

Chest & Lower Respiratory Tract Disorders

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Atelectasis

- ❖ Closure or collapse of alveoli
- ❖ Acute or chronic
- ❖ Most common is acute atelectasis, which occurs in the postoperative setting
- ❖ Symptoms: insidious, increasing dyspnea, cough, and sputum production
- ❖ Acute: tachycardia, tachypnea, pleural pain, and central cyanosis if large areas of the lung are affected
- ❖ Chronic: similar to acute, pulmonary infection may be present

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Assessment and Diagnosis for Atelectasis

- ❖ Characterized by increased work of breathing and hypoxemia
- ❖ Decreased breath sounds and crackles over the affected area
- ❖ Chest x-ray may suggest a diagnosis of atelectasis before clinical symptoms appear
- ❖ Pulse oximetry (SpO₂) may demonstrate a low saturation of hemoglobin with oxygen (less than 90%)

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Nursing Interventions for Atelectasis

❖ Prevention

- Frequent turning
- Early mobilization
- Strategies to expand lungs and manage secretions
- Incentive spirometer
- Voluntary deep breathing
- Secretion management
- Pressurized metered-dose inhaler

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Management of Atelectasis

❖ Improve ventilation and remove secretions

❖ First-line measures:

- Frequent turning, early ambulation, lung volume expansion maneuvers and coughing

❖ Multidisciplinary: ICOUGH (see Chart 19-3)

❖ PEEP, CPAP, bronchoscopy

❖ CPT

❖ Endotracheal intubation and mechanical ventilation

❖ Thoracentesis to relieve compression

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Acute Tracheobronchitis

❖ Inflammation of the mucous membranes of the trachea usually after a viral infection

❖ Pathophysiology

- Mucopurulent sputum

❖ Clinical manifestations

- Initially dry cough with mucoid sputum
- As progresses, dyspnea, stridor, wheezes, purulent sputum

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Tracheobronchitis

- Treatment/Management
 - Antibiotics, analgesics
 - ↑ fluids intake, rest
 - Suctioning & bronchoscopy
 - Bronchial hygiene
 - Cool vapor therapy/ steam inhalations
 - Moist heat to chest

Pneumonia

- Inflammation of lung parenchyma
- Bacteria, mycobacteria, fungi, viruses
- Classifications
 - Community-Acquired pneumonia (CAP)
 - Health care associated pneumonia
 - Hospital Acquired pneumonia
 - Ventilator associated pneumonia
 - Pneumonia in immunocompromised host
 - Aspiration pneumonia
- Risk factors
 - Heart failure, DM, ETOH, COPD, HIV/AIDS
 - immunocompromised

Types of Pneumonia #1

- ❖ Community-acquired
 - Community setting or within first 48 hours post hospitalization
 - Rate of infection increases with age
 - *S. Pneumoniae* is the most common cause among adults
 - Viral origin in infants and children
- ❖ Health care-associated
 - Often caused by multidrug-resistant organisms
 - Early diagnosis and treatment are critical

Types of Pneumonia #2

❖ Hospital-acquired

- Develops 48 hours or more after hospitalization
- Subtype of health care-associated pneumonia
- Potential for infection from many sources
- High mortality rate
- Colonization by multiple organisms due to overuse of antimicrobial agents
- Pleural effusion, high fever, and tachycardia
- Common with debilitated, dehydrated patients with minimal sputum production

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Types of Pneumonia #3

❖ Ventilator-associated

- Received mechanical ventilation for at least 48 hours
- Prevention is key
- VAP bundles (Chart 19-6)

❖ Pneumonia in the immunocompromised host

- Common agents include pneumocystis, fungi, and tuberculosis
- Receiving immunosuppressive agents, history of immunosuppressive condition
- Subtle onset with progressive dyspnea, fever, and nonproductive cough

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Clinical Manifestations of Pneumonia

- Depend of type and organism
- Respiratory tract infection, headache, low-grade fever, pleuritic pain, myalgia, rash, and pharyngitis
- Orthopnea, crackles, increased tactile fremitus, purulent sputum
- Bacterial
 - Sudden onset of chills, fever, pleuritic chest pain, tachypnea, and respiratory distress
- Viral
 - bradycardia

Management of Pneumonia

- Diagnostic Tests
 - CXR, blood cultures, sputum cultures, bronchoscopy
- Prevention
 - Pneumococcal vaccine
 - Education

