

Clinical Simulation Examination

Detailed Content Outline

Each section of each problem is classified to a minor content heading (e.g., I.A, II.B) described below.

Each scored form will include 2-problem pretests.

I. PATIENT DATA EVALUATION AND RECOMMENDATIONS

A. Evaluate Data in the Patient Record

1. Patient history, for example,
 - admission data
 - orders
 - medications
 - progress notes
 - DNR status / advance directives
 - social history
2. Physical examination relative to the cardiopulmonary system
3. Drainage and access devices, for example,
 - chest tube
 - artificial airway
4. Laboratory results, for example,
 - CBC
 - electrolytes
 - coagulation studies
 - culture and sensitivities
 - sputum Gram stain
 - cardiac enzymes
5. Blood gas analysis results
6. Pulmonary function testing results
7. 6-minute walk test results
8. Cardiopulmonary stress testing results
9. Imaging study results, for example,
 - chest radiograph
 - CT
 - ultrasonography
 - MRI
 - PET
 - ventilation / perfusion scan
10. Maternal and perinatal / neonatal history, for example,
 - Apgar scores
 - gestational age
 - L / S ratio
 - social history
11. Metabolic study results, for example,
 - O₂ consumption / CO₂ production
 - energy expenditure
 - respiratory quotient
12. Sleep study results
13. Trends in monitoring results
 - a. fluid balance
 - b. vital signs
 - c. intracranial pressure
 - d. weaning parameters
 - e. pulmonary compliance, airways resistance, work of breathing
 - f. noninvasive, for example,
 - pulse oximetry
 - capnography
 - transcutaneous O₂ / CO₂
14. Trends in cardiac monitoring results
 - a. ECG
 - b. hemodynamic parameters
 - c. cardiac catheterization
 - d. echocardiography

B. Gather Clinical Information

1. Interviewing a patient to assess
 - a. level of consciousness and orientation, emotional state, and ability to cooperate
 - b. level of pain
 - c. presence of dyspnea, sputum production, and exercise tolerance
 - d. smoking history

- e. environmental exposures
- f. activities of daily living
- g. learning needs, for example,
 - literacy • culture
 - preferred learning style
- 2. Performing inspection to assess
 - a. general appearance
 - b. characteristics of the airway, for example,
 - patency
 - c. cough, sputum amount and character
 - d. status of a neonate, for example,
 - Apgar score • gestational age
- 3. Palpating to assess
 - a. pulse, rhythm, force
 - b. accessory muscle activity
 - c. asymmetrical chest movements, tactile fremitus, crepitus, tenderness, secretions in the airway, and tracheal deviation
- 4. Performing diagnostic chest percussion
- 5. Auscultating to assess
 - a. breath sounds
 - b. heart sounds and rhythm
 - c. blood pressure
- 6. Reviewing lateral neck radiographs
- 7. Reviewing a chest radiograph to assess
 - a. quality of imaging, for example,
 - patient positioning • penetration
 - b. presence and position of tubes and catheters
 - c. presence of foreign bodies
 - d. heart size and position
 - e. presence of, or change in
 - (i) cardiopulmonary abnormalities, for example,
 - pneumothorax • pleural effusion
 - consolidation • pulmonary edema
 - (ii) hemidiaphragms, mediastinum, or trachea

C. Perform Procedures to Gather Clinical Information

- 1. 12-lead ECG
- 2. Noninvasive monitoring, for example,
 - pulse oximetry • transcutaneous
 - capnography
- 3. Peak flow
- 4. Tidal volume, minute volume, and vital capacity
- 5. Screening spirometry
- 6. Blood gas sample collection
- 7. Blood gas analysis / hemoximetry
- 8. 6-minute walk test
- 9. Oxygen titration with exercise
- 10. Cardiopulmonary calculations, for example,
 - $P(A-a)O_2$ • P / F
 - V_D / V_T • oxygenation index
- 11. Hemodynamic monitoring
- 12. Pulmonary compliance and airways resistance
- 13. Maximum inspiratory and expiratory pressures
- 14. Plateau pressure
- 15. Auto-PEEP determination
- 16. Spontaneous breathing trial
- 17. Apnea monitoring

