Nursing Interventions for Patients with Respiratory Needs

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UPPER AIRWAY DISORDERS
- Epistaxis
- Sinusitis
- Pharyngitis/Tonsillitis
- Rhinitis
- Sinusitis vs Allergic Rhinitis
- Laryngitis

Epistaxis Causes
- Causes
  - Irritation
  - Trauma
  - Infection
  - Foreign Body
  - Tumor
  - Systemic disease
  - Hypertension
  - Blood Dyscrasias
Epistaxis continued

- 90% anterior bleeds
- 10% posterior bleeds
- May require nasal packing
- Surgery for severe bleed
Nursing Management
Epistaxis

- Nursing management
- Monitor closely for hypoxia and airway obstruction
- Monitor for further bleeding
- Pack remains in place for 5 days
- Comfort measures

Epistaxis (Surgery)

- Packing remains in place for 24 hours
- Watch for further:
  - Bleeding
  - Infection
  - Hypertension
  - Hypotension
- Minimize activity for 10 days
Sinusitis

- Etiology
  - Bacterial
  - Viral
  - Fungal
  - Impaired ciliary action
  - Accumulation or mucous
- Acute or Chronic
**Sinusitis Continued**

- Assessment
- Diagnosis
- Medical Management

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**Nursing Management Sinusitis**

- Hot packs
- Avoid antihistamines
- Saline nasal spray
- Adequate rest
- Increase fluid intake
- Notify provider if symptoms increase or fail to resolve

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**Sinusitis Surgical Management**

- Purpose is to allow ventilation and drainage of mucous
- Potential complications
- Assessment
  - Pre-op
    - Assess for bleeding tendencies
  - Post-op
    - Assess for bleeding, respiratory distress, bruising and/or facial edema
Nursing Management of Surgical Sinusitis

- Interventions
  - Preoperatively
  - Postoperatively

Pharyngitis/Tonsillitis

- Generally viral infections
- Treat viral infections symptomatically
- Antibiotics only in the presence of documented bacterial infection
- Tonsillectomy reserved for recurrent tonsillitis
Rhinitis

- Acute Rhinitis (Common Cold)
- Allergic Rhinitis
- Vasomotor Rhinitis
- Symptoms
- Effects

Management of Rhinitis

- Avoidance
- Steroid Nasal Spray
- Antihistamine
- Desensitization
Differentiation of Sinusitis and Allergic Rhinitis

- **Sinusitis**
  - Red and inflamed mucosa
  - Discolored drainage

- **Allergic Rhinitis**
  - Pale, boggy nasal mucosa
  - Clear drainage
  - Itching of face, nose, palate with sneezing and nasal crease

Laryngitis

- **Causes**
  - Inflammation
  - Vocal Abuse
  - Reflux
  - Virus
  - Bacteria

- **Treatment**
  - Antibiotics
  - Steroids
  - Increase Humidity
  - Voice Rest
  - Treat Reflux
LOWER AIRWAY DISORDERS

- Asthma
- Status Asthmaticus
- COPD
- Chronic Bronchitis
- Emphysema
- Tracheobronchitis
- Bronchiectasis
- Atelectasis
- Influenza

LOWER AIRWAY DISORDERS

- Pneumonia
- Pulmonary Tuberculosis
- SARS
- Malignant Neoplasms
- Occupational Lung Disease
- Cystic Fibrosis
- Lung Transplant
- Sarcoidosis
- Pleural Pain and Pleural Effusion
- Avian Flu
Asthma
- Also called RAD
- Etiology
- Pathophysiology
- Early Phase Reaction
- Late Phase Reaction
Asthma Triggers

- Stress
- Allergens in extrinsic asthma
- Cold or hot air
- Dry Air
- Exercise
- ASA/NSAIDS or beta blockers
- Foods containing MSG
- URI, GERD, Sinusitis, PND
- Anything that irritates the airway
  - Hairspray or cologne
  - Household cleaners especially with bleach
  - Air freshener (Aerosols)