Treatment of Pneumonia

- Treatment

– Airway management – Oxygen with humidification, pulse ox – Antibiotics within 4 hrs – Antipyretics, antitussives, decongestants, antihistamines – Hydration- increase fluids (PO/IV) rest	– CPT – Cough techniques – Position changes – Nutrition – Rest – Activity as tolerated
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Complications of Pneumonia

- Sepsis/ septic shock
- Respiratory failure
- Atelectasis
- Pleural effusion
- Delirium

Planning and Goals for the Patient with Bacterial Pneumonia

- ❖ Improved airway patency
- ❖ Increased activity
- ❖ Maintenance of proper fluid volume
- ❖ Maintenance of adequate nutrition
- ❖ Understanding of the treatment protocol and preventive measures
- ❖ Absence of complications
- ❖ Based on patient outcomes plan for home, community, and transitional care

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Aspiration

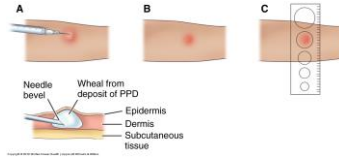
- Inhalation of foreign material into the lungs
- Risk Factors
- S/S
 - Tachycardia, dyspnea, cyanosis, HTN, ↓ bp, death
- Prevention
 - Swallowing screening
 - Keep HOB elevated and endotracheal cuff elevated (if intubated)
 - Avoid stimulation of gag reflex with suctioning or other procedures
 - Check for placement before tube feedings
 - Soft diet, small bites, no straws

Tuberculosis

- Mycobacterium tuberculosis
- airborne transmission
 - Lungs, kidneys, bones, and cerebral cortex
 - Granulomas and ghon tubercule
- Risk Factors
- Associated factors
- S/S
 - Weight loss, fever, night sweat, cough, hemoptysis, fatigue
- Dx
 - CXR

Tuberculosis

- Con't of Dx
 - Mantoux- tuberculin/ PPD skin test



- Quantiferon- TB Gold test (QFT-G)
- Sputum culture
- Sputum testing

Tuberculosis

- Bacille Calmette- Guerin (BCG) vaccine
- Treatment
 - Initial phase- 4 or more meds daily x 8 weeks
 - Continuation phase- 4 -7 months (INH & rifampin or INH & rifapentine)
 - Prophylactic treatment

Tuberculosis

- Concerns
 - Airway
 - Transmission
 - Adherence to treatment
 - Adequate nutrition

Lung Abscess

- Necrosis of lung parenchyma
- Etiology
 - S. aureus, klebsiella
- S/S
 - ↓ / absent BS, pleural friction rub, crackles, mild vary from productive cough to acute illness, foul sputum, leukocytosis, pleurisy, dyspnea, weakness, anorexia, weight loss

Assessment and Diagnostic Findings for Lung Abscess

- ❖ Pleural friction rub
- ❖ Crackles
- ❖ Chest x-ray
- ❖ Sputum culture
- ❖ Bronchoscopy
- ❖ CT of the chest

Medical Management of Lung Abscess

- ❖ Prevention
- ❖ Adequate drainage of the lung
- ❖ Chest physiotherapy
- ❖ Diet high in protein and calories
- ❖ Antimicrobial therapy
- ❖ Pulmonary resection (rare)

Nursing Management of Lung Abscess

- ❖ Administer IV antibiotics
- ❖ CPT
- ❖ Educate patient to perform deep breathing and coughing exercises
- ❖ Encourage diet high in protein and calories
- ❖ Emotional support
- ❖ Promote home, community-based, and transitional care

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Sarcoidosis

- Etiology- unknown
 - Interstitial lung disease that is inflammatory, multisystem, granulomatous
- 20- 40 years of age, more common in African American women
- Hypersensitivity
 - bacteria, fungi, viruses, chemicals → granuloma and fibrosis
- Multisystem
- S/S
 - dyspnea, cough, hemoptysis, congestion, anorexia, fatigue, and weight loss

Assessment and Diagnostic Findings for Sarcoidosis

- ❖ Chest x-ray and CT scans
- ❖ Mediastinoscopy or transbronchial biopsy
- ❖ Pulmonary function test
- ❖ Arterial blood gases
- ❖ Need biopsy for definitive diagnosis

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Management of Sarcoidosis

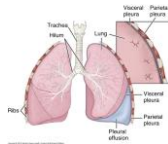
- ❖ Medical management
 - Corticosteroids
 - May have spontaneous remission without treatment
 - Immune modulator
- ❖ Nursing management
 - Support all medical treatments
 - Patient education for medication and when to notify the primary provider
 - Chronic illness management
 - Contact Foundation for Sarcoidosis Research for community resources

