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### QUESTION NO. 1

#### Respiratory Disease

#### Pneumonia

- **Pneumonia** is an infection in one or both lungs. Bacteria, viruses, and fungi cause it.
- The infection causes inflammation in the air sacs in your lungs, which are called alveoli.
- The alveoli fill with fluid or pus, making it difficult to breathe

#### Pneumonia has four stages,

- Namely consolidation
- Red hepatization
- Grey hepatization
- Resolution.

## Causes of emphysema:

- **Pneumonia** is a lung disease characterized by inflammation of the airspaces in the lungs, most commonly due to an infection.
- **Pneumonia** may be **caused** by viral infections, bacterial infections, or fungi; less frequently by other **causes**.
- The most common bacterial type that **causes pneumonia** is *Streptococcus pneumoniae*.

## Community-acquired pneumonia

Community-acquired pneumonia is the most common type of pneumonia. It occurs outside of hospitals or other health care facilities. It may be caused by:

- **Bacteria.** The most common cause of bacterial pneumonia is *Streptococcus pneumoniae*.
  - This type of pneumonia can occur on its own or after you've had a cold or the flu. It may affect one part (lobe) of the lung, a condition called lobar pneumonia.
- **Bacteria-like organisms:** *Mycoplasma pneumoniae* also can cause pneumonia.
  - It typically produces milder symptoms than do other types of pneumonia. Walking pneumonia is an informal name given to this type of pneumonia, which typically isn't severe enough to require bed rest.
- **Fungi.** This type of pneumonia is most common in people with chronic health problems or weakened immune systems, and in people who have inhaled large doses of the organisms.
  - The fungi that cause it can be found in soil or bird droppings and vary depending upon geographic location.
- **Viruses.** Some of the viruses that cause colds and the flu can cause pneumonia. Viruses are the most common cause of pneumonia in children younger than 5 years.
  - Viral pneumonia is usually mild. But in some cases it can become very serious.

## **Symptoms:**

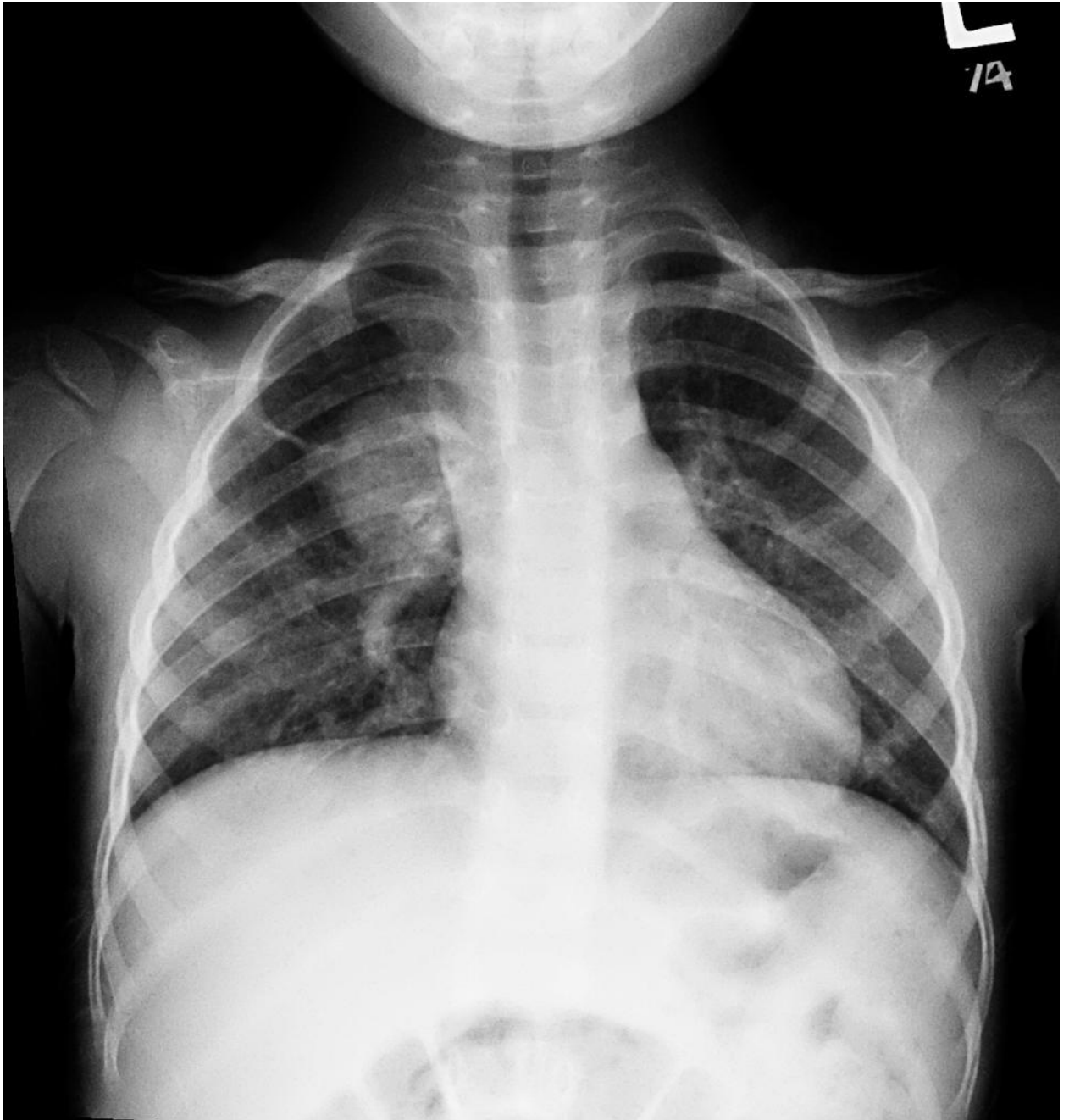
The signs and symptoms of pneumonia vary from mild to severe, depending on factors such as the type of germ causing the infection, and your age and overall health. Mild signs and symptoms often are similar to those of a cold or flu, but they last longer.