Asthma Classifications

- Mild Intermittent
- Mild Persistent
- Moderate Persistent
- Severe Persistent

<table>
<thead>
<tr>
<th>Severity Level</th>
<th>Medication Regimen</th>
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<tr>
<td>Mild intermittent asthma</td>
<td>No daily medications; Short acting β2 agonist as needed (should not be needed daily)</td>
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| Mild persistent asthma        | Daily anti-inflammatory mediation like cromolyn or a low dose inhaled corticosteroid | May consider a leukotriene modifier instead
|                               | Short acting β2 agonist as needed                                                  |
| Moderate persistent asthma    | Daily medium to high dose inhaled corticosteroid + long acting β2 agonist           | Also consider adding leukotriene modifier
|                               | Short acting β2 agonist as needed                                                  |
| Severe persistent asthma      | Daily high dose inhaled corticosteroid + long acting β2 agonist and leukotriene modifier | Short acting β2 agonist as needed |
Asthma

- Chronic inflammation leads to hyperresponsiveness
- Hyperactivity of bronchi and airway edema decrease diameter of lumen
- Mucous further reduces diameter
- Airflow is limited

Asthma Symptoms

- Wheezing
- Dyspnea
- Cough
- Increased respiratory effort
- Nasal flaring
- Pursed lip breathing
- Accessory Muscle use
- Cyanosis is LATE sign
- Inability to auscultate wheezing may be an ominous sign

Emergency Signs of Asthma

- Cyanosis
- Peak expiratory flow of <50 of their usual value
- Absence of wheezing in an asthmatic patient with respiratory distress requires immediate treatment
Diagnosing Asthma

- Clinical symptoms
- PFT's/Spirometry
- Response to treatment
- ABG's
- Allergy testing

Medical Goals for Asthma

- Prevent chronic asthma exacerbations
- Maintain normal activity levels
- Maintain normal lung function
- Minimize side effects of therapy
- Partner with patient to meet expectations and satisfaction

**Teach step by step instructions for monitoring and adjusting therapy at home** p.1817
Asthma Medical Management

- Treat infections
- Treat GERD
- Rule out other medical diagnosis such as CHF
- Reverse Airway Spasm
- Control Inflammation
- Treatment is based on classification of severity

Asthma Treatment Protocol p.1815

- www.nhlbi.nih.gov/about/naepp
- Click on health provider information
- Has treatment protocol for children < 5 years of age and children and adults > 5 years of age including all medications currently being used in the treatment of asthma.

Asthma Exacerbations

- Treated with
  - Subcutaneous Epinephrine
  - Oxygen
  - Nebulized ?2 Agonist
  - IV Corticosteroids
  - Possible Antibiotics
Asthma Medications
- Bronchodilators
- ?2 Agonist
- Theophylline/aminophylline
- Anticholinergics
- Combination
- Anti-inflammatory
- Leukotriene Modifiers

Asthma Nursing Process
- Assessment
- Control airway distress
- Precipitating factors
- Complete Respiratory Assessment
- Monitor for deteriorating or improving symptoms
- Assess family support and teach how stress may exacerbate symptoms

Status Asthmaticus
- Life threatening condition
- Acute bronchospasm that continues despite aggressive treatment or recurs as the medication wears off
- Work of breathing is increased 5-10 x
- Can lead to severe air trapping, CO2 retention, obstruction of venous return, severe pulsus paradoxus and cor pulmonale, death
Status Asthmaticus
Treatment
- Treat with:
  - Subcutaneous Epinephrine 1:1000 (0.3ml)
  - Oxygen
  - Nebulized β2 Agonist
  - IV Corticosteroids
  - Intubation may be required

Asthma Nursing Diagnosis
- Ineffective Breathing Pattern
- Ineffective Airway Clearance
- Impaired Gas Exchange
- Anxiety
- Activity Intolerance
- Imbalanced Nutrition
- Disturbed Sleep Pattern
- Infection
- Knowledge Deficit

Asthma and the Nursing Process
- Evaluate
  - Respiratory status and oxygenation
  - Knowledge of treatment plan
  - Ability to identify triggers and measures to avoid them
  - Ability to use inhaler correctly
  - Ability to use peak flow meter
  - Knowledge of signs of distress and what to do when they occur
Asthma Self Care

- Patient should keep diary of symptoms
- Patient should assess peak flow BID before any medications
- Medications are adjusted based on peak flow readings
- Patient should know triggers and attempt to avoid them

Chronic Obstructive Pulmonary Disease (COPD)

- Refers to several disorders that affect movement of air in and out of lungs
- American Thoracic Society defines it as a disease state that is characterized by airflow obstruction resulting from obstructive bronchitis or emphysema.