18. Overnight pulse oximetry
19. CPAP / NPPV titration during sleep
20. Tracheal tube cuff pressure and / or volume
21. Sputum induction
22. Cardiopulmonary stress testing
23. Pulmonary function testing

D. Evaluate Procedure Results

1. 12-lead ECG
2. Noninvasive monitoring, for example,
 - pulse oximetry
 - capnography
 - transcutaneous
3. Peak flow
4. Tidal volume, minute volume, and vital capacity
5. Screening spirometry
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E. Recommend Diagnostic Procedures

1. Skin testing, for example,
 - TB
 - allergy
2. Blood tests, for example,
 - electrolytes
 - CBC
3. Imaging studies
4. Bronchoscopy
5. Bronchoalveolar lavage (BAL)
6. Sputum Gram stain, culture and sensitivities
7. Pulmonary function testing
8. Noninvasive monitoring, for example,
 - pulse oximetry
 - capnography
 - transcutaneous
9. Blood gas analysis
10. ECG
11. Exhaled gas analysis, for example,
 - CO_2
 - CO
 - NO (FENO)
12. Hemodynamic monitoring
13. Sleep studies
14. Thoracentesis

II. TROUBLESHOOTING AND QUALITY CONTROL OF EQUIPMENT, AND INFECTION CONTROL

A. Assemble and Troubleshoot Equipment

1. Oxygen administration devices
2. CPAP devices
3. Humidifiers
4. Nebulizers
5. Metered-dose inhalers (MDI), spacers, and valved holding chambers
6. Dry powder inhalers
7. Resuscitation devices
8. Mechanical ventilators
9. Intubation equipment
10. Artificial airways
11. Suctioning equipment, for example,
 - regulator
 - tubing
 - canister
 - catheter
12. Gas delivery, metering, and clinical analyzing devices, for example,
 - concentrator
 - gas cylinder
 - liquid system
 - blender
 - flowmeter
 - air compressor
 - regulator
13. Blood analyzers, for example,
 - hemoximetry
 - blood gas
 - point-of-care
14. Patient breathing circuits
15. Incentive breathing devices
16. Airway clearance devices, for example,
 - high-frequency chest wall oscillation
 - intrapulmonary percussive ventilation
 - vibratory PEP
 - insufflation/exsufflation device
17. Heliox delivery device
18. Nitric oxide (NO) delivery device
19. Spirometers – hand-held and screening
20. Pleural drainage devices
21. Noninvasive monitoring devices, for example,
 - pulse oximeter
 - transcutaneous
 - capnometer
22. Gas analyzers
23. Bronchoscopes and light sources
24. Hemodynamic monitoring devices
 - a. pressure transducers
 - b. catheters, for example,
 - arterial
 - pulmonary artery

B. Ensure Infection Control

1. Using high-level disinfection techniques
2. Selection of appropriate agent and technique for surface disinfection
3. Monitoring effectiveness of sterilization procedures
4. Proper handling of biohazardous materials
5. Adhering to infection control policies and procedures, for example,
 - Standard Precautions
 - isolation

C. Perform Quality Control Procedures

1. Gas analyzers
2. Blood gas analyzers and hemoximeters
3. Point-of-care analyzers
4. Pulmonary function equipment
5. Mechanical ventilators

6. Gas metering devices, for example,
 - flowmeter
7. Noninvasive monitors, for example,
 - transcutaneous

III. INITIATION AND MODIFICATION OF INTERVENTIONS

A. Maintain a Patent Airway Including the Care of Artificial Airways

1. Proper positioning of a patient
2. Recognition of a difficult airway
3. Establishing and managing a patient's airway
 - a. nasopharyngeal airway
 - b. oropharyngeal airway
 - c. laryngeal mask airway
 - d. esophageal-tracheal tubes / supraglottic airways, for example,
 - Combitube®
 - King®
 - e. endotracheal tube
 - f. tracheostomy tube
 - g. laryngectomy tube
 - h. speaking valves
4. Performing tracheostomy care
5. Exchanging artificial airways
6. Maintaining adequate humidification
7. Initiating protocols to prevent ventilator associated pneumonia (VAP)
8. Performing extubation