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Pleural Effusion

- Fluid in pleural space
- Secondary process
 - HF, TB, pneumonia, pulmonary infections, nephrotic syndrome, connective tissue dz, PE, tumors
- S/S
 - Fever, chills, pleuritic pain, dyspnea (large effusion)
 - Decreased or absent breath sounds; decreased fremitus; and a dull, flat sound on percussion
- Dx
 - CXR, chest CT, thoracentesis
- Treatment/ Nursing Care



Empyema

- Accumulation of purulent fluid
- Etiology
- S/S
 - Acutely ill, fever, night sweats, pleural pain, cough, dyspnea, ↓ or absent BS, ↓ fremitus, anorexia, weight loss
- Dx
 - Chest CT, thoracentesis
- Treatment/ Nursing Care
 - Drain fluid
 - Antibiotic 4-6 weeks
 - Tube thoracostomy
 - Open chest drainage- possible Rib resection

Pulmonary Edema

- Fluid accumulation
- Etiology/pathophysiology
- S/S
 - Dyspnea, cyanosis, anxious, agitated, frothy sputum- blood tinge/pink, tachycardia, ↓ O2 sat, hypoxia
- Dx
 - CXR
- Treatment/ Nursing Care
 - Meds: vasodilators, inotropic agents, diuretic,
 - Fluid restriction
 - Oxygen
 - Possible intubation

Acute Respiratory Failure

- Sudden, life threatening impairment in ventilation & perfusion
- hypoxemia, hypercapnia, and respiratory acidosis
 - ↓ PaO₂ < 50 mmHg, ↑ PaCO₂ > 50 mmHg & arterial pH < 7.35
- S/S
 - Early signs: restlessness, tachycardia, hypertension, fatigue, headache
 - Later signs: confusion, lethargy, central cyanosis, diaphoresis, respiratory arrest
 - dyspnea, air hunger, tachycardia, ↑ bp → confusion, lethargy, tachycardia, tachypnea, central cyanosis, diaphoresis → resp arrest
- Dx
 - ABG, CXR

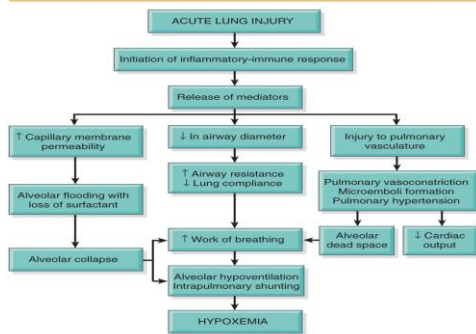
Medical and Nursing Management of ARF

- ❖ Identification and treatment of underlying cause
- ❖ Intubation, mechanical ventilation
- ❖ Nutritional support, enteral feedings preferred
- ❖ Reduce anxiety
- ❖ Provide patient a form of communication
- ❖ Prevent complications (turning, ROM, mouth care, skin care)

Acute Respiratory Distress Syndrome (ARDS)

- Sudden, progressive pulmonary edema, hypoxemia (unresponsive to O₂) and absence of ↑ left arterial pressure
- Etiology- lung injury
- Death- multi-system organ failure
- Dx
 - BNP (brain natriuretic peptide), ECG
 - Pulmonary artery catheterization
- Treatment
 - Ventilator- PEEP
 - Supportive management

Physiology Pathophysiology



ARDS Medical Management

- ❖ Identification and treatment of underlying cause
- ❖ Intubation, mechanical ventilation with PEEP to keep alveoli open
- ❖ Hypovolemia treated
- ❖ Prone positioning is best for oxygenation, frequent repositioning to safeguard integumentary system
- ❖ Nutritional support, enteral feedings preferred
- ❖ Reduce anxiety

Pulmonary Hypertension

- Right ventricular enlargement
- Etiology
 - Lung condition causing hypoxemia
- S/S
- Treatment/ Nursing Care
 - O₂
 - Pulse ox, ECG
 - Chest PT and bronchial hygiene
 - Bronchodilators
 - Bedrest, ↓ Na, diuretics, digoxin,

Pulmonary Embolism

- Occlusion of pulmonary artery- thrombus (i)
- Etiology
- S/S
 - dyspnea
- Dx
- Prevention
 - Leg exercises, SCD's, prophylaxis anticoagulant
- Treatment/ Nursing Care
 - Improve respiratory and vascular status
 - Anticoagulation and thrombolytic therapy
 - Surgery