COPD

- Etiology
  - Smoking is leading risk factor
  - Aging
  - Heredity and genetic predisposition
- Pathophysiology Hallmarks
  - Destruction of lung parenchyma-emphysema
  - Inflammation of central airways-chronic bronchitis
Chronic Bronchitis

- Defined as:
  - Presence of productive cough for 3 months in 2 successive years
- Other causes must be ruled out before diagnosis is made
- Pathophysiology
- Manifestations

Deaths Caused By Smoking

- 440,000 Total Deaths
- 159,500 Cancers
- 142,600 Heart Disease
- 98,000 Lung Diseases
- 38,000 Second Hand Smoke
- 970 House Fires
- 970 Infant Deaths
Chronic Bronchitis involves an inflammation of the bronchi (the large airway passages, or bronchioles, connecting each lung to the trachea), and excessive production of sputum (mucus). The inflammation makes it very difficult to get rid of sputum, and the airways become progressively blocked.

Emphysema

- Pathophysiology
- Hallmarks
- Classifications
- Manifestations
1. Healthy alveolus
2. Alveolus with emphysema
Medical Management of COPD

- Improve ventilation
- Remove bronchial secretions
- Promote Exercise
- Prevent complications
- Slow progression of manifestations
- Promote health maintenance and client management of disease
**Common Medications of COPD**
- β2 Agonist and Anticholinergics
- Steroids
- Methylxanthines (Rare)
- Mucolytics (Controversial)
- Diuretics
- Antiarrhythmics, Inotropics
- Antibiotics
- Alpha 1 Antitrypsin
- Antidepressants
- Anxiolytics

**Nursing Management of COPD**
- Health history
- Details regarding onset and duration of symptoms
- Complete physical assessment
- Vital Signs
- Specific Pulmonary Assessment
- Labs
**COPD Nursing Diagnosis**
- Impaired gas exchange
- Activity Intolerance
- Anxiety
- Ineffective Breathing Pattern
- Altered Nutrition: less than body requirements
- Knowledge deficit: self care
- Sleep pattern disturbance
- Ineffective individual or family coping
- Altered family process

**Surgical Management of COPD**
- Lung Transplant
- Lung Volume Reduction Surgery
- Bullectomy
Nursing Management of the Surgical Patient
- Frequent Assessments
- Good pulmonary hygiene
- Pain control
- Monitor oxygenation and ventilation after discharge (SaO2)
- Refer to pulmonary rehabilitation program

Considerations for Elderly Patients
- Coexisting health problems
- Decreased exercise tolerance
- Impaired nutrition
- Long standing smoking habits
- Increased risk of drug interactions

Tracheobronchitis
Bronchiectasis

- Extreme form of bronchitis
- Permanent, abnormal dilation and distortion of the bronchi and bronchioles
- Bronchial walls are weakened by chronic inflammatory changes
- Usually localized to one lobe or one lung segment

Bronchiectasis

More mucus can accumulate in pouches and crevices in the baggy, soft, bronchial tube walls. During coughs, the bronchial tube wall tends to collapse, trapping mucus inside, rather than acting as a rigid tube through which mucus can be expelled. This leads to more mucus accumulating in the bronchial tubes, producing a vicious cycle, where increasing amounts of infected mucus produce further damage and softening of the bronchial tube walls, leading to the accumulation of more mucus. The presence of soft, dilated bronchial tubes is called Bronchiectasis.
Atelectasis

- **Definition:** Collapse of lung tissue at any structural level. Develops when there are factors that interfere with lung expansion.

- **Etiology**
- **Manifestations**
- **Nursing Management**

**Goal** is to prevent occurrence with frequent position changes and early ambulation.

- Deep breathing and coughing enhance lung expansion
- May require oxygen, postural drainage, chest PT and tracheal suctioning

**Atelectasis**

![X-ray image of lungs]
Influenza

- Definition: Viral infection of the respiratory tract
- Etiology
- Manifestations
- Nursing Management
  - Prevention through vaccination
  - Administer anti-viral agents within 24 hours of onset of symptoms
  - Prevent spread of infection to others
  - Symptomatic treatment

Pneumonia

- Definition: Inflammatory process in lung parenchyma associated with increase in interstitial and alveolar fluid.
- Etiology
- Pathophysiology
Pneumonia Risk Factors

