# Respiratory System NCLEX Review

## Respiratory System Disorders

### Chest Injuries

### Flail chest

- Occurs from blunt chest trauma associated with accidents, which may result in hemothorax and rib fractures.

- The loose segment of the chest wall becomes paradoxical to the expansion and contraction of the rest of the chest wall.

**Assessment**

- Paradoxical respirations (inward movement of a segment of the thorax during inspiration with outward movement during expiration)
- Severe pain in the chest
- Dyspnea
- Cyanosis
- Tachycardia
- Hypotension
- Tachypnea, shallow respirations
- Diminished breath sounds

**Interventions**

- Maintain the client in a Fowler’s position.
- Administer oxygen as prescribed.
- Monitor for increased respiratory distress.
- Encourage coughing and deep breathing.
- Administer pain medication as prescribed.
- Maintain bed rest and limit activity to reduce oxygen demands.
- Prepare for intubation with mechanical ventilation, with PEEP for severe flail chest associated with respiratory failure and shock.

**Pneumothorax**

- Accumulation of atmospheric air in the pleural space, which results in a rise in intrathoracic pressure and reduced vital capacity
- The loss of negative intrapleural pressure results in collapse of the lung.
- A spontaneous pneumothorax- occurs with the rupture of a pulmonary bleb with unknown cause.
- An open pneumothorax- occurs when an opening through the chest wall allows the entrance of positive atmospheric air pressure into the pleural space.

- A tension pneumothorax- occurs from a blunt chest injury or from mechanical ventilation with PEEP when a buildup of positive pressure occurs in the pleural space and causes a shift of heart and great vessels.
- Hemothorax- Blood in the pleural space

**Interventions**

- Apply a nonporous dressing over an open chest wound.
- Administer oxygen as prescribed.
- Place the client in a Fowler's position.
- Prepare for chest tube placement, which will remain in place until the lung has expanded fully.
- Prepare for possible thoracentesis
- Monitor the chest tube drainage system.
- Monitor for subcutaneous emphysema.
- Clients with a respiratory disorder should be positioned with the head of the bed elevated.

**Acute Respiratory Distress Syndrome**

- A form of acute respiratory failure that occurs as a complication of some other condition; it is caused by a diffuse lung injury and leads to extravascular lung fluid.

- The major site of injury is the alveolar capillary membrane.

- The interstitial edema causes compression and obliteration of the terminal airways and leads to reduced lung volume and compliance.

- The ABG levels identify respiratory acidosis and hypoxemia that do not respond to an increased percentage of oxygen.

- The chest x-ray shows bilateral interstitial and alveolar infiltrates

- Causes include sepsis, fluid overload, shock, trauma, neurological injuries, burns, DIC, drug ingestion, aspiration, and inhalation of toxic substances.

**Assessment**

- Tachypnea
- Dyspnea
- Decreased breath sounds
- Deteriorating ABG levels
- Hypoxemia despite high concentrations of delivered oxygen
- Decreased pulmonary compliance
- Pulmonary infiltrates

**Interventions**

- Identify and treat the cause of the acute respiratory distress syndrome.
- Administer oxygen as prescribed.

- Place the client in a Fowler’s position.
- Restrict fluid intake as prescribed.
- Provide respiratory treatments as prescribed.
- Administer diuretics, anticoagulants, or corticosteroids as prescribed.
- Prepare the client for intubation and mechanical ventilation using PEEP.

**Asthma**

- Chronic inflammatory disorder of the airways that causes varying degrees of obstruction in the airways

- Status asthmaticus is a severe life-threatening asthma episode that is refractory to treatment and may result in pneumothorax, acute cor pulmonale, or respiratory arrest.

**Assessment**

- Restlessness
- Wheezing or crackles
- Absent or diminished lung sounds
- Hyper-resonance
- Use of accessory muscles for breathing
- Tachypnea with hyperventilation
- Prolonged exhalation
- Tachycardia
- Pulsus paradoxus
- Diaphoresis
- Cyanosis
- Decreased oxygen saturation
- Pulmonary function test results that demonstrate decreased airflow rates

**Interventions**

1. Monitor vital signs.
2. Monitor pulse oximetry.
3. Monitor peak flow.
4. During an acute asthma episode, provide interventions to assist with breathing

**Client education**

- On the intermittent nature of symptoms and need for long-term management
- To identify possible triggers and measures to prevent episodes
- About the management of medication and proper administration
- About the correct use of a peak flow meter
- About developing an asthma action plan with the primary HCP and what to do if an asthma episode occurs

**Chronic Obstructive Pulmonary Disease**

- Also known as chronic obstructive lung disease and chronic airflow limitation

- Chronic obstructive pulmonary disease is a disease state characterized by airflow obstruction caused by emphysema or chronic bronchitis

- Progressive airflow limitation occurs, associated with an abnormal inflammatory response of the lungs that is not completely reversible.
- COPD leads to pulmonary insufficiency, pulmonary hypertension, and cor pulmonale.

**Assessment**

1. Cough
2. Exertional dyspnea
3. Wheezing and crackles
4. Sputum production
5. Weight loss
6. Barrel chest (emphysema)
7. Use of accessory muscles for breathing
8. Prolonged expiration
9. Orthopnea
10. Cardiac dysrhythmias
11. Congestion and hyperinflation seen on chest x-ray
12. ABG levels that indicate respiratory acidosis and hypoxemia
13. Pulmonary function tests that demonstrate decreased vital capacity

**Interventions**

- Monitor vital signs (breath and lung sounds, o2 saturation, etc.)
- Administer a concentration of oxygen based on ABG values and oxygen saturation by pulse oximetry as prescribed.
- Administer medications as prescribed: bronchodilators, metered dose inhalers, corticosteroids, etc.
- Teach client to rinse out mouth thoroughly with water after steroid treatments to avoid risk for oral candidiasis
- Provide respiratory treatments and CPT.
- Instruct the client in diaphragmatic or abdominal breathing techniques and pursed-lip breathing techniques
- Monitor weight.
- Encourage small, frequent meals to maintain nutrition and prevent dyspnea.
- Provide a high-calorie, high-protein diet with supplements.
- Encourage fluid intake up to 3000 mL/day to keep secretions thin, unless contraindicated
- Administer bronchodilators as prescribed and instruct the client in the use of oral and inhalant medications.

