ABG on 2 L/min oxygen were pH 7.37, PaO₂ 60 mm Hg and PaCO₂ 58 mm Hg. On admission, he has increased cough and increased purulence of sputum. His medications include inhaled salbutamol and ipratropium. On examination, the patient's respiration rate is 34 breaths/min, blood pressure is 148/80 mm Hg and pulse rate is 120 beats/min, auscultation reveals diffusely reduced breath sounds and wheezing on forced expiration. He looks cachectic, sitting in tripod position with pursed-lip breathing. The physical examination is otherwise unremarkable. ABG on 2 L/min nasal oxygen show a PaO₂ of 6.0 kPa (45 mm Hg), PaCO₂ of 8.8 kPa (66 mm Hg) and pH of 7.31. Which of the following therapies is not likely to benefit this patient?
- Noninvasive bi-level ventilation
 - Systemic corticosteroids
 - Continue therapy with an inhaled β_2 -agonist and ipratropium
 - Increasing nasal oxygen to 5 L/min
51. Which of the following is associated with a decreased risk of upper limb catheter associated DVT?
- Diameter of the central venous catheter (smaller versus larger)
 - Infection of the catheter
 - Duration of catheter use (long versus short)
 - Antecubital versus subclavian or internal jugular venous access for central venous catheter insertion
52. A 38-year-old otherwise healthy man is admitted in the ICU with respiratory failure associated to pneumonia. He is on mechanical ventilation, volume control mode, with a tidal volume of 6 mL/kg of predicted body weight, PEEP of 16 cmH₂O, and FIO₂ 100%. His SPO₂ is hovering around 88–90%. He is hemodynamically stable; his peak pressure is around 37 cmH₂O and plateau pressure of around 29 cmH₂O. What next is to be done?
- Airway pressure release ventilation
 - High frequency oscillatory ventilation
 - Inhaled nitric oxide
 - Prone positioning
53. A 63-year-old male with no known comorbidity underwent colectomy for colonic cancer. Preoperative assessment of lungs showed normal gas exchange and spirometry. What is the most appropriate perioperative ventilator settings?
- Tidal volume of 10–12 mL/kg and maintaining end inspiratory plateau pressure of <30 cmH₂O
 - Tidal volume of 6–8 mL/kg and maintaining end inspiratory plateau pressure of <45 cmH₂O
 - Tidal volume of 10–12 mL/kg and maintaining end inspiratory plateau pressure of <45 cmH₂O
 - Tidal volume of 6–8 mL/kg and maintaining end inspiratory plateau pressure of <30 cmH₂O
54. A patient was on mechanical ventilation, suddenly the ventilator alarms were activated. The table shows the pre-alarm and post-alarm ventilator mechanics:
- | Pre-alarm | Post-alarm |
|-------------|------------|
| Ppeak 24 cm | 42 cm |
| Pplat 18 cm | 23 cm |
- What is the most appropriate next step?
- Laryngoscopic evaluation of tube placement
 - Endotracheal tube suctioning
 - IV diuretics
 - Emergency tube thoracostomy
55. A 24-year-old female diagnosed with H1N1 pneumonia complicated ARDS is not maintaining on 100% oxygen on the ventilator with plateau pressure of 36 cmH₂O. Next plan is to initiate venovenous VV ECMO, which of the following is expected?
- Continued requirement of 100% oxygen
 - No need for oxygen or PEEP from the ventilator

- c. Ability to change tidal volume as per the PCO_2
- d. PCO_2 can be controlled by flow of ECMO alone

56. A new antibiotic is being tested in patients with ventilator associated pneumonia (VAP). In normal subjects, the $t_{1/2}$ is 2.5 hours, volume of distribution is 11 L. Assuming normal renal and hepatic functions. What is the dosage adjustment required in this critically ill patient?