- Signs and symptoms of pneumonia may include:
- Chest pain when you breathe or cough
- Confusion or changes in mental awareness (in adults age 65 and older)
- Cough, which may produce phlegm
- Fatigue
- Fever, sweating and shaking chills
- Lower than normal body temperature (in adults older than age 65 and people with weak immune systems)
- Nausea, vomiting or diarrhea
- Shortness of breath

## **Chest X-Ray**

- This chest X-ray shows an area of lung inflammation indicating the presence of pneumonia.
- The doctor will start by asking about your medical history and doing a physical exam, including listening to your lungs with a stethoscope to check for abnormal bubbling or crackling sounds that suggest pneumonia.
- X-rays of the chest reveal areas of opacity.
- A normal chest x-ray makes community-acquired pneumonia (CAP) less likely; however, CAP is sometimes not seen on x-rays because the disease is either in its initial stages or involves a part of the lung not easily seen by x-ray.
- X-rays can be misleading, because other problems, like lung scarring and congestive heart failure, can mimic pneumonia on x-ray.[2] Chest x-rays are also used to evaluate for complications of pneumonia.

- Chest x-ray findings are usually nonspecific in viral pneumonia.
- Computed tomography is used in situations when the diagnosis is not clear with a chest x-ray



## **Treatment:**

Treatment depends on the type and severity of the pneumonia.

- Bacterial types of pneumonia are usually treated with antibiotics.
- Viral types of pneumonia are usually treated with rest and plenty of fluids. Antiviral medications can be used in influenza.
- Fungal types of pneumonia are usually treated with antifungal medications.
- Doctors commonly prescribe over-the-counter (OTC) medications to help manage the symptoms of pneumonia. These include treatments for reducing fever, reducing aches and pains, and suppressing coughs.
- In addition, it is crucial to rest and drink plenty of fluids. Staying hydrated helps to thin out thick phlegm and mucus, making it easier to cough up.
- Hospitalization for pneumonia may be required if symptoms are especially bad or if an individual has a weakened immune system or other serious illnesses.
- In the hospital, patients are generally treated with intravenous antibiotics and fluids. They may need a supplemental oxygen supply.

## **QUESTION NO. 2**

### **Blood Disease**

### **Leukocytosis**

- Leukocyte is another name for white blood cell (WBC).
- These are the cells in our blood that help your body fight infections and some diseases.
- When the number of white cells in our blood is higher than normal, it's called leukocytosis.
- This usually happens because we are sick, but sometimes it's just a sign that your body is stressed.

### **Types of leukocytosis**

Leukocytosis is classified by the type of WBC that's increased. **The five types are:**

#### **1. Neutrophilia.**

This is an increase in WBCs called neutrophils. They're the most common type of WBCs, accounting for 40 to 60 percent of your WBCs. Neutrophilia is the type of leukocytosis that occurs most often.

#### **2. Lymphocytosis**

About 20 to 40 percent of your WBCs are lymphocytes. An increased number of these cells is called lymphocytosis. This type of leukocytosis is very common.

#### **3. Monocytosis.**

This is the name for a high number of monocytes. This cell type makes up only about 2 to 8 percent of your WBCs. Monocytosis is uncommon.

#### **4. Eosinophilia.**

This means there are a high number of cells called eosinophils in your blood. These cells make up about 1 to 4 percent of your WBCs. Eosinophilia is also an uncommon type of leukocytosis.

