Objectives

Following this presentation the participant will demonstrate understanding of pneumonia by successful completion of the Pneumonia "I.Q. Quiz" (7 or more correct answers).

Participant will learn:

- Etiology/Epidemiology
  - Types of Pneumonia to include:
    - Pneumococcal
    - Staphylococcal
    - Gram Negative Bacterial
    - Hemophilus Influenzae
    - Legionella Pneumophila
    - Atypical
    - Viral
    - Fungal
    - Pneumocystis
    - Aspiration

Objectives Continued

- Pathophysiology
- Classic Symptoms
- Medical Management
- Nursing Priorities for Patient Care
- Promote Effective Airway Clearance
- Facilitate Breathing and Oxygenation
- Promote Patient Comfort
- Plan for Activity Tolerance
- Promote Adequate Hydration and Fluid Balance
- Patient Teaching
What Is Pneumonia?

- Pneumonia is an inflammation of one or both lungs that involves the small air sacs (alveoli) and the tissues around them.

U.S. Statistics

- In the United States, about 3 million people develop pneumonia each year, and 40,000 to 70,000 of them die.
- Pneumonia is the 6th most common cause of death overall, and the most common fatal infection acquired in hospitals.
- The incidence of pneumonia has been stable. 1990 pneumonia rate is nearly identical to the 1970 rate of 1.5 episodes/100 persons.
Most cases of pneumonia are contracted by breathing in small droplets that contain the bacteria or virus that can cause pneumonia. These droplets get into the air when a person infected with these germs coughs or sneezes. In other cases, pneumonia is caused when bacteria or viruses that are normally present in the mouth, throat, or nose inadvertently enter the lung. During sleep it is quite common for people to aspirate secretions from the mouth, throat, or nose. Normally, the body’s reflex response (coughing back up the secretions) and immune system will prevent a pneumonia from starting. However, if a person is in a weakened condition from another illness, a severe pneumonia can develop.

Once the bacteria, virus or fungus enter the lungs, they usually settle in the air sacs of the lung where they rapidly grow in number. This process may cause a variety of responses. This area of the lung then becomes filled with fluid and pus as the body attempts to fight off the infection.
Who is at the most risk?

People with emphysema, heart disease, and swallowing problems, as well as alcoholics, drug users and those who have suffered a stroke or seizure are at higher risk for developing pneumonia.

The very young and the very old are also at higher than average risk.

People who are debilitated, bedridden, paralyzed, unconscious, or who have a disease that impairs the immune system, such as AIDS, are also at risk.

Pneumonia may follow surgery, particularly abdominal surgery, or any injury (trauma), particularly a chest injury, because of the resulting shallow breathing and impaired ability to cough.

Who Is at Risk

Symptoms
Symptoms of Pneumonia

- Most people who develop pneumonia initially have symptoms of a cold which is then followed by a high fever (39°-40°/102.2°-104°), shaking chills, and a cough with sputum production. The sputum is often bloody. Pleuritic chest pain may develop on one side with restricted chest movement. The patient may become short of breath, tachypnic, inspiratory rales, and dullness to percussion can be noted on physical assessment.

- In other cases of pneumonia, there can be a slow onset of symptoms. A worsening cough, headaches, and muscle aches may be the only symptoms. At times, the individual's skin color may change and become dusky or purplish due to their blood being poorly oxygenated.

Diagnosing Pneumonia

- Pneumonia may be suspected when the doctor examines the patient and hears coarse breathing or crackling sounds when listening to a portion of the chest with a stethoscope. There may be wheezing or the sounds of breathing may be faint in a particular area of the chest.

- A chest x-ray is ordered to confirm the diagnosis of pneumonia. Sputum samples can be collected and examined under the microscope. If the pneumonia is caused by a bacteria, it can often be detected by this examination. A CBC can be performed and the white blood cell count can often give a hint as to the severity of the pneumonia and whether it is caused by a bacteria or a virus.
**Pneumococcal Pneumonia**

- The most common cause of a bacterial pneumonia is *Streptococcus pneumoniae*. There is usually an abrupt onset of the illness with shaking chills, fever and a rust-colored sputum. The infection spreads into the blood in 20-30% of cases and if this occurs 20-30% of these patients die.
- A vaccination is recommended for people at high risk such as those with diabetes, steroid-dependent asthma, alcoholism, cigarette abuse and in those persons over age 65.
- Antibiotics often used in the treatment of this pneumonia include penicillin, ampicillin-clavulanate (Augmentin), and erythromycin.