- a. No change in dosage (2 g q8h)
- b. Decrease dosing interval (2 g q12h)
- c. Administer a loading dosage (3 g at first dose)
- d. Decrease the dose (1 g q8h)

57. A 68-year-old male patient with very severe COPD (GOLD Stage 4) on long-term home oxygen therapy and domiciliary BiPAP since 4 years persists with recurrent exacerbations. Presently is hospitalized with respiratory failure. Which of the following statements is/are false?

- a. Whether to admit in the ICU should be based on the patient's quality of life and the will to live.
- b. Recurrent exacerbations in patients who have been previously treated in an ICU are commonly due to Gram-negative
- c. Should not be put on invasive ventilation because the probability of their extubation is low
- d. Patients with very severe COPD with history of ventilation have a lower 5-year survival rate.

58. A 46-year-old male patient with no other known comorbidities, is admitted in ICU with H1N1 pneumonia with ARDS. Presently, he was desaturating on a FiO_2 of 65%. The resident performed a recruitment maneuver, the SPO_2 improved to 95%. Which of the following is/are NOT improved following recruitment?

- a. Peak Inspiratory Flow Rate
- b. Airway plateau pressure
- c. End tidal CO_2
- d. Peak airway pressure

K Type Questions

[Mark True (T)/False (F)]

1. β_2 -adrenergic agents relieve airway obstruction caused due to smooth muscle contraction in asthmatics. What is true of them?

- a. There are two types of β_2 -adrenergic agents: Short acting and long acting
- b. They should be administered to patients by inhalational, subcutaneous or intravenous routes
- c. The major side effect of β_2 -adrenergic agents are tremors, hypokalemia, cardiac stimulation and lactic acidosis
- d. A small volume nebulizer is better than metered dose inhaler with spacer for delivery of β_2 -agonists in patients with acute asthma

2. The "crazy-paving" pattern on CT of chest is:

- a. Diagnostic of Alveolar proteinosis
- b. May indicate infection, neoplastic, inhalational and other disorders of lung
- c. Refers to ground glass attenuation with superimposed interlobular septal thickening
- d. Is a sufficient finding to treat the patient

3. All are true for re-expansion pulmonary edema (REPE) except:

- a. Mortality may occur in up to 20% of cases
- b. The incidence is about 10%
- c. Risk factors are large pneumothorax or pulmonary collapse of more than 7 days duration
- d. Drainage of pleural effusion more than 3 L in one sitting

4. A lung transplant (LTx) recipient patient gets admitted with acute breathlessness associated with low grade fever. He had undergone lung transplant 6 months back. He was stabilized on high flow nasal O_2 therapy. He undergoes bronchoscopy and transbronchial biopsy reveals bronchiolitis obliterans syndrome. His steroids doses were jacked up, and the other two immunosuppressants (calcineurin