- Age
- History URI
- Smoking
- Malnutrition
- Dehydration
- Chronic Disease
- Tracheal Intubation
- Prolonged Immobility
- Immunosuppressive Therapy
- Non functioning immune system

Pneumonia Manifestations

- Fever and chills
- Pleuritic chest pain
- Cough, sputum and hemoptysis
- Dyspnea
- Headache
- Fatigue
- ** Elderly patients frequently present with altered LOC and dehydration **
- **Afebrile**

Pneumonia

- Assessment Findings
- Medical Management:
  - Depends on type of pneumonia
- Nursing Management
- Frequent respiratory assessments
- Monitor oxygen therapy and ABG's
- Additional pertinent information
- Evaluation
Pneumonia Nursing
Diagnosis
- Ineffective Airway Clearance
- Ineffective Breathing Pattern
- Activity Intolerance
- Fluid Volume Deficit
- Altered Nutrition
- Pain
- Altered Oral Mucous Membranes
- Knowledge Deficit

Pulmonary Tuberculosis
- Kills more people than any other infectious disease in the world
- Caused by mycobacterium tuberculosis
- Most commonly occurs in people who have repeated close contact with an infected person who has not been diagnosed

Pulmonary Tuberculosis
- Risk Factors
- Factors that influence development of active TB
Pulmonary Tuberculosis

- Pathophysiology
  - Primary Infection
  - Secondary Infection

Pulmonary TB Manifestations

- Manifestations
  - Often unrecognized because patients are relatively asymptomatic
  - Only signs may be + skin test and X-ray finding

Pulmonary TB Skin Testing

- TB skin testing
  - 0.1ml given intradermal in left forearm
  - Read in 48-72 hours
  - Note the presence of induration, not erythema
- Positive results are
  - >5mm in known or suspected HIV infection, IV drug users, those with close contact with known TB infection and those with X-rays suggestive of previous TB infection
  - >10mm for all other high risk groups (US)
  - >15mm for patients in low risk groups
Measuring a TB Skin Test

Induration created by the Mantoux Skin Test. The size of a positive test result depends on the exposure history and health status of the individual and a measure of the actual induration rather than the erythema produced.

Pulmonary TB Diagnosis

- If confirmed with Sputum culture for AFB
  - 3 separate specimens collected on 3 consecutive mornings
  - Smears are not extremely sensitive
  - Culture is definitive but may take 2-12 weeks
  - Respiratory isolation until culture results are known
- Other mycobacterial diseases will have a positive smear for AFB
Treatment of Pulmonary TB

- Rarely hospitalized
  - Only if acutely ill, living in a high risk situation, non-compliant with therapy, has a history of previous disease with non-compliance or highly resistant organisms
- Treatment is long term and should be started ASAP
- Patients usually receive 2-3 medications to ensure elimination of resistant organisms

CDC recommends a 2 phase approach

1st: intensive phase with 2-3 drugs aimed at destruction of large numbers of rapidly multiplying organisms, lasts about 2 months

2nd: maintenance phase of usually 2 drugs, lasts another 4+ months until cultures are clear

If no response in 1st phase, 2 additional agents will be added

Pulmonary TB Nursing Diagnosis

- Anxiety
- Ineffective airway clearance
- Impaired gas exchange
- Pain
- Altered nutrition: less than body requirements
- Ineffective individual and/or family coping
- Altered health maintenance
- Knowledge deficit
- Sleep pattern disturbance
Prevention of Transmission of Pulmonary TB

May prevent infection in those who are exposed and keep people with dormant TB from developing active TB

INH is used for preventive therapy for 6-12 months

Preventative Therapy for Pulmonary TB

- May prevent infection in those who are exposed and keep people with dormant TB from developing active TB
- INH is used for preventive therapy for 6-12 months

Self Care Pulmonary TB

- Teach patient about disease, its transmission and how to prevent it
- Teach patient regarding treatment
- Teach patient about need to continue therapy & keep follow-up appointments
- Teach regarding medication side effects and interactions
Evaluate Pulmonary TB

- Medication compliance
- Understanding of action of medications
- Side effects
- Future sputum specimens
- Follow up x-ray results
- Improvement or worsening of condition

Extrapulmonary Tuberculosis

- TB occurring outside lungs
- Highly aerobic sites such as renal cortex, growth plates and meninges
- Often difficult to detect with nondistinct findings, weight loss, fatigue, malaise, fever and night sweats may or may not be present
- Treatment may be longer and more medications may be required

