Chapter 31

Drugs Used to Treat Lower Respiratory Disease

Learning Objectives

Describe the physiology of respirations

Compare the physiologic responses of the respiratory system to emphysema, chronic bronchitis, and asthma

Identify components of blood gases

Distinguish the mechanisms of action of expectorants, antitussives, and mucolytic agents

Lower Respiratory Tract Anatomy and Physiology

Larynx

Trachea

Bronchus

Arterioles

Bronchiole

Alveolus

The Respiratory Tract and the Alveoli

Common Lower Respiratory Diseases

Chronic obstructive pulmonary disease (COPD)

Chronic airflow limitation disease (CALD)

Asthma

Chronic bronchitis
• Emphysema
• Drug Therapy for Lower Respiratory Diseases
• Expectorants
• Antitussives
• Mucolytic agents
• Antiinflammatory agents
• Immunomodulators

• Learning Objectives
• Cite nursing assessments used to evaluate the respiratory status of a patient
• Review the procedures for administration of medication by inhalation
• Implement patient education for patients receiving drug therapy for lower respiratory disease

• Learning Objectives (cont’d)
• State the nursing assessments needed to monitor therapeutic response and the development of side effects to expect or report from expectorant, antitussive, and mucolytic therapy

• Nursing Process for Lower Respiratory Disease
• Assessment
  ■ History, description, medications, description of current symptoms, respiratory assessment, inspection, palpation
• Planning
Medications, hydration, respiratory and cardiovascular assessment, laboratory/diagnostic studies

• Implementation

• Patient Education and Health Promotion

• Understand how to use peak flowmeter

• Avoid irritants

• Adjust physical activity

• Adjust nutritional patterns

• Prevent infections

• Increase fluid intake

• Expectorants: Guaifenesin

• Actions: enhances output of respiratory tract fluid

• Uses: relieves dry, nonproductive cough
  ■ Removes mucous plugs from respiratory tract

• Therapeutic outcomes: reduced frequency of nonproductive cough

• Nursing process for guaifenesin
  ■ Premedication assessment: record cough characteristics
  ■ Planning: availability
  ■ Implementation: tablets and liquids
  ■ Evaluation: side effects and drug interactions

• Expectorants

• Potassium iodide
- Actions: increases bronchial gland secretions
- Uses: treats chronic pulmonary diseases
- Therapeutic outcomes: reduces mucus viscosity

- Nursing process for potassium iodide
  - Premedication assessment: record cough characteristics, note pregnancy
  - Planning: availability
  - Implementation: liquid
  - Evaluation: expected side effects

- Expectorants: Saline Solutions

- Actions
  - Hydrates mucus, reduces viscosity

- Uses
  - Effective expectorants when administered by nebulization

- Therapeutic outcomes
  - Moisturized mucous membranes

- Antitussive Agents

- Actions: suppress cough center in brain

- Uses: suppress disruptive spasms

- Therapeutic outcomes: reduce coughs

- Nursing process for antitussive agents
  - Premedication assessment: record characteristics of cough
  - Planning: availability
  - Implementation: capsules, tablets, syrup, liquid
  - Evaluation: side effects, drug interactions
• Mucolytic Agents: Acetylcysteine

• Actions: dissolves chemical bonds in mucus

• Uses: dissolves abnormally viscous mucus
  ▪ In chronic emphysema, emphysema with bronchitis, asthmatic bronchitis, pneumonia

• Therapeutic outcomes: improved airway flow

• Nursing process for acetylcysteine therapy
  ▪ Premedication assessment: record baseline vital signs
  ▪ Planning: availability
  ▪ Implementation
  ▪ Evaluation: side effects, drug interactions

• Beta Adrenergic Bronchodilators

• Actions: stimulate beta receptors within smooth muscle of tracheobronchial tree

• Uses: reverse airway constriction
  ▪ Mainstay of all asthma therapy

• Therapeutic outcomes: easier breathing

• Nursing process for beta adrenergic bronchodilators
  ▪ Premedication assessment
  ▪ Planning: availability
  ▪ Implementation
  ▪ Evaluation: side effects