- inhibitors, cytostatic agent) were continued. What drug would you add to prevent/treat chronic rejection (CR)?
- Monoclonal agents directed against interleukin-2 receptor of T cells (IL-2RA)
 - Lymphocyte depleting agents
 - Neomacrolide antibiotics
 - Montelukast
5. Which statement holds true if there is coexistent bronchiectasis in patients with COPD admitted to ICU with acute respiratory failure?
- Associated with more severe exacerbation
 - Associated with higher mortality
 - Associated with increased risk of MDR
 - There is no difference
6. Mechanical ventilation has been recognized to have a potential of worsening lung function and causing ventilator induced lung injury (VILI). VILI is determined by several parameters. What is true of VILI?
- Stress, strain, driving pressure are main determinants
 - Strain is ratio of end inspiratory lung volume and the end expiratory lung volume
 - Stress is the linear deformation of the lung
 - Static strain is more important than the dynamic strain
 - Stress is represented by transpulmonary pressure
7. Following are the causes of respiratory alkalosis with widened A-a oxygen gradient:
- Chronic interstitial lung disease (ILD)
 - Pulmonary embolism
 - Hepatic failure with normal lungs
 - Right to left shunt
 - High altitude
8. Pregnancy results in following changes in the cardiopulmonary physiology:
- Decrease in forced expiratory volume in 1 second (FEV₁)
 - Functional residual capacity increase by 15-25%
 - Normal PCO₂ during pregnancy is 27-34 mm Hg
 - Minute ventilation increases by 20-40%
 - Normal PaO₂ in pregnant women ranges from 100 to 110 mm Hg
9. Small proportion of pregnant patient develops tocolytic induced pulmonary edema that is characterized by:
- Risk factors include multiple gestation, large volume of crystalloid infusion and pre-eclampsia
 - Risk comes down by maintaining the maternal heart rate under 120 and limiting the intravenous phase β -adrenergic therapy to less than 24-48 hours
 - Use of concomitant steroids to enhance fetal lung development is contraindicated
 - Clinical improvement takes about 72 hours after the drug is discontinued
 - Tocolytic therapy is not safe in patients with underlying cardiac disease
10. Following are the absolute contraindications to thrombolytic therapy in PE:
- Previous hemorrhagic stroke
 - Active internal bleeding
 - Pregnancy
 - Uncontrolled severe hypertension
 - Intracranial surgery
11. Bronchopleural fistula (BPF) is a commonly encountered problem in ICU. It may be found to present as a complication of a therapeutic or diagnostic procedures like thoracic surgery or due to mechanical ventilation. It may be detected if there is incomplete expansion of lung post chest tube insertion, especially in a chest trauma patient. Following statements hold true for BPF in ICU:
- BPF should be aggressively and surgically managed due to associated morbidity
 - Pleurodesis is helpful in this setting
 - In ARDS, approximately 25% of minute ventilation leaks through the BPF
 - Negative pressure application to chest tube in BPF is associated with inappropriate cycling of the ventilator
 - High frequency ventilation is preferred over conventional ventilation
12. Respiratory muscle weakness is frequently responsible for failure to wean patient from mechanical ventilation. It has a multifactorial etiology like:
- Hypothyroidism
 - Chronic renal failure

- c. Corticosteroids
- d. Hyponatremia
- e. Critical illness neuropathy

13. Liberation from mechanical ventilation is an important process in care of critically ill patients. What is true for carrying out weaning from mechanical ventilation?

- a. Protocol based ventilatory management team lead to better outcome
- b. Spontaneous breathing trial (SBT) is found to be superior to pressure support (PS) or SIMV weaning
- c. Early identification and correction of adrenal insufficiency is associated with favorable weaning with shorter weaning times
- d. 120 minutes trial are better than 30 minutes trials
- e. Twice daily spontaneous breathing trials does not offer any advantage over once daily trial

14. Various industrial processes are associated with generation of potentially unhealthy gases which lead to acute inhalation injury if inhaled in large amounts. Approximately 44% of such injuries are related to work-place exposure, and 60% are related to exposure to a chemical in general environment. Smoke inhalation is also responsible for large number of acute inhalational injury cases. Other peculiarities of this injury are:

- a. Asphyxiants result in dilution of oxygen in ambient atmospheric air resulting in fall in FiO_2
- b. Chemical asphyxiants lead to decrease in oxygen carrying capacity
- c. Carbon monoxide is the most frequent simple asphyxiants
- d. In carbon dioxide asphyxiation symptoms appear rapidly once FiO_2 is less than 0.21 due to increase in ambient CO_2
- e. Severity of symptoms in CO poisoning correlates with carboxyhemoglobin levels better than with duration of exposure

15. Less than 2% of women in the perinatal period require intensive care admission. Respiratory failure is the most frequent

indication for ICU care. What holds true in such patients?