SARS

- Severe acute respiratory syndrome
- Age 25-70
- Most victims were previously healthy
- Incubation 2-7 days
- Prodromal period of fever, sometimes associated with chills, rigors, headache, diarrhea, malaise and myalgia
- Occasionally, respiratory manifestations are noted
SARS
- After 3-7 days, lower respiratory phase begins
- Dry, nonproductive and dyspnea progressing to hypoxemia
- Fatality rate is about 3%
- Ranges from mild illness to death
- A few close contacts have become ill but most remain well
- Effective treatment regimen remains unknown
- With progressive illness, interstitial infiltrates and consolidation show on x-ray
- Leukopenia and thrombocytopenia

Malignant Neoplasms
- Malignancy of epithelium of respiratory tract
  - Most common types
    - Small cell (oat cell) carcinoma
    - Squamous cell carcinoma
    - Adenocarcinoma
    - Large cell carcinoma
    - Are many other types
Malignant Neoplasms

Risk Factors

Pathophysiology
- Small cell
- Non-small cell

Malignant Neoplasms

Manifestations
- Mimics other pulmonary conditions
- Specific findings vary with type of tumor, location and pre-existing pulmonary health
- Pulmonary symptoms
- Chest, shoulder, arm and back pain
- Hemoptysis
- Pericardial effusion or tamponade
- Cardiac dysrhythmias

Malignant Neoplasms

Warning signs
- Changes in respiratory status
- Persistent cough
- Blood streaked sputum or frank hemoptysis
- Rust colored or purulent sputum
- Weight loss
- Chest, shoulder, back or arm pain
- Unexplained dyspnea
- Recurrent episodes of pleural effusion, pneumonia or bronchitis
Malignant Neoplasms

- Diagnosis
- Bronchoscopy
- Sputum cytology
- CT
- MRI
- Biopsy confirms diagnosis
- Radio Nucleotide Scans

Malignant Neoplasms

Diagnostic staging
- Tumor-node-metastasis (TNM) scheme used (p1854)
- Uses size of tumor and degree of pulmonary involvement along with evaluation of metastasis to lymph nodes and distant metastasis to stage
- Example: T1-N0-M0

Malignant Neoplasms

- Metastasis
  - Spreads either by direct extension or metastasis
- Management
- Early detection
- Radiation
- Chemotherapy
- Surgery
Malignant Neoplasms

Surgical Procedures
- Laser surgery done for esophageal obstructions that are not resectable
- Pulmonary resection
- Lobectomy – removal of entire lobe of one lung
- Pneumonectomy – removal of entire lung

Surgical management (cont)
- Usually 2 chest tubes are placed following resectional surgery
- Upper tube anterior at 2nd intercostal space allows drainage of air from pleural space
- Lower tube posterior 8th intercostal or 9th midaxillary intercostal is usually larger to allow drainage of serosanguineous fluid

Nursing Management
- Diagnostic Phase
- Medical Treatment
- Preoperative
- Postoperative
Malignant Neoplasms

Postoperative nursing management
- When to clamp a chest tube
  - Usually contraindicated because it may precipitate a tension pneumothorax
  - Clamp in the following cases
    - Persistent air leak
    - Changing drainage system
    - Evaluating readiness for removal

Potential complications (p1858)
- Monitor for respiratory failure, tension pneumothorax, pulmonary embolism, pulmonary edema, thrombophlebitis, hypovolemia, infection, subcutaneous emphysema,
- Monitor IV flow rate
- Monitor cardiac rhythm
Nursing Diagnosis
- Ineffective airway clearance
- Pain
- Impaired physical mobility
- Risk for ineffective individual coping
- Deficient knowledge r/t self care after discharge

Occupational Lung Disease
- Caused by inhalation of dust, chemicals, and other particles present in the work environment
- Harmful effects depend on
  - Nature of exposure
  - Duration and intensity of exposure
  - Particle size and water solubility

Occupational Lung Disease
- Acute respiratory irritation results from exposure to chemicals like ammonia and chlorine in the form of gases, aerosols or particulate matter
- If irritants reach lower airway, alveolar damage and pulmonary edema may result
- Effects are usually short lived although may cause chronic damage
- Treatment is avoidance and respiratory support
People with cystic fibrosis have between 2 and 5 times the normal amount of salt in their sweat. Thus, doctors can use a sweat test to measure the amount of salt (sodium chloride) in a person's sweat. Sweat is collected from the person's arm or leg and taken to a laboratory to be analyzed.