• Anticholinergic Bronchodilating Agents: Ipratropium Bromide

• Actions: produces bronchodilation by competitive inhibition of cholinergic receptors on bronchial smooth muscle
• Uses: long-term treatment of reversible bronchospasm associated with COPD

• Therapeutic outcomes: easier breathing

• Nursing process for sympathomimetic bronchodilators
  - Premedication assessment
  - Planning: availability
  - Implementation
  - Evaluation: side effects

• Anticholinergic Bronchodilating Agents: Tiotropium Bromide

• Administered by aerosol inhalation

• Produces bronchodilation by competitive inhibition of cholinergic receptors on bronchial smooth muscle

• Longer in duration of action than ipratropium

• Used once daily for long-term treatment of reversible bronchospasm associated with COPD, including bronchitis and emphysema

• Xanthine-Derivative Bronchodilating Agents

• Actions: act on tracheobronchial tree to dilate bronchi

• Uses: reverse airway constriction

• Therapeutic outcomes: easier breathing

• Nursing process for xanthine-derivative bronchodilating agents
  - Premedication assessment: obtain, record baseline vital signs
  - Planning: availability
  - Implementation
  - Evaluation: side effects, drug interactions
Respiratory Antiinflammatory Agents: Corticosteroids

- Actions: treat obstructive lung disease
- Uses: given to patients unresponsive to sympathomimetic agents or xanthine derivatives
- Therapeutic outcomes: easier breathing with less effort

Nursing process for corticosteroids
- Premedication assessment: inspect oral cavity for infection
- Planning: availability
- Implementation
- Evaluation: side effects

Antileukotriene Agents: Montelukast-Singulair

- Actions: selective and competitive receptor antagonist of cysteinyl leukotriene receptor
- Uses: with other medications to treat asthma
- Therapeutic outcomes: reduces acute asthma

Nursing process for montelukast
- Premedication assessment: obtain, record baseline vital signs
- Planning: availability
- Implementation: tablets
- Evaluation: side effects

Antileukotriene Agents: Zafirlukast-Accolate

- Actions: selective and competitive receptor antagonist of the cysteinyl leukotriene receptor
- Uses: with other medications for asthma
- Therapeutic outcomes: fewer episodes of acute asthmatic symptoms
• Nursing process for zafirlukast
  ▪ Premedication assessment
  ▪ Planning: availability
  ▪ Implementation
  ▪ Evaluation: side effects

• Immunomodulators: Omalizumab
  ▪ Actions: inhibits chemicals that can lead to asthma
  ▪ Uses: patients at least 12 years with asthma with a positive skin test to airborne allergens
  ▪ Therapeutic outcomes: reduced frequency of acute asthmatic exacerbations

• Nursing process for omalizumab
  ▪ Premedication assessment: determine allergy history
  ▪ Planning: availability
  ▪ Implementation: dissolve powder for subcutaneous injection
  ▪ Evaluation: side effects

• Miscellaneous Antiinflammatory Agents: Cromolyn Sodium-Intal
  ▪ Actions: inhibits release of histamines and other mediators of inflammation
  ▪ Uses: treats patients with severe bronchial asthma or allergic rhinitis
  ▪ Therapeutic outcomes: reduced asthmatic attacks

• Nursing process for cromolyn sodium
  ▪ Premedication assessment
  ▪ Planning: availability
  ▪ Implementation
  ▪ Evaluation: side effects
• Miscellaneous Antiinflammatory Agents: Nedocromil Sodium-Tilade

• Actions: prevents release of histamines and other mediators that cause inflammation

• Uses: treats patients with bronchial asthma

• Therapeutic outcomes: fewer episodes of acute asthmatic symptoms

• Nursing process for nedocromil sodium
  - Premedication assessment
  - Planning: availability
  - Implementation
  - Evaluation: side effects