- a. Pneumonia is the third leading cause of obstetric maternal deaths
- b. The first choice of antibiotic for pneumonia is a beta lactam in pregnant patient
- c. PE is the main reason for CPR in peripartum period
- d. D-dimer is most reliable in pregnancy
- e. The oxygenation goals for all causes of respiratory failure in pregnancy should be maternal SpO_2 of 95% or a PaO_2 of equal to or greater than 70 mm Hg

16. Hepatopulmonary syndrome (HPS) is characterized by oxygenation defect due to intrapulmonary vascular dilatation on a background of liver disease. Following statements are true regarding HPS:

- a. Oxygenation failure in hepatopulmonary syndrome occurs secondary to intrapulmonary shunting as well as diffusion impairments
- b. Platypnea and orthodeoxia are characteristics of intrapulmonary shunting in HPS
- c. Pulmonary function test normalizes after liver transplantation
- d. Contrast enhanced transthoracic echocardiogram (CETE) and lung perfusion scan are utilized for diagnosing HPS
- e. Survival rate of HPS without liver transplant has been found to be 23% when compared to 76% post liver transplantation

17. National Healthcare Safety Network (NHSN) in 2013 had come up with the definition of ventilator associated events (VAE) supplanting the previous definition of ventilator associated pneumonia (VAP). This 3-tiered definition of pneumonia is characterized by:

- a. It provides defined objective criteria which can capture all preventable complications in electronic medical record (EMR) of patients
- b. To qualify as a VAC patient must have had 4–5 days of mechanical ventilation with either stable or reducing FiO_2 requirements before the days of increased oxygenation

- c. VAC suggests a causal relationship between VAE and infectious disease
- d. Most of the patients meeting the criteria for VAE are afflicted by a noninfectious cause
- e. The current VAE lacks a radiographic component

18. Several clinical criterions have been proposed to identify patients who can be safely weaned from the ventilator. What are the minimum required criterions that must be met before weaning is initiated:

- a. Cause of respiratory failure has improved
- b. pH more than 7.25
- c. Hemoglobin more than 8 to 10 mg/dL
- d. Core temperature less than 38–38.5°C
- e. Ability to initiate an inspiratory effort

19. NIV in acute respiratory failure not only decreases complication rate of mechanical ventilation but also reduces mortality and shortens ICU and hospital length of stay. NIV is contraindicated in many situations like:

- a. Severe upper GI bleeding
- b. Poor bulbar function
- c. Hypotension
- d. Severe encephalopathy
- e. Severe arrhythmias

20. ARDS is one of the most commonly encountered clinical diagnoses in ICU. It was first reported in a clinical case series of 12 patients in 1994. Sometimes it becomes difficult to distinguish it from other causes of respiratory failure like cardiogenic edema or massive aspiration. Which of the following points support an underlying ARDS process?

- a. Pulmonary capillary wedge pressure of more than 18 mm Hg
- b. A low neutrophil count in BAL
- c. Protein (lavage/serum) ratio of >0.7
- d. In early ARDS chest X-ray abnormalities are more pronounced than hypoxemia

21. It was a common belief that oxygen protected cell from injury but the accumulated evidence has proven that, oxygen in fact may be responsible for much of the cell

injury especially pulmonary, in critically ill patients. Pulmonary oxygen toxicity is characterized by:

- a. Lungs are well endowed with antioxidant activity in the form of vitamin C and glutathione normally
- b. Inhalation of 100% oxygen by healthy volunteers even for brief periods of time (6–12 hours) results in tracheobronchitis and absorption atelectasis
- c. The toxic level of FiO_2 has been identified as 0.7
- d. Antioxidant protection of lung to decrease the risk of oxygen toxicity is not possible

22. Infrared capnography is used to measure PCO_2 in the exhaled gas. When gas exchange is presumably normal, the PCO_2 at the end of expiration (ETCO_2) is equivalent to PCO_2 in end capillary blood. What statements hold true regarding measurement of PCO_2 and ETCO_2 ?