**Staphylococcal Pneumonia**

- *Staphylococcus aureus* causes 2% of pneumonia cases outside the hospital, but it causes 10 – 15% of those acquired in hospitals while people are being treated for another disorder.
- Tends to develop in the very young, very old, and people who are debilitated by other illnesses.
- High death rate (15–40%)
- Chills and fever more persistent in staphylococcal pneumonia than in pneumococcal pneumonia.
- Staphylococcus may cause abscesses (collection of pus) in the lungs. Collection of pus in pleural space (empyema) relatively common.

**Gram-Negative Bacterial Pneumonia**

- Gram-negative bacteria, such as *Klebsiella* and *Pseudomonas* cause pneumonia that tends to be extremely serious.
- Gram-negative bacteria rarely infect lungs of healthy adults. More common in infants, elderly, alcoholics and people with chronic diseases.
- Often acquired in a hospital or nursing home.
- Gram-negative bacteria may rapidly destroy lung tissue so this pneumonia tends to become serious quickly.
- Fever, coughing and SOB are common.
- Sputum may be thick and red – the color and consistency of currant jelly.
- Treated intensively in the hospital with antibiotics, *O₂* and IV fluids. May require a ventilator.
- Despite treatment, about 25–50% of people with Gram-negative bacteria die.
Hemophilus Influenzae

- Hemophilus influenzae type b can cause pneumonia, usually in children under age 6.
- Signs of the infection include sneezing and runny nose, followed by typical pneumonia symptoms.
- Vaccination for type b strains of Hemophilus influenzae is recommended in all children.
  - Vaccine is given in 3 doses – at ages 2, 4 and 6 months.
- Antibiotics used to treat Hemophilus influenzae type 2 pneumonia.

Legionella Pneumophila

- Legionnaire's disease caused by the bacteria Legionella pneumophila accounts for 1 - 8% of all pneumonias and about 4% of fatal pneumonias acquired in hospitals.
- Tends to strike in late summer or early fall.
- Legionella pneumophila lives in water and outbreaks have occurred when organism has spread through hotels and hospital air-conditioning systems.
- May occur at any age, people who are middle-aged and older have been affected most often.

Legionella Pneumophila

- People who smoke, abuse alcohol or take corticosteroids seem to be at greater risk.
- Legionnaires' disease can produce minor symptoms or can be life-threatening.
- The first symptoms to appear (2-10 days post transmission) include fatigue, fever, headache and muscle aches.
- A dry cough that later produces sputum follows.
- Serious infections can include extreme SOB and diarrhea.
- Erythromycin and Azithromycin are the antibiotics of choice for treating this pneumonia.
Atypical Pneumonias

- Atypical pneumonias are caused by organisms other than the so-called typical bacteria, viruses or fungi.
- *Mycoplasma pneumoniae* is the most common cause of pneumonia in people 5 – 35, but uncommon in other age groups. Appears in confined groups (military, students, families).
- A slowly developing infection, incubation period lasts 10-14 days. Symptoms include fever, chills, muscle aches, diarrhea, and rash.
- Most people recover without treatment. Erythromycin, clarithromycin (Biaxin), and azithromycin (Zithromax) are antibiotics commonly prescribed for mycoplasma pneumonia.

Atypical Pneumonias

- *Chlamydia pneumoniae* is another common cause of pneumonia in people ages 5 – 35. But also affects some elderly.
- Transmitted by droplets – coughing
- Symptoms similar to Mycoplasmal pneumonia. Most do not become seriously ill.
- Erythromycin and tetracycline are effective. If treatment is stopped too early, symptoms tend to return.

