## Focus on Asthma

(Relates to Chapter 29, “Nursing Management: Obstructive Pulmonary Diseases,” in the textbook)

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**Asthma - Definition**

- Chronic inflammatory disorder of airways
- Causes airway hyperresponsiveness leading to wheezing, breathlessness, chest tightness, and cough

**Significance**

- Affects about 16 million Americans
- Women are 66% more likely to have asthma than men.
- Older adults may be undiagnosed.
### Triggers of Asthma

#### Allergens
- May be seasonal or year round depending on exposure to allergen
- House dust mites
- Cockroaches
- Furry animals
- Fungi
- Molds

#### Exercise
- Induced or exacerbated after exercise
- Pronounced with exposure to cold air
- Breathing through a scarf or mask may ↓ likelihood of symptoms

#### Air Pollutants
- Can trigger asthma attacks
  - Cigarette or wood smoke
  - Vehicle exhaust
  - Elevated ozone levels
  - Sulfur dioxide
Triggers of Asthma

Occupational Factors
- Most common form of occupational lung disease
- Exposure to diverse agents
- Arrive at work well, but experience a gradual decline

Respiratory Infection
- Major precipitating factor of an acute asthma attack
- ↑ inflammation hyperresponsiveness of the tracheobronchial system

Nose and Sinus Problems
- Allergic rhinitis and nasal polyps
- Large polyps are removed
- Sinus problems are usually related to inflammation of the mucous membranes
Triggers of Asthma

Drugs and Food Additives

- Asthma triad: Nasal polyps, asthma, and sensitivity to aspirin and NSAIDs
- Wheezing develops in about 2 hours.
- Sensitivity to salicylates
  - Found in many foods, beverages, and flavorings
- β-Adrenergic blockers

Triggers of Asthma

Drugs and Food Additives

- Food allergies may cause asthma symptoms.
  - Rare in adults
  - Avoidance diets

Triggers of Asthma

Gastroesophageal Reflux Disease

- Exact mechanism is unknown.
  - Reflux of acid could be aspirated into lungs, causing bronchoconstriction.

Triggers of Asthma
Emotional Stress

- Psychologic factors can worsen the disease process.
- Attacks can trigger panic and anxiety.
- Extent of effect is unknown.

Pathophysiology

- Primary response is chronic inflammation from exposure to allergens or irritants.
- Leading to airway hyperresponsiveness and acute airflow limitations.
**Pathophysiology**

- Inflammatory mediators cause early-phase response.
- Vascular congestion
- Edema formation
- Production of thick, tenacious mucus
- Bronchial muscle spasm
- Thickening of airway walls
Pathophysiology

• Late-phase response
  • Occurs within 4 to 10 hours after initial attack
  • Occurs in only 30% to 50% of patients
  • Can be more severe than early phase and can last for 24 hours or longer

Pathophysiology

• Late-phase response
  • If airway inflammation is not treated or does not resolve, it may lead to irreversible lung damage.

Clinical Manifestations

• Unpredictable and variable
  • Recurrent episodes of wheezing, breathlessness, cough, and tight chest
  • May be abrupt or gradual
  • Lasts minutes to hours
<table>
<thead>
<tr>
<th>Clinical Manifestations</th>
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</thead>
<tbody>
<tr>
<td>• Expiration may be prolonged.</td>
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<tr>
<td>• Inspiration-expiration ratio of 1:2 to 1:3 or 1:4</td>
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<tr>
<td>• Bronchospasm, edema, and mucus in bronchioles narrow the airways.</td>
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<tr>
<td>• Air takes longer to move out.</td>
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<td>• Wheezing is unreliable to gauge severity.</td>
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<td>• Severe attacks may have no audible wheezing.</td>
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<tr>
<td>• Usually begins upon exhalation</td>
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<td>• Cough variant asthma</td>
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<td>• Cough is only symptom.</td>
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<tr>
<td>• Bronchospasm is not severe enough to cause airflow obstruction.</td>
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Clinical Manifestations

• Difficulty with air movement can create a feeling of suffocation.
• Patient may feel increasingly anxious.

