LESSON ASSIGNMENT

LESSON 4
Chronic Obstructive Pulmonary Diseases.

TEXT ASSIGNMENT
Paragraphs 4-1 through 4-10.

LESSON OBJECTIVES
After completing this lesson, you should be able to:

4-1. Identify the characteristics, signs/symptoms, and treatment for asthma.

4-2. Identify the characteristics, signs/symptoms, and treatment for chronic bronchitis.

4-3. Identify the characteristics, signs/symptoms, and treatment for emphysema.

SUGGESTION
After completing the assignment, complete the exercises at the end of this lesson. These exercises will help you to achieve the lesson objectives.
CHRONIC OBSTRUCTIVE PULMONARY DISEASES

Section I. ASTHMA

4-1. DEFINITION/CHARACTERISTICS

a. Chronic obstructive pulmonary diseases (COPD) affect one out of five Americans. Asthma and bronchitis are common forms of COPD and are found more often in men than in women. The incidence of these diseases is more common among cigarette smokers than people who do not smoke. Asthma is a disease characterized by attacks of wheezing and difficult breathing. Spasms of the smooth muscles that lie in the walls of the smaller bronchi and bronchioles bring on the attacks and cause these passageways to close partially. Asthma can be caused by environmental factors such as dust or cold air. Asthma can also be caused by an infection, exercise, or emotional upset.

b. In an asthma attack, several bodily changes make it difficult for air to go through bronchi passageways. These changes include bronchoconstriction (bronchial muscles constricting), mucus secretion in the bronchi, and edema (fluid retention) in the bronchial wall. The difficulty in bringing air through those passages accounts for a sign almost always associated with asthma—wheezing.

c. There are five types of asthma. They are:

(1) Extrinsic (allergic) asthma.

(2) Intrinsic asthma.

(3) Triad asthma.

(4) Nasal polyp asthma.

(5) Bronchospasm.

4-2. SIGNS/SYMPTOMS

a. **Extrinsic (Allergic) Asthma.** This type of asthma usually affects children and young adults who have a personal or family history of being hypersensitive to substances in the environment, foods, or air substances that are inhaled. An individual can inherit an allergy to drugs, vaccines, and anesthetic agents also.
(1) Inhalant allergens include:
   (a) Pollens.
   (b) Dusts.
   (c) Animal danders/hairs.
   (d) Feathers.
   (e) Molds.

(2) Food allergens include:
   (a) Milk.
   (b) Eggs.
   (c) Nuts.
   (d) Chocolate.
   (e) Fish.
   (f) Shellfish
   (g) Strawberries.

(3) Irritant inhalants include:
   (a) Fumes.
   (b) Cold air.
   (c) Air pollutants.

b. **Intrinsic Asthma.** This type of asthma is more common among adults over 35, especially women. Upper and lower respiratory tract infections may cause intrinsic asthma even though there has been no family or childhood history of the disease.
c. **Triad Asthma.** As the name implies, triad asthma includes three elements at the same time: aspirin (ASA), indomethacin (Indocin), and yellow food dye.

(1) Signs/symptoms of triad asthma include:

(a) Respiratory distress.

(b) Cough.

(c) Flushing--redness of skin.

(d) Cyanosis (bluish or grayish skin from oxygen poor blood).

(e) Apprehension.

(f) Tachycardia (rapid pulse).

(g) Perspiration.

(h) Flaring of nasal alae (outer side of each nostril).

(i) Dyspnea (labored or difficult breathing).

(j) Wheezing (quite audible or absent).

(2) The patient may have difficulty breathing and exhibiting these signs of respiratory distress:

(a) Dyspnea.

(b) Wheezing.

(c) Hyperresonance (very loud body sounds).

(d) Rhonchi.

(e) Wheezing in a particular part of the body indicating an obstruction by a foreign body or a tumor in the area. If a patient is wheezing, it is not safe to say that the patient has asthma. Not every person who wheezes has asthma. Wheezing may also be caused by:

1. Acute left heart failure (cardiac asthma).

2. Smoke inhalation.
3 Chronic bronchitis.
4 Acute pulmonary embolism.

4-3. LABORATORY FINDINGS

a. Chest x-rays usually show nothing abnormal.

b. If the patient shows signs of wheezing and dyspnea, chest x-rays and other laboratory tests are used to rule out the following:

   (1) Pneumothorax (an accumulation of air or gas in the pleural space).
   (2) Mucus plugging (a glob of mucus obstructing passageways).
   (3) Pneumonia.
   (4) Foreign body obstructing passageways.
   (5) Cancer.