### **5. Basophilia.**

This is a high level of WBCs called basophils. There aren't many of these cells in your blood — only 0.1 to 1 percent of your WBCs. Basophilia is rare.

Each type of leukocytosis tends to be associated with a few conditions:

- **Neutrophilia** is associated with infections and inflammation.
- **Lymphocytosis** is associated with viral infections and leukemia.
- **Monocytosis** is associated with certain infections and cancer.
- **Eosinophilia** is associated with allergies and parasites.
- **Basophilia** is associated with leukemia.

## **Symptoms of leukocytosis**

- a stroke
- problems with your vision
- breathing problems
- bleeding from areas covered with mucosa, such as your mouth, stomach, and intestines
- This is called hyperviscosity syndrome. It happens with leukemia, but it's rare.

- Other symptoms of leukocytosis are related to the condition causing your high number of WBCs, or sometimes due to effects of the specific type of white blood cell. These may include:
  - fever and pain or other symptoms at the site of an infection
  - fever, easy bruising, weight loss, and night sweats with leukemia and other cancers
  - hives, itchy skin, and rashes from an allergic reaction on your skin
  - breathing problems and wheezing from an allergic reaction in your lungs

## Blood Test:

- How many white blood cells (WBCs) someone has varies, but the normal range is usually between 4,000 and 11,000 per microliter of blood.
- A blood test that shows a WBC count of less than 4,000 per microliter (some labs say less than 4,500) could mean your body may not be able to fight infection the way it should.

**Table 1. Laboratory Data.**<sup>a,c</sup>

Variable	Reference Range, Adults <sup>†</sup>	14 Mo before Presentation, Outpatient Clinic of the Other Hospital	12 Mo before Presentation, Outpatient Clinic of the Other Hospital	9 Days Before Presentation, Emergency Department of the Other Hospital	5 Days before Presentation, Outpatient Clinic of the Other Hospital	On Presentation, This Hospital
White-cell count (per mm <sup>3</sup> )	4500–11,000	10,800	12,000	31,200	33,600	36,700
Differential count (%)						
Neutrophils	40.0–70.0	70.5	75.1	80.8	81.4	81.9
Lymphocytes	22.0–44.0	28.0 (ref 21.0–49.0)	23.4	18.4	17.5	14.7
Monocytes	4.0–11.0	1.0 (ref 2.0–10.0)	0.7	0.5	0.8	
Eosinophils	0.0–8.0	0.0 (ref 0.0–7.0)	0.6	0.2	0.1	
Basophils	0.0–3.0	0.4 (ref 0.0–2.0)	0.3	0.1	0.3	
Myelocytes (%)	0					1.7
Metamyelocytes (%)	0					1.7
Hematocrit (%)	36.0–46.0 (women)	40.1 (ref 37.0–47.0)	41.6	41.7	40.0	40.0
Hemoglobin (g/dl)	12.0–16.0 (women)	13.8 (ref 12.0–16.0)	14.3	14.3	13.3	13.0
Mean corpuscular volume (fl)	80.0–100.0	98.9 (ref 80.0–94.0)	98.9	93.9	94.5	98.0
Platelet count (per mm <sup>3</sup> )	150,000–400,000	203,000	202,000	297,000	315,000	253,000 (large platelets present)
Peripheral-blood smear		No ring forms seen			Occasional band forms (3% estimated); few myelocytes	1+ polychromasia; burr cells present
Calcium (mg/dl)	8.5–10.5	9.6 (ref 8.5–10.0)		10.3		10.0
Alkaline phosphatase (U/liter)	30–100	117 (ref 31–116)		193	207	216
Aspartate aminotransferase (U/liter)	9–32	46 (ref 10–32)		41	35	37
Alanine aminotransferase (U/liter)	7–33	45 (ref 7–35)		35	29	19
Lactate dehydrogenase (U/liter)	110–210	256 (ref 100–190)		274		291
Globulin (g/dl)	1.9–4.1					1.3

<sup>a</sup> Ref denotes reference range at the other hospital. To convert the values for calcium to millimoles per liter, multiply by 0.250.

<sup>†</sup> Reference values are affected by many variables, including the patient population and the laboratory methods used. The ranges used at Massachusetts General Hospital are for adults who are not pregnant and do not have medical conditions that could affect the results. They may therefore not be appropriate for all patients.



## **Treatment:**

- **IV fluids may be given to give you extra fluid and electrolytes.**
- **Medicines may be given to decrease inflammation or treat an infection. You may also be given medicine to decrease acid levels in your body or urine.**
- **Leukapheresis is a procedure to decrease the number of WBCs.**