Viral Pneumonia

- Many viruses can infect the lungs, causing viral pneumonia. In infants, children and the elderly, respiratory syncytial virus, parainfluenza and influenza virus are the most common.
- In healthy adults types A & B influenza virus cause pneumonia. Chickenpox and herpes simplex viruses can also cause pneumonia.
- Viral pneumonias do not typically respond to antibiotic treatment.
- These pneumonias usually resolve over time with the body’s immune system fighting off the infection.
- It is important to make sure that a bacterial pneumonia does not secondarily develop. If it does, then the bacterial pneumonia is treated with appropriate antibiotics.
Fungal Pneumonia

- Fungal pneumonias that can occur include:
  - Histoplasmosis - Mississippi and Ohio river valleys in U.S.
  - Coccidiomycosis - Semi-arid climates - Southwestern U.S., South and Central America
  - Blastomycosis - Southeastern, South central U.S. and Great Lakes area.
  - Most people who become infected have only minor symptoms & don't know they're infected. A few become gravely ill.
  - These are responsible for a relatively small percentage of pneumonias in the United States.

Pneumocystis Pneumonia

- *Pneumocystis Carinii* is a common organism that may reside harmlessly in normal lungs, usually causing disease only when the body’s defenses are weakened by cancer, cancer treatment or AIDS.
- Often 1st indication that person with HIV infection has developed AIDS.
- Diagnosis is made by sputum examination obtained by induction or bronchoscopy.
- Symptoms - SOB, fever, dry cough, hypoxia.
- Treatment and prevention (in AIDS patients) includes antibiotics and aerosolized pentamidine via SVN.

Aspiration Pneumonia

- Particles from the mouth that are not cleared by normal defense mechanisms can enter the lungs, causing inflammation, infection and pneumonia.
- People who are debilitated, intoxicated by alcohol or drugs, or unconscious from anesthesia or a medical condition are at risk for aspiration.
- Even a healthy person who inhales a large amount of material can develop pneumonia.
- People either recover rapidly, progress to acute respiratory distress syndrome, or develop bacterial infection.
- Treatment consists of antibiotics, oxygen therapy and possible mechanical ventilation.
Nursing Priorities for Patient Care

- Promote effective airway clearance
- Administer medications as prescribed
- Antibiotics
- Expectorants
- Antitussive
- Adequate Room Humidity
- Encourage cough and deep breathing
- Assist patient to become effective with cough
- Suction airway if patient is unable to clear their own secretions
- Nebulizers and/or bronchodilators PRN

Nursing Care Continued

- Position patient in semi-Fowlers
  - *Do NOT* position patient on affected side
  - Encourage frequent position changes
  - Instruct and enforce use of Incentive Spirometer
  - Administer Oxygen as ordered

Nursing Care Continued

- Assess adequacy of ventilation
- Auscultate Lungs every 4 hours at a minimum
Nursing Care Continued

- Promote Patient Comfort
- Plan for Activity Tolerance
- Promote Adequate Hydration and Fluid Balance

Patient Teaching

- Disease Prevention
- Available immunizations for elderly
- Eat and drink enough fluids
- Symptom recognition and action(s) to take

Discharge Planning

- Placement if needed in SNF
- Plan for assistance at home if needed
- Home oxygen and/or respiratory equipment needs
- Medications
Conclusions

- Pneumonia can be a serious and life-threatening infection. This is true especially in the elderly, children and those that have other serious medical problems such as emphysema, heart disease, diabetes, and certain cancers. Most pneumonias are successfully treated with antibiotics. In fact, most pneumonias can be treated with oral antibiotics and without the need for hospitalization. Those over age 65 usually require hospitalization.

Quiz Time

Pneumonia “I.Q. Quiz” Answers

1. False – Pneumonia can affect anyone at any time.
2. True – Episodes of pneumonia invariably require hospitalization in people over age 65.
3. False – In 1990 pneumonia rate 1.6 episodes/100 persons nearly identical to 1970 rate of 1.5 episodes/100 persons.
4. False – Viruses are only one cause of pneumonia.
5. True – Effective vaccine available for pneumococcal pneumonia.
Pneumonia “I.Q. Quiz” Answers (Continued)

6. True - Bacteria Legionella pneumophila causes Legionnaire’s Disease.

7. False – Common symptoms include coughing which produces a great deal of sputum.

8. True – Hemophilus Influenzae type b (Hib) is a common bacterium, therefore most adults are immune.

9. False – PCP is the first sign of illness in more than 1/2 the people who get AIDS, but outbreaks have occurred among people who are not at risk.

10. False – Inhalation is a common route of infection, but it is only one route – also by aspiration, and infection in the blood stream.