4-4. TREATMENT

a. Purpose. The purpose of treatment in an asthma attack is twofold. First, it is necessary to treat the symptoms of the attack. Then, causes of the attack should be diagnosed and treatment begun to prevent further attacks.

b. Hospitalization. Consider hospitalization when the patient has had one or more of the following situations:

   (1) Seventy-two hours of unremitting asthma.
   (2) One hour of adequate acute therapy without improvement.
   (3) Three trips to the emergency room in three days.
   (4) Quiet chest.
   (5) Pulsus paradox (an abnormal decrease in systolic pressure during inspiration, the decrease being greater than 10 mm of mercury [Hg]).
   (6) Sternocleidomastoid muscle and intercostal muscle withdrawing.
   (7) Low carbon dioxide pressure (PCO₂).
c. **Monitoring.** During treatment for an acute asthma attack, monitor arterial blood gases every 30 to 60 minutes.

d. **Long-Term Therapy.** Long-term therapy is an attempt to identify the cause of asthma attacks and prevent those causes. Long-term therapy includes:

   (1) Discovering and avoiding, if possible, whatever causes the asthma attack.

   (2) Being desensitized against whatever is causing the asthma; for example, desensitization against ragweed, other pollens, etc.

   (3) Taking appropriate medication. (Tedral, Quibron, aminophylline, and steroids are drugs that can be used to treat asthma).

e. **Asthma in Children.** The treatment for asthma in children requires providing a pleasant and understanding home environment. Over-protection or parental resentment must be avoided.

f. **Acute Asthma Attack.** An acute attack of asthma is treated as a respiratory emergency. First, determine what medications the patient has taken within the last 12 hours.

   (1) Procedure for an adult patient is given below.

      (a) Open the airway if it is not open.

      (b) Give humidified oxygen or a nebulizer (a device for throwing a spray). Use an intermittent positive pressure breathing (PPB) device if one is available. Do not use the unmodified demand valve on the PPB device because the dry gases it will send to the airway makes the mucus secretions worse.

      (c) Establish an IV with a solution of five percent water with dextrose (D5W) or D5/normal saline.

      (d) Administer epinephrine 1:1000, 0.3 to 0.5 ml subcutaneously (adult dose) if the patient has not taken large doses of inhalant bronchodilators. Repeat the dose in thirty minutes, if necessary.

      (e) Aminophylline may be given by adding 250 mg of the drug to a 250 ml bag of D5/W. This infusion can be attached to the IV in piggyback fashion.

      (f) Bronchodilators such as epinephrine (Isoproterenol, Isuprel) or Isoetharine (Bronkosol) may be administered by aerosol.
WARNINGS

DO NOT give sedatives that may depress respiration or antihistamines that dry secretions.

DO NOT give aspirin. Many asthmatics are allergic to aspirin.

(2) Procedure for a child is given below.

(a) Give oxygen.

(b) The drug of choice is epinephrine, 1:1000 0.01 ml/kg to 0.3 ml is the maximum dosage. The dosage may be repeated once or twice every 20 minutes. Alternative drugs that may be used include the following:

   1  Sus-Phrine (1:200 aqueous suspension of epinephrine).
   2  Theophylline preparation administered in a 4 mg/kg of body weight IV in 25 cc D5W over 5-15 minutes not exceeding 25 mg per minute. IV hydration is important (D5W or D5-saline wide open).

(c) Avoid using sedatives and oral preparations when treating asthma in an emergency situation.

(d) Aminophylline suppositories are a possible treatment.

CAUTION: Administering epinephrine after the use of over the counter (OTC) bronchodilators can cause severe circulatory disease or cardiac arrhythmias.

(3) In the case of a prolonged asthma attack, consider that the cause might be an infection or an allergen.

(4) Status asthmaticus is a condition that is considered a medical emergency. Status asthmaticus is a severe prolonged asthmatic attack that cannot be broken with epinephrine.

(a) Signs/symptoms include the following:

   1  Chest that is severely distended.
   2  Severe dyspnea (difficult or labored breathing).
   3  Prominent use of accessory muscles.
4 Breath sounds (wheezes may be entirely inaudible).

5 Exhaustion.

6 Severe acidosis (accumulation of acid or depletion of the alkaline reserve in the blood and body tissues).

7 Dehydration.

(b) Other signs/symptoms may be:

1 Hypoxia (lack of oxygen reaching body tissues) contributing to encephalopathy (disease of the brain or spinal cord).

2 Respiratory acidosis.

3 Pneumomediastinum (presence of air or gas in the mediastinum which may interfere with respiration and circulation).

4 Possible progressive respiratory tract impairment.

(c) Treatment. Treatment is similar to that for acute asthma and includes the following:

1 Give oxygen by intermittent positive pressure breathing (IPPB). A machine delivering IPPB forces oxygen into the patient as the patient starts to take a breath. The machine automatically forces enough oxygen into the patient's lungs to open the alveoli.