Clinical Manifestations

• An acute attack usually reveals signs of hypoxemia.
  • Restlessness
  • ↑ anxiety
  • Inappropriate behavior

Clinical Manifestations

• More signs of hypoxemia
  • ↑ pulse and blood pressure
  • Pulsus paradoxus (drop in systolic BP during inspiratory cycle >10 mm Hg)
Classification of Asthma
- Mild intermittent
- Mild persistent
- Moderate persistent
- Severe persistent

Complications
- Severe acute attack
  - Respiratory rate >30/min
  - Pulse >120/min
  - PEFR is 40% at best.
  - Usually seen in ED or hospitalized

Complications
- Life-threatening asthma
  - Too dyspneic to speak
  - Perspiring profusely
  - Drowsy/confused
  - Require hospital care and often admitted to ICU
Diagnostic Studies
• Detailed history and physical exam
• Pulmonary function tests
• Peak flow monitoring
• Chest x-ray
• ABGs

Diagnostic Studies
• Oximetry
• Allergy testing
• Blood levels of eosinophils
• Sputum culture and sensitivity

Collaborative Care
• Education
  • Start at time of diagnosis.
  • Integrate through care.
• Self-management
  • Tailored to needs of patient
  • Culturally sensitive
Collaborative Care

- Desired therapeutic outcomes
  - Control or eliminate symptoms
  - Attain normal lung function
  - Restore normal activities
  - Reduce or eliminate exacerbations and side effects of medications
Collaborative Care

- Mild intermittent and mild persistent asthma
  - Avoid triggers of acute attacks.
  - Premedicate before exercising.
  - Choice of drug therapy depends on symptom severity.

Collaborative Care

- Acute asthma episode
  - Respiratory distress
  - Treatment depends upon severity and response to therapy.
  - Severity measured with flow rates

- O₂ therapy may be started and monitored with pulse oximetry or ABGs in severe cases.
Collaborative Care

- Severe exacerbations
  - Most therapeutic measures are the same as for acute episode.
  - ↑ in frequency and dose of bronchodilators

- IV corticosteroids are administered every 4 to 6 hours, then are given orally.
- Continuous monitoring of patient is critical.
- IV magnesium sulfate is given as a bronchodilator.
- Supplemental O₂ is given by mask or nasal cannula for 90% O₂ saturation.
- Arterial catheter may be used to facilitate frequent ABG monitoring.
- IV fluids are given because of insensible loss of fluids.
The nurse anticipates intubation and mechanical ventilation for the patient with a severe exacerbation of asthma (status asthmaticus) when:

1. The PaCO\(_2\) is 60 mm Hg.
2. The PaO\(_2\) decreases to 70 mm Hg.
3. Severe respiratory muscle fatigue occurs.
4. The patient has extreme anxiety and fear of suffocation.

**Drug Therapy**

- Long-term control medications
  - Achieve and maintain control of persistent asthma
- Quick-relief medications
  - Treat symptoms of exacerbations

**Audience Response Question**

The nurse anticipates intubation and mechanical ventilation for the patient with a severe exacerbation of asthma (status asthmaticus) when:

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Drug Therapy

- Three types of antiinflammatory drugs
  - Corticosteroids
  - Leukotriene modifiers
  - Monoclonal antibody to IgE

- Corticosteroids (e.g., beclomethasone, budesonide)
  - Suppress inflammatory response
  - Inhaled form is used in long-term control.
  - Systemic form to control exacerbations and manage persistent asthma

- Corticosteroids
  - Reduce bronchial hyperresponsiveness
  - Decrease mucous production
  - Are taken on a fixed schedule
**Drug Therapy**

- **Corticosteroids**
  - Oropharyngeal candidiasis, hoarseness, and a dry cough are local side effects of inhaled drug.
  - Can be reduced using a spacer or by gargling after each use

**Spacer**

Fig. 29-6. Example of an AeroChamber spacer used with a metered-dose inhaler.