- a. Under normal circumstances ETCO_2 is 2–3 mm Hg lower than PaCO_2
- b. As the V/Q mismatch increases ETCO_2 increases relative to PaCO_2
- c. PaCO_2 – PETCO_2 difference exceeds 3 mm of mercury in presence of open ventilator circuit, obstructive lung disease and PE
- d. PaCO_2 – ETCO_2 is negative in presence of high cardiac output and higher FIO_2

23. Optical and colorimetric techniques have made noninvasive monitoring of blood gases (PO_2 , PCO_2) possible in ICU. These monitoring techniques are an integral part of daily ICU care. Which statements holds true for oximetry in ICU?

- a. It utilizes the Lambert–Beer law for detection of hemoglobin in its different forms
- b. It helps in detecting four different forms of hemoglobin-oxygenated hemoglobin (HbO_2), deoxygenated hemoglobin (Hb), carboxyhemoglobin (COHb) and methemoglobin (metHb)
- c. It utilizes red and infrared regions of light
- d. Percentage (%) saturation = $\text{Hb}/\text{HbO}_2 + \text{Hb} \times 100$

- e. One side of the finger probe has photo transmitter and the other side has a photodetector
- 24. Which statements hold true regarding Alveolar-arterial oxygen gradient (A-a DO₂)?**
- A-aDO₂ = [FiO₂(PB-PH₂O)-(PaCO₂/RQ)]-PaO₂
 - A-aDO₂ increases with age and FiO₂
 - RQ is defined as the relative exchange of oxygen and carbon dioxide across the alveolar capillary interface
 - A-aDO₂ is a measure of intrapulmonary shunting
 - Increasing FiO₂ changes A-aDO₂ by resulting in regional hypoxic vasoconstriction in the lungs
- 25. We often use partial pressure of oxygen in arterial blood (PaO₂) as an indicator of oxygenation. It is in fact the oxygen content which is the main indicator of oxygenation. Normal values of carbon dioxide and oxygen transport parameters as derived with the help of pulmonary artery catheter are:**
- Oxygen uptake = 200–270 mL/min
 - Respiratory quotient = 0.75–0.85
 - Oxygen extraction ratio = 0.3–0.4
 - Oxygen delivery = 900–1100 mL/min
 - Carbon dioxide elimination = 162–220 mL/min
- 26. DHI is a common phenomenon in patients with obstructive airway disease on mechanical ventilation. What holds true for DHI?**
- Auto PEEP or intrinsic PEEP is usually measured by expiratory hold maneuver
 - DHI may be reflected by peak pressures
 - DHI can be decreased by decreasing minute ventilation and by changing to decelerating pattern of flow
 - Work of breathing in triggering the ventilator can be countered by adding external PEEP up to 80% of the auto PEEP
 - DHI is clinically recognized by noticing visible respiratory efforts but not triggering of ventilator in a patient on ACV/PS/SIMV mode
- 27. Pneumothoraces in ICU are encountered routinely. These are usually related to some intervention. These are usually characterized by:**
- It effects the prognosis of the patient
 - Small pneumothorax can be treated with needle aspiration
 - Chest tube should be inserted into the fourth or fifth intercostal space in the anterior or midaxillary line
 - Large bore tube should be used for drainage of pneumothorax
 - Removal of chest tube should be done during end inspiration only
- 28. A 54-year-old man renal transplant recipient is admitted to ICU with history of fever, dry cough and progressively worsening shortness of breath. He has been on triple immunosuppressants ever since he had transplant 3 years back. He did not have any other complaints. He was hemodynamically stable. He required 60% FiO₂ and 60 L/min of flow on high flow nasal cannula (HFNC) for stability. His X-ray of chest showed features of bilateral pneumonia. What may be the possible etiological organisms?**
- Cytomegalovirus and other herpes virus
 - Aspergillus*
 - Mucor*
 - Pneumocystis carinii*
 - Staphylococcus aureus*
- 29. Treatment guidelines for PE recommend:**
- In patients with acute PE and active cancer, use of direct acting oral anticoagulants (DOAC) is recommended
 - Unfractionated heparin should be the initial agent of choice for anticoagulation in PE
 - Systemic thrombolysis should be limited to high-risk, hemodynamically unstable PE or select intermediate PE with a low bleeding risk
 - Alteplase (tPA) and tenecteplase are two FDA approved agents recommended for thrombolysis in PE
 - Surgical thrombectomy should be reserved for patients with cardiogenic shock and end organ damage