2 Administer sodium bicarbonate intravenously to counteract acidosis. If you must add the medication to the primary intravenous bottle, use strict aseptic technique and follow this basic procedure:

   a Wash your hands.

   b Check the medication order.

   c Prepare the medication and draw it up in a syringe.

   d Remove the metal protector and rubber diaphragm from the bottle.

   e Insert the needle into the injection site.

   f Mix the solution and medication.
g  Label the bottle.

h  Discard the used needle and syringe.

i  Record the medication.

3  Reassure the patient.

4  Transport the patient to a hospital immediately.

5  Begin an intravenous infusion (IV) lifeline of dextrose in water solution (D5W).

Section II. CHRONIC BRONCHITIS

4-5. DEFINITION/CHARACTERISTICS

Chronic bronchitis is an inflammation of the bronchi of long duration. There is a productive cough associated with recurring infections of the lower respiratory tract. The result is a reduced ability to ventilate (breathe in and out) the lungs. A characteristic is an excessive, recurrent, mucus-producing cough. The patient is usually a heavy cigarette smoker who is obese. The soft tissues around the patient's fingers and toes may have undergone changes, but not the bone structure.

4-6. SIGNS/SYMPTOMS

As the disease becomes more severe, the following signs/symptoms may be noticed in the patient.

a. Rales (a dry or moist sound according to the absence or presence of fluids in the air passages).

b. Rhonchi (a dry, coarse sound in the bronchial tubes due to a partial obstruction).

c. Wheeze (a whistling sound made in breathing).

d. Light fever (101°F to 102°F).

e. Back and muscle pain.

f. Cyanosis (blue bloater; a bluish discoloration of the skin and/or membranes; in dark-skinned individuals, the skin discolors to gray or grayish tone).

g. More purulent (containing pus) and increase in volume of mucus produced with a cough.
h. Patient weakening due to hypoxia (lack of adequate oxygen).

i. Confusion due to hypoxia.

j. Muscle twitching.

k. Edema (abnormal accumulation of fluid in body tissues).

l. Jugular vein distention.

m. Barrel chest, perhaps.

n. Productive cough with sputum color changes.

4-7. TREATMENT

Keep in mind that the patient may be suffering from another disease, and bronchitis is a secondary problem. Remember the following:

a. The patient should avoid possible irritants such as smoking, allergenic agents, fumes and/or other irritants.

b. Codeine phosphate or a comparable antitussive agent can be used to suppress a nonproductive cough.

c. Mist inhalations (cool or warmed) and adequate fluid intake can be used to cope with thick sputum.

d. A drug such as terbutaline can be used to relieve bronchial spasm (violent cough).

e. Antihistamine drugs may reduce bronchial inflammation due to allergy.

f. Other measures may be taken depending on the cause of the bronchitis.

Section III. EMPHYSEMA

4-8. DEFINITION/CHARACTERISTICS

The word emphysema means "blown up" or "full of air." In emphysema, the alveolar walls of the lungs have lost their elasticity, causing air to remain trapped in the lungs when the person breathes out. A first symptom is that the person exhales less than his usual amount of air. Alveoli in other areas of the lungs become damaged later. Many alveoli may unite, thus further reducing the overall volume of air the person is able to inhale.
a. Eventually, the lungs become permanently inflated because they have lost their elasticity. The size of a person’s chest increases to adjust to the new larger size of the permanently inflated lungs. At this point, the person has to work voluntarily to exhale. The oxygen in the blood is a little lowered, and the person becomes breathless from any mild exercise in which the blood cells need more oxygen. As the disease progresses, unusually high amounts of carbon dioxide dissolve in the plasma producing acid conditions that are toxic to brain cells. This causes the body’s inspiration area to become less active which causes the respiration rate to slow down.

b. A number of factors can cause emphysema.

(1) A tendency in some families for chronic obstructive pulmonary diseases such as silicosis (a disease caused by inhaling stone, sand, or flint dust into the lungs) or fibrosis (formation of fibers in the lungs).

(2) A history of chronic bronchial obstruction such as bronchitis or asthma.

(3) Cigarette smoking is thought to be a major cause.

(4) The result of a penetrating wound of the chest wall.

4-9. SIGNS/SYMPTOMS

a. The signs and symptoms of emphysema are listed as follows:

(1) Shortness of breath.

(2) Pursed lip breathing (pink puffers).

(3) Barrel chest appearance.

(4) Wheezing.

(5) Chronic cough.

(6) Expectoration with small quantities of mucus.

(7) Dyspnea (difficult or labored breathing) on exertion.

(8) Hyperresonant to percussion.