**Pneumonia**

- Infection of the pulmonary tissue, including the interstitial spaces, the alveoli, and the bronchioles.

- The edema associated with inflammation stiffens the lung, decreases lung compliance and vital capacity, and causes hypoxemia.

- Pneumonia can be community-acquired or hospital-acquired.

- The chest x-ray film shows lobar or segmental consolidation, pulmonary infiltrates, or pleural effusions.

- A sputum culture identifies the organism.

- The white blood cell count and the erythrocyte sedimentation rate are elevated.

**Assessment**

- Chills
- Fever
- Pleuritic pain
- Tachypnea/ Dyspnea
- Rhonchi, wheezes, and bronchial lung sounds
- Use of accessory muscles for breathing
- Productive cough with sputum production

**Interventions**

- Monitor vital signs
- Monitor Pulse oximetry
- Monitor respiratory status and administer oxygen as prescribed.
- Encourage coughing and deep breathing and use of the incentive spirometer.
- Place the client in a semi-Fowler's position to facilitate breathing and lung expansion.
- Monitor and record color, consistency, and amount of sputum.
- Provide a high-calorie, high-protein diet with small frequent meals.
- Encourage fluids, up to 3 L/day, to thin secretions unless contraindicated.
- Provide a balance of rest and activity, increasing activity gradually.
- Administer antibiotics as prescribed.
- Administer antipyretics, bronchodilators, cough suppressants, mucolytic agents, and expectorants as prescribed.
- Prevent the spread of infection by hand washing and the proper disposal of secretions.

**Client education**

- About the importance of rest, proper nutrition, and adequate fluid intake
- Educate adequate fluid intake
- Smoking cessation
- Regarding medications and the use of inhalants as prescribed
- To receive a pneumococcal vaccine as recommended by the HCP

**Tuberculosis**

1. Highly communicable disease caused by Mycobacterium tuberculosis
2. Because M. tuberculosis is an aerobic bacterium, it primarily affects the pulmonary system, especially the upper lobes, where the oxygen content is highest, but also can affect other areas of the body, such as the brain, intestines, peritoneum, kidney, joints, and liver.

3. An exudative response causes a nonspecific pneumonitis and the development of granulomas in the lung tissue.
4. The goal of treatment is to prevent transmission, control symptoms, and prevent progression of the disease.

**Transmission**

- Via the airborne route by droplet infection.

**Client history**

1. Past exposure to tuberculosis
2. Client’s country of origin and travel to foreign countries in which the incidence of tuberculosis is high
3. Recent history of influenza, pneumonia, febrile illness, cough, or foul-smelling sputum production
4. Previous tests for tuberculosis; results of the testing
5. Recent bacillus Calmette-Gue´rin (BCG) vaccine (a vaccine containing attenuated tubercle bacilli that maybe given to persons in foreign countries or to persons traveling to foreign countries to produce increased resistance to tuberculosis). An individual who has received a BCG vaccine will have a positive tuberculin skin test result and should be evaluated for tuberculosis with a chest x-ray.

**Clinical manifestations**

- May be asymptomatic in primary infection
- Fatigue
- Lethargy
- Anorexia
- Weight loss
- Low-grade fever
- Chills
- Night sweats
- Persistent cough and the production of mucoid and mucopurulent sputum, which is occasionally streaked with blood
- Chest tightness and a dull, aching chest pain may accompany the cough.

**Chest assessment**

1. A physical examination of the chest does not provide conclusive evidence of tuberculosis.
2. A chest x-ray is not definitive, but the presence of multi-nodular infiltrates with calcification in the upper lobes suggests tuberculosis.
3. If the disease is active, caseation and inflammation may be seen on the chest x-ray.
4. Advanced disease

- Dullness with percussion over involved parenchymal areas, bronchial breath sounds, rhonchi, and crackles indicate advanced disease.
- Partial obstruction of a bronchus caused by endobronchial disease or compression by lymph nodes may produce localized wheezing and dyspnea.

**QuantiFERON-TB Gold test**

- A blood analysis test by an enzyme-linked immuno-sorbent assay
- A sensitive and rapid test (results can be available in 24 hours) that assists in diagnosing the client

**Sputum cultures**

- Sputum specimens are obtained for an acid-fast smear.
- A sputum culture identifying M. tuberculosis confirms the diagnosis.

**Tuberculin skin test (TST)**

- A positive reaction does not mean that active disease is present but indicates previous exposure to tuberculosis or the presence of inactive (dormant) disease.
- Once the test result is positive, it will be positive in any future tests.
- Skin test interpretation depends on 2 factors: measurement in millimeters of the induration, and the person’s risk of being infected with tuberculosis and progression to disease if infected.
- Once an individual’s skin test is positive, a chest x-ray is necessary to rule out active tuberculosis or to detect old, healed lesions.

**The hospitalized client**

- airborne isolation precautions in a negative- pressure room; to maintain negative pressure, the door of the room must be tightly closed.
- The nurse wears a particulate respirator (a special individually fitted mask) when caring for the client and a gown when the possibility of clothing contamination exists.
- Thorough hand washing is required before and after caring for the client.