Measles
“Rubeola”

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- **Epidemiology:**
- Measles is acute highly contagious disease of childhood caused by specific virus of the group Paramyxoviruses. The disease clinically characterized by fever and catarrhal symptoms of the upper respiratory tract (coryza, cough) followed by a typical rash.

- The word “rubeola” means red spots, the earliest description of measles was by Abu Bakr Al-Razi (865-925 AD), in 1884 Panum described the epidemiology, in 1954 Enders and his colleagues isolated the virus, in 1958 the vaccine was in clinical trials, in 1963 the vaccine was licensed to use.

- Measles is associated with high morbidity and mortality in the developing countries and its worldwide endemically distributed before active immunization application. Epidemics tend to occur every 2-3 years.
- Nearly 100 % of children in the developing countries will contract the disease between the age of 6 months - 3 years while the age is 5 years in the developed countries. The epidemics tend to occur when 40 % of children are susceptible (90 % of virgin community will be infected). After application of active immunization the age distribution shifted to older children, 50 % of cases occur in school children 10-14 years, 5 % of cases occur in those over 20 years of age.

- **Sex Distribution:** both sexes equally affected.
- **Immunity:**
- No age is immunized but infants less than 6 months get benefit from the passive acquired immunity from the mother’s antibodies.

- **Nutrition:**
- Measles tend to be sever in malnourished children (they shed the virus for a long period), also measles attack is followed by weight loss ending in malnourished child.
- **Seasonal Variation:**
- Measles is a disease of winter (early spring) because of crowding.
- **Infectious Agent:**
- Measles virus is RNA Paramyxovirus (can't survive outside human body for any length of time.

- **Source Of Infection:**
- The only source is a case of measles (clinical or subclinical), carriers are not known to occur.
- **Reservoir:** man is the only reservoir.
- **Incubation Period:**
- 10 days from exposure to fever appearance and 14 days to rash appearance.

- **Period Of Communicability:**
- 4 days before the rash, and 5 days after it. The secondary attack rate of measles is 80-90 % among household susceptible contacts.
- **Portal of entry:**
- Respiratory tract mainly, via conjunctiva could occur. Recipients of vaccine are not contagious to others.
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- **Clinical Features:**
- 1. The prodromal stage: 10-14 days, fever, coryza, sneezing, nasal discharge, cough, eye redness, lacrimation and often photophobia. Vomiting and diarrhea lasting for 1-2 days then appearance of the rash & Koplik's spot on the buccal mucosa.
- 2. Eruptive stage: after few days appearance of the dusky red rash (Maculo-papular rash) starting behind the ear and spread within few hours to the face, neck, trunk, then extremities taking 2-3 days to reach.
- 3. Post measles stage: the child will have weight loss and weakness for few days.

- **Diagnosis:**
- Epidemiologist standard case definition for disease surveillance give standard definition for measles: history of generalized rash, fever and history of cough, coryza, conjunctivitis. WHO has put a standard case investigation from certain information regarding identification of cases, possible source of infection, clinical data, laboratory data and final outcome.

- **Complications:**
- More than 50 % of cases develop complication which include: Pneumonia, encephalitis (which cause brain damage, mental retardation in 1/2000), the occurrence of complication depend on host factors in particular nutritional status of child (more sever in the malnourished children). Long term complication include subacute sclerosing panencephalitis (SSPE). All cases of sever measles need vitamin A, because the might develop acute deficiency of vitamin A then keratomalacia then blindness from corneal scaring occur.

- **Case Fatality:**
- 2-15 % in developing countries, 0.2/10000 in the developed countries, the mortality is 100-400 times more in the preschool age. Before the introduction of the vaccine (before 1960) measles used to kill 7-8 million children yearly and caused 135 million cases yearly world wide. Today only 1 million dye from 42 million who get measles yearly. Measles still a leading killer among vaccine preventable diseases of childhood mainly in the malnourished children living in crowded areas.

- **Treatment:**
- No specific treatment, so we only give supportive measures, and antibiotics in case of secondary bacterial infections.

- **Prevention & Control:**

A- Preventive measures:

1- Measles vaccination:

- Achieving immunization rate of 95 %, and ongoing immunization against measles through successive generations of children.

2- Immunoglobulins:

- Measles can be prevented in early incubation period by administration of 0.25 ml/kg immunoglobulin within 3-4 days of the exposure.

- **B- Control measures:**
- Isolation for 7 days after the onset of the rash, but it’s of little value because the case is infectious during the prodromal stage, but we should exclude the child from school for 10 days to prevent further spread of disease to the others in the class (10 days is 7 days of IP + 4 days).

- **Immunization:**
- Measles vaccine is a live attenuated vaccine given in a single dose at the age of 9 months, as 0.5 ml subcutaneous , this gives 90 % protection. It’s repeated at 15 months with another vaccine (Rubella) as MMR. It’s repeated because children in endemic areas are susceptible to get the infection and the vaccine will decrease in efficacy.

- The vaccine should be stored in 2-8 C^{o}, protected from light (because it will inactivate the vaccine.
- The vaccine is absolutely contraindicated in immune deficiency e.g. leukemia, lymphoma and malignancy, patients on cytotoxic drugs and those on steroids.
- The vaccine is relatively contraindicated in transient acute illnesses and febrile illnesses, hypersensitivity to neomycin and eggs, and in pregnancy.

- Adverse effects include toxic shock syndrome (TTS), this occur when the vaccine is contaminated (poor quality of immunization services). It's characterized by sever watery diarrhea, vomiting, high fever reported few hours after measles vaccination, it's highly fatal within 48 hours.
- Measles vaccine can be combined with other life attenuated vaccines such as mumps and rubella (as MMR vaccine), such combination is highly effective.

- **Eradication:**
- It’s believed that measles like small pox as amenable to eradication, no known animal reservoir, no long term carriers, lifelong immunity after recovery from the disease, simple case detection, effective vaccine, single dose is needed and 96 % coverage only is needed.

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