Chapter 54

Drugs Acting on the Upper Respiratory Tract

Drugs That Affect the Respiratory System

• Antitussives
  – Block the cough reflex

• Decongestants
  – Decrease the blood flow to the upper respiratory tract and decrease the overproduction of secretions

• Antihistamines
  – Block the release or action of histamine, which increases secretions and narrows airways

Drugs That Affect the Respiratory System (cont.)

• Expectorants
  – Increase productive cough to clear airways

• Mucolytics
  – Increase or liquefy respiratory secretions to aid clearing of airways
Antitussives

- **Action**
  - Traditional: codeine (generic only), hydrocodone (Hycodan), and dextromethorphan (Benylin), and others
    - Act directly on the medullary cough center of the brain to depress the cough reflex
  - Non traditional: Benzonatate (Tessalon)
    - Acts directly on the respiratory passages, lungs, and pleurae, and blocks the effectiveness of the stretch receptors that stimulate a cough reflex.

Antitussives

- **Indication**
  - Control nonproductive cough

- **Pharmacokinetics**
  - Rapidly absorbed, metabolized in the liver, and excreted in the urine

- **Contraindications**
  - Patients who need to cough to maintain the airway*
  - Head injury and impaired CNS
  - Not for pregnant or lactating women
Antitussives (cont.)

• Caution
  – Hypersensitivity or history of narcotic addiction
  – Patients who need to drive or be alert
  – Patients with liver/renal impairment
• Adverse effects (For the Traditional meds)
  – Drying effect on the mucous membranes
  – CNS effects: drowsiness and sedation
  – GI upset*

Antitussives cont’

• Adverse effects (Nontraditional meds)
  – GI upset
  – Headache
  – Feelings of congestions
  – dizziness

Antitussive Prototype

• Dextromethorphan (Benylin)
  – Route: oral
  – Onset: 25-30 minutes
  – Peak: 2 hours
  – Duration: 3-6 hours
  – Half life: 2-4 hours
  – Adverse effects: dizziness, respiratory depression, dry mouth
What do we do as the nurse?

- Premedication screening
  - History of allergy to the drug
  - Cough > 1 week
  - Pregnancy or lactation
  - Underlying respiratory disease
- Physical Assessment
  - To establish baseline data for assessing the effectiveness of the drug and the occurrence of any adverse effects

What do we do as the nurse?

- Ensure that the drug is not taken any longer than recommended
- Arrange for further medical eval for persistent coughs
- Provide other cough relief measures*
- Provide thorough patient teaching
- Offer support and encouragement
- Monitor the patient’s response to the drug
- Monitor for adverse effects
- Evaluate the effectiveness of your teaching
- Monitor the effectiveness of other cough relief measures

Topical Nasal Decongestants

- Actions
  - Sympathomimetic
  - Affect sympathetic nervous system to cause vasoconstriction and thus decrease blood flow to the irritated mucous membranes. Reduces mm edema, opens nasal passages, and promotes drainage.
  - Almost immediate action because they are applied topically; also there is less chance of systemic effects
Topical Decongestants

• Indications
  – Relieve the discomfort of nasal congestion that accompanies the common cold, sinusitis, and allergic rhinitis
  – To facilitate examination by dilating the nares
  – Open the nasal passage and allow better drainage of the eustachian tube and relieve pressure in the middle ear

Topical Nasal Decongestants (cont.)

• Pharmacokinetics
  – Generally not absorbed systemically
  – Any portion of these topical decongestants that is absorbed is metabolized in the liver and excreted in the urine
  – Pregnancy and lactation-no data-use with caution

• Contraindications
  – Lesion or erosion in the mucous membranes*  

Topical Nasal Decongestants (cont.)

• Caution
  – Any condition that might be exacerbated by sympathetic activity*

• Adverse effects
  – Local stinging and burning*
  – Rebound congestion*
  – Sympathomimetic effects (increased pulse, blood pressure, and urinary retention)

• Drug-to-drug interactions
  – Cyclopropane and halothane*  
  – Monitor combination use carefully
Topical Decongestant Prototype

- **Ephedrine**
  - Route: topical (nasal spray)
  - Onset: immediate
  - Duration: 4-6 hours
  - Half life: 0.4-0.7 hours
  - Adverse effects: disorientation, confusion, light-headedness, nausea, vomiting, fever, dyspnea, rebound congestion

What do we do as the nurse?

- Screen for any allergies to the drug or contraindications for its use
- Physical Assessment-to establish baseline data for assessing the effectiveness of the drug and the occurrence of any adverse effects*
- Teach proper administration Box 54.2 (pg 883)
- Teach patient to not use drug for longer than 5 days and seek medical care if s/s persist
- Caution concerning combination drugs
- Provide safety measure if dizziness or sedation occur

What do we do as the nurse?

