Quick Review

1. Order: Administer a med. in dosage of 50mg/kg to a client who weighs 132 lbs. Med is labeled 2 gms/tab. How many tablets will nurse give?

2. Nurse is to administer med ordered as 4mcg/kg/min. The client weighs 55 kg. The IV bag is labeled 100mg in 500ml. What is the rate in milliliters/hr for this IV?
PULMONARY DISORDERS & Drug Therapy

DRUGS FOR ALLERGIC RHINITIS & THE COMMON COLD (CH 38)

DRUGS FOR ASTHMA & OTHER PULMONARY DISORDERS (CH 39)
Let’s talk Anatomy First!!
You tell me!
The patient has been dx’d with an upper respiratory tract infection. What structures make up the URT? (4)

1) Nostrils, 2) Nasal cavity/sinuses, 3) pharynx, and 4) larynx
What structures make up the LRT?

The trachea, bronchi, and lungs (alveoli)
By what mechanism does this occur?

Diffusion
Its main function is to bring oxygen ($O_2$) into the body, & remove carbon dioxide ($CO_2$) from the body.

This done through **ventilation** (moving air into & out of the lungs) & **respiration** (exchanging gases in the alveoli of the lungs)
Important!

- Without adequate, constant supplies of oxygen, the tissues & organs will die. When the tissues & organs die, **death** of the entire organism follows unless something happens to restore oxygenation.
Our bodies are vulnerable to attack and compromise every day:

- by allergens, toxins and chemicals, microorganisms, injury, and even heredity.

Our miraculous bodies often work over time to alleviate these problems

- Quite often the respiratory tract is the first organ effected by these encounters

One defense mechanism is the antigen-antibody reaction
THE 3 MOST COMMON CONDITIONS OF THE RESPIRATORY TRACT

1. THE COMMON COLD (Acute coryza, or rhinitis)
   rhino = nose, itis = inflammation
   rhinitis = inflammation of the nasal mucosa
   coryza = inflammation of nasal mucosa

1. ASTHMA

2. COPD (Chronic Obstructive Pulmonary Disease)
Respiratory Disorders affecting the URT
ALLERGIC RHINITIS

- More commonly known as hay fever
- Inflammation of nasal mucosa secondary to exposure to allergens
- Not a life-threatening condition
- Frequently needs medication to treat
TREATMENT GOALS

Avoidance - Prevention

Allergen Tolerance

Drugs used to treat attacks
- Antihistamines
- Glucorticoids
- Mast cell stabilizers
- Decongestants

Patient Education - (How, What, When, Why’s)
ALLERGY TESTING
Inflammatory Process

- An Immediate Defensive / Protective Response
- Neutralizes Destroys and Limits Spread of the microbes
- Basophils and Mast Cells release histamine by a variety of stimuli (e.g. allergy, injury and infection).
- **Histamine** when released by injured cells causes vessels to dilate sending more blood and repair substances to the injured site.
Histamine

• The first chemical mediator released in immune and inflammatory responses
• After release it diffuses rapidly into other tissues where it interacts with H1 and H2 receptors
• H1Receptors are found on smooth muscle within blood vessels and the respiratory tract.
• Various reactions will occur: vasodilation, bronchoconstriction, increase vessel permeability
What do you think- Is histamine going to be released with Acute Allergic Rhinitis?

- **Dah!!! Keyword:** Allergic- yes histamine will be released in an antigen-antibody defense!

Why do you think watery eyes, sneezing and itchy nasal membranes occur?
- All responses to aid in getting rid of the allergen

In about 4-8 hours, a delayed reaction occurs, causing continuous inflammation of the mucosa.
ANTIHISTAMINES/ H₁ Receptor Antagonists

- They block the action of histamines at the $\text{H}_1$ receptor sites
- Some popular ones:
  - Dimetapp
  - Benadryl** (*prototype of 1$^{\text{st}}$ generation antihistamines*)
  - Allegra** (*prototype of 2$^{\text{nd}}$ generation antihistamines*)
  - Claritin
  - Zyrtec
- S.E. of many 1$^{\text{st}}$ generation meds = drowsinessness
- 2$^{\text{nd}}$ gen. cause less drowsinessness
- Anticholinergic S.E. common=inc. drying of mucosa= dry mouth and urinary hesitancy
Patient Education with Antihistamine Use

- Before admin. need baseline VS and EKG.
- Precaution with patients having cardiac issues (e.g. dysrhythmias and heart failure)
  - Can cause changes in heart rate
- Precaution with patients having liver or kidney issues
  - Problem with metabolize or excreting the drug
  - Problem with drying of mucosa/ urinary hesitancy
- Caution patients that it can make them sleepy!
DECONGESTANTS - SYMPATHOMIMETICS