In newborns, doctors can measure the amount of a protein called trypsinogen in the blood. The level of this protein is higher than normal in people with cystic fibrosis.

Finally, genetic tests can identify a faulty CFTR gene using a sample of the patient's blood.
Cystic Fibrosis

**Manifestations**
- Earliest signs are cough that is intermittent, becomes daily and is worse at night in early morning
- Cough becomes productive, then paroxysmal and is associated with gagging and emesis
- Sputum is tenacious, purulent and often green

**Management**
- Clear secretions
  - Ensure hydration
  - Mucolytic and bronchodilator aerosols
  - Teach effective coughing techniques
  - Postural drainage and percussion at least BID
- Enhance aeration
  - Effective cough to clear airways
  - High Fowler's position
  - Oxygen is hypoxia is present
  - Exercise to improve pulmonary function

Lung Transplant

- Done for end stage lung disease
- Involves replacement of one or both lungs
- Widely accepted treatment for many lung diseases
- Preoperative Care
- Postoperative Care
Lung Transplant

- Signs of rejection: dyspnea, development of infiltrates on x-ray, need for ventilatory support, fatigue
- Patient may experience alterations in self concept related to
  - Changes in appearance due to side effects of medication for rejection (steroids and immunosuppressants)
  - Lifestyle
  - Work ability

Lung Transplant

- Self care
  - Teach about meds
  - Stress need for daily medication despite lack of manifestations
  - Teach to report fever, cough, dyspnea, sputum, pain, reduced exercise tolerance, weight gain or fatigue

Sarcoidosis

- Etiology
- Pathophysiology
- Manifestations
- Management
Pleural Pain
- Indicates presence of inflammation
- Often accompanied by pleural friction rub
- Often develops abruptly and is severe enough for the patient to seek medical care
- Usually unilateral and worsened by breathing or coughing
- May restrict normal respiratory efforts and lead to problems with gas exchange
- Analgesics
- Intercostal nerve block

Pleural Pain
- Accumulation of fluid in pleural space
- Manifestations depend on amount of fluid present and the severity of lung compression
- 250 mL or less may only be seen on x-ray
- Large effusions may restrict lung expansion leading to dyspnea esp. on exertion, and a dry non-productive cough

Pleural Effusion
Thoracentesis

Fluid is removed from the pleural cavity with a needle.

Pleural Pain

- Thoracentesis is used to remove excess fluid
- Fluid is analyzed to help determine cause of effusion
- After thoracentesis, a closed chest drainage unit to suction is used to re-expand the lung

Avian (Bird) Influenza

- Pandemic is a global disease outbreak. A flu pandemic occurs when a new influenza virus emerges for which people have little or no immunity, and for which there is no vaccine. The disease spreads easily person-to-person, causes serious illness, and can sweep across the country and around the world in very short time.
  - It is especially virulent
  - It is being spread by migratory birds
  - It can be transmitted from birds to mammals and in some limited circumstances to humans, and
  - Like other influenza viruses, it continues to evolve.
Avian Influenza

- Symptoms in humans have ranged from:
  - typical human influenza-like symptoms (e.g., fever, cough, sore throat, and muscle aches)
  - eye infections
  - Pneumonia
  - severe respiratory diseases (such as acute respiratory distress)
  - and other severe and life-threatening complications.

Pulmonary Embolus

- Definition
- Etiology
  - Pathophysiology
  - Clinical Manifestations
  - Diagnosis
Pulmonary Embolus

- Medical Management
  - Stabilizing Cardiopulmonary System
  - Anticoagulant Therapy
  - Fibronolytic Therapy
  - Surgical Management

Nursing Management for PE

- Monitor Frequently
- Monitor ABG’s and Pulse Ox
- Monitor for Right-sided Heart Failure
- Elevate HOB
- Oxygen
- Carefully elevate legs
- Analgesia (Morphine)
- Carefully monitor for excess anticoagulation
Pneumothorax

- Presence of air in the pleural space that prohibits lung expansion.
- Open
- Closed
- Spontaneous
- Traumatic