- Institute other measures to relieve congestion
- Provide thorough patient teaching
- Offer support and encouragement
- Monitor patient response to the drug
- Monitor for adverse effects
- Evaluate the effectiveness of the teaching plan
- Monitor the effectiveness of comfort and safety measures
Oral Decongestants

- **Action**
  - Shrink the nasal mucous membrane by stimulating the alpha-adrenergic receptors in the nasal mucous membranes

- **Indications**
  - Promote drainage of the sinuses and improve air flow
  - Increased risk for adverse effects due to systemic absorption.

- **Pharmacokinetics**
  - Well absorbed and widely distributed in the body
  - Metabolized in the liver and primarily excreted in the urine

Oral Decongestants (cont.)

- **Contraindications**
  - Any condition that might be exacerbated by sympathetic activity
  - No studies for use during pregnancy/lactation—use only if benefits outweigh risks

- **Adverse effects**
  - Rebound congestion
  - Sympathetic effects (feelings of anxiety, tenseness, restlessness, tremors, hypertension, arrhythmias, sweating, and pallor)

- **Drug-to-drug interactions**
  - OTC products that contain pseudoephedrine; concurrent use can cause serious side effects

What do we do as the nurse?

- Screen for any allergy to the drug or other contraindications for its use
- Physical Assessment to establish baseline data for assessing the effectiveness of the drug and the occurrence of any adverse effects
  - Same focus as with Nasal Decongestants
- Caution on combination products
- Provide safety measures to prevent patient injury
- Monitor pulse, BP, and cardiac response for patients at risk for cardiac stimulation
What do we do as the nurse?
- Do not use > 1 week or if symptoms persist
- Provide thorough patient teaching
- Offer support and encouragement
- Monitor patient’s response to the drug
- Monitor for adverse effects (increased pulse, BP, pallor, sweating, arrhythmias, feelings of anxiety, tension, and dry skin)
- Evaluate the effectiveness of your teaching
- Monitor the effectiveness of comfort and safety measures

Topical Nasal Steroid Decongestants
- **Action**
  - Exact mechanism of action is not known
  - Produce a direct local effect that blocks many of the reactions responsible for the inflammatory process
  - May take up to a week to see results. D/C after 3 weeks if no benefit.
- **Indications**
  - Seasonal allergic rhinitis
  - Inflammation after the removal of nasal polyps
- **Pharmacokinetics**
  - Generally not absorbed systemically
- **Contraindication**
  - Acute/active infection*

Topical Nasal Steroid Decongestants (cont.)
- **Cautions**
  - Active infection
  - Avoid exposure to airborne infections (chicken pox, measles, etc.)
- **Adverse effects**
  - Local burning, irritation, stinging, dryness of the mucosa, and headache
  - Suppression of healing can occur in a patient who has had nasal surgery or trauma so monitor these closely
Topical Nasal Steroid Prototype

- **Flunisolide**
  - Route: topical (nasal spray)
  - Onset: immediate
  - Peak: 10-30 min
  - Duration: 4-6 hours
  - Half Life: not generally absorbed systemically
  - Adverse effects: local burning, irritation, stinging, dryness of the mucosa, headache, increased R/F infection

What do we do as the nurse?

- Screen for any allergies or other contraindications for drug usage
- Physical assessment to establish baseline data for assessing effectiveness and the occurrence of any adverse effects
- Teach proper administration
- Instruct patient to continue using med, even if results are not seen immediately, as benefits may take 2-3 weeks.
- Monitor the patient for development of acute infection

What do you do as the nurse?

- Provide thorough teaching
- Offer support and encouragement
- Monitor patient’s response to the drug
- Monitor for adverse effects (local burning and stinging)
- Evaluate the effectiveness of your teaching plan
- Monitor the effectiveness of comfort and safety measures and compliance
Antihistamines

- **Actions**
  - Selectively block the effects of histamine at the histamine-1 receptor sites, decreasing the allergic response
  - Anticholinergic and antipruritic effects

- **Indications**
  - Seasonal and perennial allergic rhinitis, allergic conjunctivitis, uncomplicated urticaria, and angioedema
  - Brings relief from itchy eyes, swelling, congestion, and runny nose.
  - Amelioration of reactions to blood or blood products.
  - Adjunct therapy in anaphylactic reactions.
  - Best if used before onset of symptoms.

- **Pharmacokinetics**
  - Well absorbed, metabolized in the liver, and excreted in the urine and feces.

Antihistamines (cont.)