- May be combined with antihistamines (examples pg 576)
- **they only relieve nasal congestion**
- **Intranasal sympathomimetics**
  - Have few systemic effects
  - **REBOUND CONGESTION** is most serious, limiting side effect
- **Oral (PO) sympathomimetics**
  - Do not produce rebound congestion
  - Not as effective in treating severe congestion
  - Work slower than intranasal
Patient Education with Decongestants

- Be sure to inform pt that a decongestant alone will only relieve nasal congestion
- Nasal decongestants have a rebound congestion effect, and should be not be used longer than 3-5 days
- Since it has Sympathomimetic activity oral decongestants can increase the B/P - Caution in patient with high blood pressure
- May increase blood glucose levels – Inform DM pts.
- May worsen glaucoma
GLUCOCORTICOIDs

- Very effective in treating many, many conditions
- Basic use of glucocorticoids is to decrease inflammation
- Intranasal tx - now considered 1st line treatment of allergic rhinitis, along with antihistamines because of effectiveness & lack of side effects
- For rhinitis treatment, route is intranasal via a metered-spray device
- It may take up to 3 weeks for maximum response, so will not be beneficial if patient is having severe allergic response
Antitussives

- A Cough is a normal reflex to remove foreign substance
- Meds to control cough are classified as opioid or non-opioid
- Depress the CNS by raising the cough threshold
- Opioids
  - Classified as schedule III, IV or V
  - Reserved for more serious coughs
  - Have minimal potential for dependence unless abused
  - Can cause respiratory depression
  - No driving or use of alcohol with this medication!
QUESTIONS~!
YOUR TURN
1. You want to give a med to block an allergic rhinitis inflammatory process – you will probably give an anti__________.

2. This medication will block activity at which receptors?

3. Can you name a generic or trade name for this type of med?

4. You are also congested so you take a decongestant. Name one

5. What is the longest you should take a intranasal decongestant, and why?
1. The patient has the flu and a dry hacking cough. Which type of med. might be given to temp. relieve the cough?

2. There are two types of this med- What are they? Non______ & __________

3. Is the client at high risk for dependence with the second one?

4. Why did I ask that question-What does it contain?

5. Most are classified as Schedule___________?

6. These medications work by doing what?

7. What usage precautions would you give the patient?
Disorders affecting the LRT
COPD
CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

- An umbrella term for three diseases
  1. ASTHMA
  2. EMPHYSEMA
  3. CHRONIC BRONCHITIS

- Chronic Bronchitis and Emphysema strongly asst with cigarette smoke
- Cigarette smoking accounts for 85-90% of all non-asthmatic COPD
COMMONALITIES

- Narrowed airways, resulting in the ability to get less air in
- The patient will be on several medications, including supplemental oxygen
- It is a chronic, progressive, debilitating disease
- Majority of cases are secondary to smoking
SMOKER'S LUNG

HEALTHY LUNG
SMOKING CESSATION

This is most important teaching we can do for patient with COPD.

The Lungs on the left have Emphysema. The one on the right has cancer - both from Smoking.
Caution is needed when administering supplemental oxygen to a person with COPD.

Their stimulus to breathe is low oxygen levels rather than high carbon dioxide levels (the rest of us breathe when co₂ levels rise)

You can not blast them with large amounts of O₂!

Use low-flow oxygen to prevent depression of the respiratory drive

Usual setting is 1-3L
Asthma
• Number of noninstitutionalized adults who currently have asthma: 17.5 million
• Percent of noninstitutionalized adults who currently have asthma: 7.7%

• Number of children who currently have asthma: 7.1 million
• Percent of children who currently have asthma: 9.6%

National Health Interview Survey, National Center for Health Statistics, CDC
A chronic disease with both inflammatory & bronchospasm components.

- affecting children & adults.