B. Perform Airway Clearance and Lung Expansion Techniques

1. Postural drainage, percussion, or vibration
2. Suctioning, for example,
 - nasotracheal
 - oropharyngeal
3. Mechanical devices, for example,
 - high-frequency chest wall oscillation
 - intrapulmonary percussive ventilation
 - vibratory PEP
 - insufflation / exsufflation device
4. Assisted cough, for example,
 - huff
 - quad
5. Hyperinflation, for example,
 - incentive spirometry
 - IPPB
6. Inspiratory muscle training techniques

C. Support Oxygenation and Ventilation

1. Initiating and adjusting oxygen therapy, for example,
 - low-flow
 - high-flow
2. Minimizing hypoxemia, for example,
 - patient positioning
 - suctioning
3. Initiating and adjusting mask or nasal CPAP
4. Initiating and adjusting mechanical ventilation settings
 - a. continuous mechanical ventilation
 - b. noninvasive ventilation
 - c. high-frequency ventilation
 - d. alarms
5. Correcting patient-ventilator dyssynchrony
6. Utilizing ventilator graphics, for example,
 - waveforms
 - scales
7. Performing lung recruitment maneuvers
8. Liberating patient from mechanical ventilation (weaning)

D. Administer Medications and Specialty Gases

1. Aerosolized preparations, for example,
 - MDI
 - SVN
2. Dry powder preparations

3. Endotracheal instillation
4. Specialty gases, for example,
 - heliox
 - NO

E. Ensure Modifications are Made to the Respiratory Care Plan

1. Treatment termination, for example,
 - life-threatening adverse event
2. Recommendations
 - a. starting treatment based on patient response
 - b. treatment of pneumothorax
 - c. adjustment of fluid balance
 - d. adjustment of electrolyte therapy
 - e. insertion or change of artificial airway
 - f. liberating from mechanical ventilation
 - g. extubation
 - h. discontinuing treatment based on patient response
3. Recommendations for changes
 - a. patient position
 - b. oxygen therapy
 - c. humidification
 - d. airway clearance
 - e. hyperinflation
 - f. mechanical ventilation parameters and settings
4. Recommendations for pharmacologic interventions
 - a. pulmonary vasodilators, for example,
 - sildenafil
 - prostacyclin
 - inhaled NO
 - b. bronchodilators
 - c. antiinflammatory drugs
 - d. mucolytics and proteolytics
 - e. cardiovascular drugs
 - f. antimicrobials
 - g. sedatives and hypnotics
 - h. analgesics
 - i. neuromuscular blocking agents
 - j. diuretics
 - k. surfactants
 - l. vaccines
 - m. changes to drug, dosage, or concentration

F. Utilize Evidence-Based Medicine Principles

1. Determination of a patient's pathophysiological state
2. Recommendations for changes in a therapeutic plan when indicated
3. Application of evidence-based or clinical practice guidelines, for example,
 - ARDSNet
 - NAEP

G. Provide Respiratory Care Techniques in High-Risk Situations

1. Emergency
 - a. cardiopulmonary emergencies, for example,
 - cardiac arrest
 - tension pneumothorax
 - obstructed / lost airway
 - b. disaster management
 - c. medical emergency team (MET) / rapid response team
2. Patient transport
 - a. land / air between hospitals
 - b. within a hospital

H. Assist a Physician / Provider in Performing Procedures

1. Intubation
2. Bronchoscopy
3. Thoracentesis
4. Tracheostomy
5. Chest tube insertion
6. Insertion of arterial or venous catheters
7. Moderate (conscious) sedation
8. Cardioversion
9. Cardiopulmonary exercise testing
10. Withdrawal of life support

I. Initiate and Conduct Patient and Family Education

1. Safety and infection control
2. Home care and equipment
3. Smoking cessation
4. Pulmonary rehabilitation
5. Disease management
 - a. asthma
 - b. COPD
 - c. sleep disorders

Specifications for Each Test Form

The type of each problem is coded.
Problems are assembled according to these specifications.

Problem Type	Specifications
A1. COPD conservative management	2
A2. COPD critical care management	2
B. Adult trauma	3
C. Adult cardiovascular	3
D. Adult neurological or neuromuscular	2
E. Pediatric	2
F. Neonatal	2
G. Adult medical or surgical	4
Total	20