(9) Appears thin and wasted (weight loss).

(10) Difficulty in hearing sounds in body while listening to lungs with stethoscope.
b. In all cases of chronic cough, asthma, or any disease that produces pulmonary fibrosis, a diagnosis of emphysema should be considered. Early diagnosis is difficult, but advanced cases of emphysema are evident by the following symptoms:

(1) Severe dyspnea (difficult or labored breathing).

(2) Distended chest.

(3) Depressed diaphragm.

(4) Abnormal blood gases.

4-10. TREATMENT

Treatment for emphysema is designed to correct or diminish the causes. For example, if air pollution, occupational exposure to industrial dust, or cigarette smoke is causing the problem, the patient must remove himself from these air pollutants as much as possible. Mist inhalations and supplemental fluids can be used to thin secretions that are thick. Other treatments designed to combat the cause of the condition can be used. Bed rest is not the main treatment but can be given when necessary.
INSTRUCTIONS. Answer these exercises by writing the answer in the space provided or choosing the statement that best answers the question. After you have answered all the exercises, turn to "Solutions to Exercises" at the end of the lesson and check your answers.

1. Asthma and bronchitis are common forms of __________________________
   ________________________________________________________________

2. Asthma is a disease in which muscle spasms in the walls of the small bronchi and bronchioles bring on the attack and cause __________________________
   ________________________________________________________________

3. List the five types of asthma.
   a. ________________________________________.
   b. ________________________________________.
   c. ________________________________________.
   d. ________________________________________.
   e. ________________________________________.

4. List three inhalant allergens given in this lesson to which a person could be allergic.
   a. ________________________________________.
   b. ________________________________________.
   c. ________________________________________.
5. List four food allergens mentioned in the lesson that might cause an asthma attack.
   a. ________________________________________.
   b. ________________________________________.
   c. ________________________________________.
   d. ________________________________________.

6. List three irritant inhalants mentioned in the lesson.
   a. ________________________________________.
   b. ________________________________________.
   c. ________________________________________.

7. __________________________ asthma is more common among adults over 35, especially women.

8. List four signs/symptoms of triad asthma.
   a. ________________________________________.
   b. ________________________________________.
   c. ________________________________________.
   d. ________________________________________.

9. Wheezing in a particular part of the body indicates __________________________
   __________________________
10. List two situations in which you may hospitalize a patient with asthma.
   a. _______________________________________.
   b. _______________________________________.

11. The purpose of long term asthma therapy is ________________________________________
    ________________________________________________________________

12. Which response is NOT part of the treatment for an adult having an acute asthma attack?
   a. Open the airway.
   b. Give humidifier oxygen or a nebulizer.
   c. Give a sedative to relax the patient.
   d. Establish an IV with D5W or D5 normal saline.
   e. Use a bronchodilator such as epinephrine.

   Check Your Answers on Next Page
SOLUTIONS TO EXERCISES, LESSON 4

1. Chronic obstructive pulmonary diseases. (para 4-1a)

2. These passageways to close partially. (para 4-1a)

3. Extrinsic (allergic) asthma.
   - Intrinsic asthma.
   - Triad asthma.
   - Nasal polyp asthma.
   - Bronchospasm. (para 4-1c)

4. You are correct if your listed any three of the following:
   - Pollens.
   - Dusts.
   - Animal danders.
   - Feathers.
   - Molds. (para 4-2a(1))

5. You are correct if you listed any four of the following:
   - Milk.
   - Eggs.
   - Nuts.
   - Chocolate.
   - Fish.
   - Shellfish.
   - Strawberries. (para 4-2a(2))

6. Fumes.
   - Cold air.
   - Air pollutants. (para 4-2a(3))

7. Intrinsic. (para 4-2b)
8. You are correct if you listed any four of the following:

   Respiratory distress.
   Cough.
   Flushing.
   Cyanosis.
   Apprehension.
   Tachycardia.
   Perspiration.
   Flaring of nasal alae.
   Dyspnea.
   Patient sitting up.
   Wheezing.  (paras 4-2c(1)(a)-(j))

9. An obstruction by a foreign body or a tumor in the area.  (para 4-2c(2)(e))

10. You are correct if you listed any two of the following:

    Seventy-two hours of unremitting asthma.
    One hour of adequate acute therapy without improvement.
    Three trips to the emergency room in three days.
    Quiet chest.
    Pulse rate which varies more than 10mm Hg.
    Sternocleidomastoid muscle and intercostal muscle withdrawing.
    Low carbon dioxide pressure (PCO$_2$).  (paras 4-4b(1)-(7))

11. To identify the cause of and prevent asthma attacks.  (para 4-4d)

12. c.  (paras 4-4f(1)(a)-(f))

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