Pneumoconioses

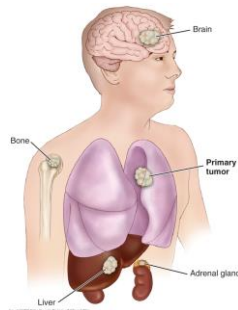
- Occupational
 - Asbestosis
 - Silicosis
 - Coal worker's pneumoconiosis
"Black Lung Disease"
- Prevention
- Not treatable

Lung Cancer

- Risk Factors
 - Tobacco- pack years
 - Secondhand smoke
 - Environmental/ occupational exposure
 - Genetics

Lung Cancer

- Classifications
 - Small cell lung cancer
 - Non-small cell lung cancer
 - Squamous cell carcinoma
 - Large cell carcinoma
 - Adenocarcinoma
 - Lung carcinoid tumor
- Staging
 - I
 - II
 - III
 - IV



Lung Cancer

- S/S
- Dx- CXR, CT, bronchoscopy, biopsy, fine needle aspiration, MRI, PET scan, PFT's, ABG's
- Treatment/ Nursing Care
 - Surgery
 - Radiation'
 - Chemotherapy
 - Palliative care
 - Manage symptoms
 - Airway & breathing

Chest Trauma

- ❖ Blunt trauma
- ❖ Sternal, rib fractures
- ❖ Flail chest
- ❖ Pulmonary contusion
- ❖ Penetrating trauma
- ❖ Pneumothorax
 - Spontaneous or simple
 - Traumatic
 - Tension pneumothorax

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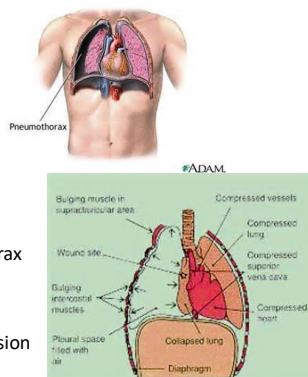
Blunt Chest Trauma

- Etiology
- Complications
- Dx
- Sternal & Rib fractures
- Flail chest
- Pulmonary contusion



Pneumothorax

- Simple
- Traumatic
- Tension
- S/S
 - Sudden chest pain
 - Size of pneumothorax
- Dx
- Treatment
 - Needle decompression
 - Chest tube



Other

- Cardiac Tamponade
- Subcutaneous Emphysema

Novel Coronavirus (Covid-19)/ SARS-CoV-2 Infection

- Epidemiology
- March 20th 2020
 - United States
 - Total cases: 15,219
 - Total deaths: 201
- Global
 - Week of March 30, 2021
 - 3.8 million new cases
 - 64,000 new deaths
- [Coronavirus Disease \(COVID-19\) Situation Reports \(who.int\)](#)
- [CDC COVID Data Tracker](#)

CDC, WHO

COVID-19 Considerations

- ❖ SARS-CoV-2
- ❖ Asymptomatic to severe viral pneumonia
- ❖ Fatigue, myalgia, congestion, sore throat, diarrhea, anosmia, and ageusia
- ❖ Mostly conservative outpatient management (rest, hydrate, antipyretic agents)
- ❖ Hospitalization for severe illness with pneumonia, increased risk of venous thromboembolism
- ❖ Can lead to shock and respiratory failure

Novel Coronavirus (Covid-19)/ SARS-CoV-2 Infection

- Clinical Presentation

- PUI

- Risk Assessment

- Travel history
 - Contact with known + COVID-19



- Diagnostic Testing

- Prevention

- Hand hygiene, face mask
 - Vaccine

Clinical Spectrum

- Asymptomatic

- Mild illness

- Moderate illness

- SpO₂ >94%

- Severe illness

- SpO₂ <94%, RR >30

- Critical illness

- Respiratory failure, septic shock, and or MODS

Treatment/ Care COVID

- Infection control measures

- Isolate
 - PPE

- Oxygenate/ ventilate

- Hemodynamics

- Crystalloids, vasopressor (levo), dopamine only if renal protection, dobutamine if cardiac dysfunction with vasopressor, corticosteroid therapy

- Acute kidney injury

- Sepsis

- Extracorporeal Membrane oxygenation- no evidence

Con't Treatment/Care

- Antiviral
 - Remdesivir
- Antithrombotic therapy
- Convalescent plasma
 - Donor plasma from recovered COVID-19 infection
- Monoclonal antibodies
- Supplements