- Clients must carry emergency medications with them; attacks may start without warning.
ASTHMA ATTACK

- Narrowed airways - lumens (openings) are made smaller by the autonomic inflammatory response which produces mucous & edema (swelling) in the airways.
- Bronchospasm occurs.
STATUS ASTHMATICUS

- A TRUE EMERGENCY
- AIRWAYS ARE SEVERELY NARROWED
- PERSON CANNOT GET ANY AIR INTO HIS/HER LUNGS
- PANIC ENSUES
ADMINISTRATION OF PULMONARY DRUGS

- Aerosol therapy: administering medication suspended in a gas. Works almost immediately.
- Nebulizers: administering medication that has been vaporized into a fine mist that is inhaled.
- Dry powder inhaler
- Metered dose inhaler

THESE METHODS HAVE A POTENTIAL OF GETTING THE MED TO THE LUNGS RAPIDLY!
TREATMENT FOR ASTHMA ATTACKS

1. Relieving the immediate problem
2. Preventing or decreasing future attacks.
3. Medications:

   **Bronchodilators**-will open the airways

   Main classes:
   - BETA-ADRENERGIC AGONISTS (sympathomimetics)
   - ANTICHOLINERGICS
   - METHYLXANTHINES
BETA-ADRENERGIC AGONISTS (sympathomimetic)

- Drug of choice for treating acute attack
- Sympathomimetic action relaxes bronchial smooth muscle causing bronchodilation
- Examples:
  - Short acting: Pirbuterol (Maxair)
  - Intermediate acting: Lavalfbuterol (Xoponex), and Albuterol (Proventil)
  - Long Acting: Salmeterol (Serevent)

- Beta Agonists do not promote anti-inflammatory response
METHYLXANTHINES (XANTHINE DERIVATIVES)

- MOST COMMON:
  - Caffeine
  - THEOPHYLLINE (theo-dur)
  - AMINOPHYLLINE (somophyllin)

What do they do?

They relax smooth muscle, especially bronchial muscle, stimulate cardiac muscle, stimulate the CNS, & produce diuresis
OTHER ASTHMA DRUGS

- Called Mast Cell Stabilizers Or Prophylactic Asthma Drugs
- Are not useful during acute asthma attacks
- 2 drugs currently in this category:
  - Cromolyn (intal)
  - Necocromil (tilade)
What is the main effect we want from the use of glucocorticoids?

An Anti-inflammatory effect

Decreases airway obstruction by diminishing mucus productions and edema

They are the most effective drugs for preventing acute asthma attacks

Can be prescribed as po or inhaled preparations

Examples:
- Beclomethasone (vanceril, beclovent)
- Prednisone
LEUKOTRINE MODIFIERS

- Newest category of asthma drugs.
- Not bronchodilators, but do indirectly decrease bronchoconstriction used as both prophylaxis & chronic treatment in adults & children > 12 years old
- 3 drugs approved in us:
  - Accolate [prototype]
  - Singulair
  - Zyflo
ROLE OF THE NURSE

- Carefully monitor patient’s condition
- Stay with patient during acute attack
- Offer emotional support to patient & family
- After attack is over:
  - Help him/her identify what triggers an attack
  - Patient teaching (meds, side effects, avoiding triggers)
- Encourage Pt to cont taking asthmas meds even when not having attacks- will help prevent an attack from occurring!
Let’s talk Medication treatment

MORE QUESTIONS - YOUR TURN

CONTINUE WITH QUESTIONS 28-30
1. Pt comes in with severe asthma attack- You notice him giving himself a puff from his inhaler incorrectly- You are concerned because normally only ___ to ___% of inhaled meds actually reach the LRT.

2. 3 Meds can be given a Anticholinergic, Beta-adrenergic agonists, and Glucocorticoid. In which order would you place them r/t reaction quickness?

3. Already discussed this on a previous slide- What is the purpose of the glucocorticoid?
28. Many patients use multiple inhalers; often only 10-50% of the med reaches the LRT.

29. They must be used in a certain order for max effect:
   1) Beta agonist
   2) Anticholinergic (sympathomimetic)
   3) Corticosteroid

30. Reduces inflammatory response (decreases mucous production & edema)
So What meds will be used to treat an URT disorder?

Perhaps:

- an Antihistamine
to block histamine production

- a glucocorticoid (intranasal)
to reduce inflammatory response

- a decongestant (sympathomimetic)
to decrease nasal congestion by attaching to alpha receptors

- an antitussive
to reduce cough

- an expectorant
to reduce mucous thickness
So What meds might be used to treat LRT disorder?

Perhaps:

- **Bronchodilator** *(Beta-adrenergic agonist)*
  - to decrease bronchoconstriction-several types/ various onsets
  - can work quick

- **another Bronchodilator** *(Anticholinergic)*
  - Blocks parasympathetic response

- **a glucocorticoid** *(systemic)*
  - to reduce inflammatory response

- **another bronchodilator** *(methylxanthines)*
  - not given as much anymore- more for long term use

- **a leukotriene modifier**
  - to block leukotriene inflammatory activity

- **a Mast cell stabilizer**
  - to block mast cell release of histamine

Which ones will be used to treat an acute asthma attack?
Breathe and Enjoy the Day!