Measles

Measles (also known as Rubeola or first disease) is a highly contagious exanthematous illness caused by a paramyxovirus.

ETIOLOGY

Measles virus is a single-stranded, lipid-enveloped RNA virus in the family Paramyxoviridae and genus *Morbillivirus*.

TRANSMISSION

The portal of entry of measles virus is through the respiratory tract or conjunctivae following contact with large droplets or small-droplet aerosols in which the virus is suspended. ***Patients are infectious from 3 days before to up to 4-6 days after the onset of rash.***

PATHOGENESIS& PATHOLOGY

Measles consists of 4 phases: **incubation period, prodromal illness, exanthematous phase, and recovery**. Fusion of infected cells results in multinucleated (up to 100 nuclei) giant cells called ***"Warthin- Finkeldey giant cells"*** which are pathognomonic for measles, with intracytoplasmic and intranuclear inclusions (represent the virus).

CLINICAL MANIFESTATIONS

Incubation period of 8-12 days, the prodromal phase begins with a mild fever followed by the onset of conjunctivitis with photophobia, coryza, a prominent cough, and increasing fever. **Koplik spots** represent the enanthem and are the pathognomonic sign of measles, appearing 1-4 days prior to the onset of the rash. They first appear as discrete red lesions with bluish white spots in the center on the inner aspects of the cheeks at the level of the premolars. They may spread to involve the lips, hard palate, and gingiva. They also may occur in conjunctival folds and in the vaginal mucosa.

Symptoms increase in intensity for 2-4 days until the 1st day of the rash. The rash begins on the forehead (around the hairline), behind the ears, and on the upper neck as a red maculopapular eruption. It then spreads downward to the torso and extremities, reaching the palms and soles .The exanthem frequently becomes confluent on the face and upper trunk. With the onset of the rash, symptoms begin to subside. The rash fades over about 7 days in the same progression as it evolved, often leaving a fine desquamation of skin in its wake. Of the major symptoms of measles, the cough lasts the longest, often up to 10 days. In moresevere cases, generalized lymphadenopathy may be present.

LABORATORY FINDINGS& DIAGNOSIS

Lymphopenia is characteristic. Total leukocyte counts may fall to 1500/µL. Serologic confirmation is made by identification of immunoglobulin (Ig) M antibody in serum. IgM antibody appears 1-2 days after the onset of the rash and remains detectable for about 1 mo. Serologic confirmation may also be made by demonstration of a 4-fold rise in IgG antibodies in acute and convalescent specimens. Viral isolation from blood, urine, or respiratory secretions can be accomplished by culture.

Imaging: Chest x-rays often show hyperinflation, perihilar infiltrates, or parenchymal patchy, fluffy densities. Secondary consolidation or effusion may be visible.

DIFFERENTIAL DIAGNOSIS

1. ***Kawasaki disease .***
2. ***Drug eruptions(eg, Stevens-Johnson syndrome).***
3. ***Meningococcemia .***
4. ***rubella, adenovirus infection, enterovirus infection, and Epstein-Barr virus infection.***
5. ***Mycoplasma pneumoniae and group A streptococcus may also produce rashes similar to that of measles.***

COMPLICATIONS

Morbidity and mortality of measles are related to several factors e.g.

age <5 yr (especially <1 yr) and >20 yr, crowding, severe malnutrition, immunodeficiency, & low serum retinol levels (vit. A deficiency).

Cxs of Measles can be classified as follows:-

1. ***Respiratory Cxs:*** **Pneumonia** is the most common cause of **death** in measles. It may manifest as ***giant cell pneumonia*** caused direct viral infection or as superimposed bacterial infection e.g. *Streptococcus pneumoniae, Haemophilus influenzae, & Staphylococcus aureus*.

Croup, tracheitis, and bronchiolitis are common in infants and toddlers. Measles can suppress TST and reactivate pulmonary TB.

2. ***ENT Cxs*** e.g. acute otitis media (is the most common complication of measles), mastoiditis, sinusitis, & retropharyngeal abscess.
3. ***GIT Cxs:*** **Diarrhea and vomiting** with dehydration are common symptoms associated with measles; appendicitis or abdominal pain may occur.
4. ***Neurological Cxs:*** **Febrile seizures** occur in <3%. **Encephalitis** is mainly occurring in adolescents and adults. It is due to postinfectious, immunologically mediated process and is not the result of a direct effect by the virus. Clinical onset begins during the exanthem and manifests as **seizures, lethargy, coma, and irritability**. Death occurs in 15% of patients with measles encephalitis.

Subacute measles encephalitis manifests 1-10 mo after measles in immunocompromised patients; it results from direct damage to the brain by the virus and manifest as seizures, myoclonus, stupor, and coma; progressive disease and death almost always occur.

5. ***Rare Cxs*** include: **Hemorrhagic or "black" measles** which is often fatal and manifests as hemorrhagic skin eruption. Other rare Cxs are keratitis, myocarditis, thrombocytopenia, bacteremia, cellulitis, and toxic shock syndrome. - 400 -

Subacute sclerosing panencephalitis (SSPE) is a rare disease but nearly always fatal. SSPE begins insidiously 7-13 yr after primary measles infection when the virus apparently regains virulence and attacks the CNS cells → inflammation and cell death. It manifests as subtle changes in behavior, irritability, reduced attention span, and temper outbursts.

6. ***Measles during pregnancy*** is associated with high rates of maternal morbidity, fetal wastage, and stillbirths; congenital malformations occur in 3% of liveborn infants**.**

TREATMENT

Management of measles is **supportive** e.g. maintenance of hydration, oxygenation, and comfort. **Antipyretics** are useful for comfort and fever control. Oral **rehydration** is effective in most cases, but severe dehydration may require IV therapy. For patients with respiratory tract involvement, **airway humidification and supplemental oxygen** may be of benefit. Respiratory failure from croup or pneumonia may require **ventilatory support**.

Vitamin A therapy is indicated for all patients with measles. Vitamin A should be administered once daily for 2 days at doses of 200,000 IU for children >1 yr; 100,000 IU for infants between 6 mo - 1 yr; and 50,000 IU for infants <6 mo of age. In children with signs and symptoms of vitamin A deficiency, a 3rd dose is recommended 2 - 4 wk after the 2nd dose.

Note: *Antiviral therapy is not effective in Rx of measles in otherwise normal patients. Likewise, prophylactic antimicrobial therapy to prevent bacterial infection is not indicated*

PREVENTION

Patients shed measles virus from 7 days after exposure to 4-6 days after the onset of rash. Exposure of susceptible individuals to patients with measles should be avoided during this period.

Measles vaccine is usually given at 9 mo of age, then at 15 mo & 5 yr (as **MMR**). SE of MMR vaccine include **fever** (usually 6-12 days following vaccination & may be associated with febrile seizures) & rash.

Post-exposure Px can be given to prevent or modify infection. It is done by either **vaccine** if given within 72 hr of exposure, or **Immune globulin** up to 6 days after exposure. Immune globulin is indicated for infants <6 mo, pregnant women, and immunocompromised persons.