- **Contraindications**
  - Pregnancy and lactation

- **Cautions**
  - Renal or hepatic impairment
  - History of arrhythmias

- **Adverse effects**
  - Drowsiness and sedation (less with the 2nd gen drugs)
  - Anticholinergic effects *

- **Drug-to-drug interactions**
  - Vary based on the drug

Antihistamines

- **Prototype:** Diphenhydramine (Benadryl)
- **Route:** Oral, IM, or IV
- **Onset:** 15-30 min (oral), 20-30 min (IM), rapid (IV).
- **Peak:** 1-4h for oral and IM, 30-60 min IV.
- **Duration:** 4-8 hrs.
- **Half-life:** 3-7 hours, metabolized in liver and excreted in urine.
- **Adverse effects:** drowsiness, sedation, dizziness, GI distress, thickened bronchial secretion, urinary frequency, rash, bradycardia.
Antihistamines
• Your job as the nurse:
  - Screen for contraindications and allergy.
  - Physical assessment to establish baseline data for effectiveness.
  - Administer on empty stomach of 1-2h after meals to increase absorption.
  - Find most effective drug.
  - Sugarless candies to relieve drying discomfort.
  - Provide safety measure to prevent injury.
  - Increase humidity
  - Have pt void to decrease urinary retention
  - Skin care
  - Avoid combination drugs
  - Avoid alcohol
  - Patient teaching

Antihistamines
• Monitor patient response
• Monitor for adverse effects
• Evaluate your teaching plan
• Monitor comfort, safety, and compliance.

Expectorants
• Actions
  - Enhances the output of respiratory tract fluids by reducing the adhesiveness and surface tension of these fluids, allowing easier movement of the less viscous secretions
• Indications
  - Symptomatic relief of respiratory conditions characterized by a dry, non-productive cough
Expectorants (cont.)

- Pharmacokinetics
  - Rapidly absorbed; metabolism and excretion processes have not been reported
- Adverse effects
  - GI symptoms
  - Headache
  - Dizziness
  - Mild rash
  - Prolonged use may result in masking a serious underlying disorder

Expectorants

- Prototype: Guaifenesin
- Route: oral
- Onset: 30 min
- Peak: Unknown
- Duration: 4-6 hrs.
- Half-life: unknown
- Adverse effects: nausea, vomiting, headache, dizziness, and rash.

Expectorants

- Your job as the nurse:
  - Screen for contraindications and allergy
  - Physical assessment
  - Caution against use > 1 week.
  - Advise small, frequent meals to alleviate GI upset.
  - Avoid tasks if dizziness and drowsiness occur.
  - Avoid comb products.
  - Provide teaching
  - Monitor response
  - Monitor for adverse effects (rash, GI upset, CNS effects.)
  - Evaluation teaching plan
  - Monitor for comfort, safety, and compliance
### Mucolytics

- **Actions**
  - Work to break down mucus in order to aid the high-risk respiratory patient in coughing up thick, tenacious secretions

- **Indications**
  - Patients who have difficulty coughing up secretions
  - Patients who develop atelectasis
  - Patients undergoing diagnostic bronchoscopy
  - Postoperative patients
  - Patients with tracheostomies

### Mucolytics (cont.)

- **Pharmacokinetics**
  - Nebulization or direct instillation into the trachea

- **Cautions**
  - Acute bronchospasm, peptic ulcer, and esophageal varices*

- **Adverse effects**
  - GI upset
  - Stomatitis
  - Rhinorrhea
  - Bronchospasm
  - Rash

### Prototype Mucolytics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Route</th>
<th>Effect</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucolytic A</td>
<td>30-60 mg</td>
<td>Oral</td>
<td>Cough suppression</td>
<td>GI upset, rash</td>
</tr>
<tr>
<td>Mucolytic B</td>
<td>1-2.5 mg</td>
<td>Intravenous</td>
<td>Bronchodilation</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

*Other potential adverse effects may include nausea, vomiting, and headache.
Mucolytics

• As the nurse:
  - Assess contraindications and allergies
  - Physical assessment
  - Avoid comb drugs
  - Dilute the concentration with sterile water
  - Wipe residue off face after mask treatment to prevent skin breakdown
  - Teach use of nebulizer
  - Store in refrigerator, protected from light.
  - Provide patient teaching
  - Monitor for drug response
  - Monitor for adverse effects (CNS effects, skin rash, bronchospasm, GI effects.
  - Monitor comfort, safety, and compliance.

Use of Upper Respiratory Tract Agents Across the Lifespan

Prototype Antitussives

Prototype Summary: Dextromethorphan

Antitussive: Control of productive cough
Action: Suppresses the cough center to help modify cough reflexes
Pharmacokinetics:
  - Onset: Immediate
  - Peak: 1 h
  - Duration: 4-6 h
  - T1/2: 2-4 hours metabolized in the liver and excreted in urine
Adverse effects: Dizziness, nausea, epigastric discomfort, dry mouth
Prototype Expectorants

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