

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

We will continue with the last subject which is pneumonia:

These are the three most important viral causative agents of pneumonia:

- 1- **Influenza**
- 2- **Respiratory syncytial virus (RSV)**
- 3- **Parainfluenza virus**

Some viruses can cause permanent ciliary dysfunction. This predisposes the patient to bacterial superinfection that is due to impaired immunity.

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- * Adenovirus: A large virus
 - * Coronavirus: MERS and SARS.
 - * Hantavirus: byunaviradae
 - * Orthomyxoviridae: influenza.
 - * Papovaviruses: JC virus, BK virus (causes of PML and other diseases in immunocompromised patients)
 - * Paramyxovirus: PIV and RSV
 - * Picornaviridae: enteroviruses, koksake, rhinovirus
 - * Reoviridae: rotavirus (causes gastroenteritis with severe diarrhea in children and pneumonia in immunocompromised).
 - * Retroviridae: HIV.
 - * Herpes Viruses: they cause pneumonia in immune-compromised patients.

Influenza Virus:

- * Enveloped ssRNA
- Belongs to orthomyxoviradae family
- * 8 segments of RNA.
 - * Most common cause of viral pneumonia.
 - * Types A, B, C.
- A and B are the most infectious.
Pandemics are caused by A
The virus with the largest amount of genetic material

1-Type A : can alter surface antigens and infect livestock (that will make it impossible to eradicate). There is a large reservoir in animals, thus making it problematic. It spreads by small particle aerosols.	2-Type B: causes illness in closed populations; boarding schools.	3-Type C: is less common and occurs as sporadic cases.
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*Type A is the most virulent

Vaccine:

1-Trivalent vaccine Has Type A (2) strains + Type B (1) strain

2-Quadrivalent vaccine has type A (2) strains +type B (2) strains (better than the first; 2 type B strains)

*Two influenza types have emerged of particular importance:

1-bird flu (Avian influenza) (H5N1)

2- Swine flu (H1N1)

RSV:

*It forms syncytia in cell culture (that why it's called respiratory syncytial virus)

*Most frequent cause of pneumonia in children.

*2nd most common cause of viral pneumonia in adults.

*Medium sized virus

*Paramyxoviridae family

*highly contagious

*Transmitted by fomites and droplets.

*Most children are infected <5 years

*Infection rate during epidemics approaches 100%, in certain settings such as daycares.

*It has no vaccine.

There was a vaccine, but it was withdrawn.

*Reinfection in children and young adults is common.

*As the person's age increases the incidence and severity of viral pneumonia increases.

Rhinovirus:

*Accounts for 30% of all viral pneumonia.

*The second most common frequent recognized agent of pneumonia and bronchiolitis in children (1st is RSV)

*Associated with bronchiolitis and measles

*Rhinovirus is linked to asthma and COPD in children.

Human Metapneumovirus:

A major cause of pneumonia in children

*New virus, discovered in Holland in 2001.

*Part of paramyxoviridae(as RSV)

*found in the environment in high amounts (ubiquitous organism)

*highly infectious: by age 5 all children have been exposed to it.

*reinfection occurs throughout life.

*Spread by droplet and fomites.

*A notable cause of LRT infections 60%: bronchiolitis, croup, asthma, and pneumonia.

*The severity increases with age.

*The most common diagnosis associated with adult hospitalizations with hMPV infection is:

-COPD.

-Bronchitis.

- Pneumonia.
 - Immunocompromised.
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Varicella zoster virus (VZV):

- *most common cause of pneumonia in bone marrow transplant
 - *Virus of chicken pox.
 - *Skin lesions are present with pneumonia
(diagnosis is easy because when pneumonia is present along with skin lesions it's indicative of VZV)
 - *It's highly contagious.
 - *Spreads by:
 - 1-breath of the patient
 - 2-skin lesions
 - *In reactivation of VZV (herpes Zoster or shingles): the lesions are contagious not the breath except in the case of immunocompromised patients
 - *The pneumonia is bad, but it's worse in immune-compromised patients.
 - *Children do get chicken pox, but they rarely get pneumonia.
 - *Complications are: bacterial superinfection, encephalitis, hepatitis, and others.
 - *Aspirin with VZV → causes Reye's syndrome which involves hepatoencephalopathy (associated with aspirin consumption by children with viral illness)
- *The infection is more severe in smoking individuals (generally all virus of respiratory tract increase with smoking)

During viremia the virus goes to the lung and when they coughing they may transmit it to other people (The patient does not necessarily have to have pneumonia).

Measles:

- *It causes pneumonia.
 - *Member of the paramyxoviridae.
 - *A ssRNA virus contained within a nucleocapsid and surrounded by an envelope.
 - *Measles is a respiratory tract virus that causes a rash in children; however, it can be complicated with pneumonia.
 - *Usually mild, but can be severe.
 - *It can result in pneumonia in hospitalized and malnourished children (considered as the main cause of immunodeficiency), with high mortality.
 - *It's highly contagious.
- In Jordan, we do not have outbreaks of measles. We had one last year, but, in general, there are sporadic cases only.
- *IP: 10-14 days.
 - *Peaks in late winter and early spring.

CMV:

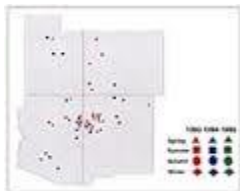
- *Common cause of infections, usually asymptomatic
 - *Transmission: it's secreted in all secretions of the patient (highly infectious). It approaches 100% infection rate (subclinical).
 - *As the social status improves, the incidence decreases.
 - *Reactivation of latent virus is almost universal.
- Most patients with BM transplants get reactivation of the virus.
- *CMV pneumonia may occur and it's often fatal in immune-compromised patients (BM transplant, organ transplant, or HIV patients)
 - *The most common cause of pneumonia in immune-compromised patients
 - *This virus is immune-suppressive.
 - *HIV patients get CMV but they get it as hepatitis and retinitis (rarely pneumonia, it's common in bone transplant)

HSV:

- *It's a rare cause of pneumonia.
 - *It's more common in immune-compromised patients (transplantation & chemotherapy)
 - *It's a serious disease.
 - *Oral-labial herpes can spread to the lungs directly (primary infection through the instruments used for chemotherapy), or by reactivation.
- *It causes death of 80% of patients.

Hantavirus:

- *RNA virus.
- It is an emerging virus
- *Part of the bunyaviridae.
 - *hemorrhagic fever & causes pneumonia, In addition to HPS (Hanta pulmonary syndrome).
- It was discovered in the United States
- *The four corner regions near Texas on the map in USA: outbreak of Hantavirus from rats spread to humans through stool or saliva (rat bite), it also can be transmitted through inhalation of air polluted with this Virus.
 - *New Mexico, Utah, Arizona, and Colorado.
 - *First named: Four corners virus.



Others:

HIV

SARS

Most important viruses cause pneumonia	In Immune-compromised:
1-Influenza virus. 2-Rhinovirus. 3-RSV. 4-Parainfluenza	1-CMV. 2-HSV. 3-Measles

The most common cause of viral pneumonia in Children: RSV

There is no vaccine for CMV, yet

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