**Drug Therapy**

- Leukotriene modifiers or inhibitors (e.g., zafirlukast, montelukast, zileuton)
  - Block action of leukotrienes—potent bronchoconstrictors
**Drug Therapy**

- **Leukotriene modifiers or inhibitors**
  - Have both bronchodilator and antiinflammatory effects
  - Not indicated for acute attacks
  - Used for prophylactic and maintenance therapy

**Drug Therapy**

- **Anti-IgE (e.g., Xolair)**
  - ↓ circulating free IgE levels
  - Prevents IgE from attaching to mast cells, preventing release of chemical mediators
  - Subcutaneous administration every 2 to 4 weeks

**Drug Therapy**

- **Three types of bronchodilators**
  - β₂-Adrenergic agonists
  - Methylxanthines
  - Anticholinergics
**Drug Therapy**

- β-Adrenergic agonists (e.g., albuterol, metaproterenol)
  - Effective for relieving acute bronchospasm
  - Onset of action in minutes and duration of 4 to 8 hours

**Drug Therapy**

- Prevent release of inflammatory mediators from mast cells
  - Not for long-term use

**Drug Therapy**

- Methylxanthines (e.g., theophylline)
  - Less effective long-term bronchodilator
  - Alleviates early phase of attacks but has little effect on bronchial hyperresponsiveness
  - Narrow margin of safety
Drug Therapy

- Anticholinergic drugs (e.g., ipratropium)
  - Block action of acetylcholine
  - Usually used in combination with a bronchodilator
  - Most common side effect is dry mouth.

Patient Teaching Related to Drug Therapy

- Correct administration of drugs is a major factor in success.
  - Inhalation of drugs is preferable to avoid systemic side effects.
  - MDIs, DPIs, and nebulizers are devices used to inhale medications.

Patient Teaching Related to Drug Therapy

- Correct administration of drugs
  - Using an MDI with a spacer is easier and improves inhalation of the drug.
  - DPI (dry powder inhaler) requires less manual dexterity and coordination.
Nonprescription Combination Drugs

- Should be avoided in general
- Epinephrine can also increase heart rate and blood pressure.
- Ephedrine stimulates CNS and cardiovascular system.
- Dietary supplements were banned in 2004.
Nursing Management
Nursing Assessment
- Health history
  - Especially of precipitating factors and medications
- ABGs
- Lung function tests

Nursing Management
Nursing Assessment
- Physical examination
  - Use of accessory muscles
  - Diaphoresis
  - Cyanosis
  - Lung sounds

Nursing Management
Nursing Diagnoses
- Ineffective airway clearance
- Anxiety
- Deficient knowledge
Nursing Management Planning

- Overall Goals
  - Maintain greater than 80% of personal best PEFR
  - Have minimal symptoms
  - Maintain acceptable activity levels

Nursing Management Planning

- Overall Goals
  - Few or no adverse effects
  - No recurrent exacerbations of asthma or decreased incidence of asthma attacks
  - Adequate knowledge to participate in and carry out management

Nursing Management Health Promotion

- Teach patient to identify and avoid known triggers.
  - Use dust covers
  - Use scarves or masks for cold air
  - Avoid aspirin or NSAIDs
Nursing Management
Health Promotion
- Prompt diagnosis and treatment of upper respiratory infections and sinusitis may prevent exacerbation.
- Fluid intake of 2 to 3 L every day

Nursing Management
Nursing Implementation
- Acute intervention
  - Monitor respiratory and cardiovascular systems:
    - Lung sounds
    - Respiratory rate
    - Pulse
    - BP

Nursing Management
Nursing Implementation
- An important goal of nursing is to ↓ the patient’s sense of panic.
  - Stay with patient.
  - Encourage slow breathing
  - Position comfortably.
Nursing Management
Nursing Implementation

- Ambulatory and home care
  - Patient and health care professional must monitor responsiveness to medication.
  - Must learn about medications and develop self-management strategies.

Nursing Management
Nursing Implementation

- Ambulatory and home care
  - Patient must understand importance of continuing medication when symptoms are not present.

Nursing Management
Nursing Implementation

- Important patient teaching
  - Seek medical attention for bronchospasm or when severe side effects occur.
  - Maintain good nutrition.
  - Exercise within limits of tolerance.
Nursing Management
Nursing Implementation

- Important patient teaching
  - Measure peak flow at least daily.
  - Asthmatic individuals frequently do not perceive changes in their breathing.

- Peak flow should be monitored daily and a written action plan should be followed according to results of daily PEFR.

Nursing Management
Nursing Implementation

- Peak flow results
  - **Green Zone**
    - Usually 80% to 100% of personal best
    - Remain on medications.
Peak flow results

Yellow Zone
- Usually 50% to 80% of personal best
- Indicates caution
- Something is triggering asthma.

Red Zone
- 50% or less of personal best
- Indicates serious problem
- Definitive action must be taken with healthcare provider.