30. PE is a challenging diagnosis. Symptoms are usually vague or non-existing, with features of many other common diagnosis. In North Americans it has been found to be the third most common cause of cardiovascular death, after myocardial infarction and stroke. Following are the characteristics of PE:

- Patients with low risk PE have a 1 year survival rate of more than 95%, and patients with high-risk PE and hemodynamic instability has a 90 day mortality of 40% approximately
- The two most common predictive values used for PE are the Wells score and the revised Geneva score
- D-dimer levels are helpful in diagnosing PE
- Performance of CTPA and V/Q scanning for diagnosing PE is equivalent
- A negative venous ultrasound is not sufficient to rule out PE in majority of patients

31. A humidifier should be able to deliver inspired gas at 32–36°C with a water content of 30–43 g/m³. There are various options available to achieve this effect: cold water humidifier, hot water humidifier and heat and moisture exchanger (HME). Following holds true for them:

- Cold water humidifier are the simplest effective and most economical to use
- Hot water humidifier may be a potential source of infection
- HMEs are considered as the gold standard for humidification of inspired air
- HME increase dead space and increase the risk of nosocomial pneumonia
- Hygroscopic HMEs are more effective than hydrophobic HMEs

32. The upper airway normally moistens, warms and then filters the inspired gas. Normal physiology of respiratory tract for this function includes:

- Mucociliary system includes cilia in the watery (sol) layer moving the viscous mucus layer (gel) over it toward the glottis
- Isothermic saturation boundary (i.e., absolute humidity of 43 m/m³ 100% relative

humidity at 37°C) exist at the level of glottis

- Under the resting condition the normal respiratory tract loses approximately 250 mL of water and 350 kcal (1.50 KJ) of energy in a day
- High FiO₂ has no effect on mucociliary function
- Minimum relative humidity required is 50%

33. PEEP during mechanical ventilation is characterized by:

- When PEEP is maintained during expiration in a spontaneously breathing patient the term “continuous positive airway pressure (CPAP)” is used
- Role of PEEP is to increase FRC, maintain recruitment of alveoli and minimize intrapulmonary shunt
- PEEP has a direct effect on reducing extravascular lung water
- PEEP may reduce oxygen delivery
- In COPD patients extrinsic PEEP (PEEP_e) should be less than intrinsic PEEP (PEEP_i)

34. A 45-year-old gentleman known case of childhood asthma presents to ICU with acute exacerbation. He is conscious though bit lethargic. His ABG shows pH of 7.15 PCO₂ of 120 PaO₂ of 62 on 2 L/min of oxygen. His X-ray chest shows hyperinflated lungs. What is the recommended management for this patient?

- Administer nebulized ipratropium bromide every 8 hourly along with nebulized salbutamol 2–4 hourly
- Patient needs to be intubated and put on mechanical ventilation.
- Nebulized mucolytic agent like n-acetylcysteine should be started as early as possible
- Respiratory stimulants should be added
- Noninvasive ventilation with 20/6 of setting should be started

35. Radiation therapy forms one of the pillars for primary adjuvant therapy for various thoracic malignancies. Lungs however have been found to be very sensitive to ionizing radiation. Radiation pneumonitis

MCQs in CRITICAL CARE

This textbook is designed for intensivists and those involved in critical care, offering a practical approach to mastering ICU concepts through MCQs. Key features include:

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Overall, it is a comprehensive guide to both exam preparation and daily ICU decision-making, emphasizing the importance of understanding the reasoning behind critical care decisions.

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