Fever and Rashes

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Rashes and fever

- Fever and rashes may be due to infectious but also none infectious diseases
- The none infectious include autoimmune diseases such as rheumatoid arthritis, or SLE, and Drugs which may lead to all types of rashes and fever
- The history is critical in deciding the cause of the disease
- The rash type also helps determine the etiologic agent

The child with rash and fever

- Maculopapular rashes
  - Measles
  - Rubella
  - Parvovirus B19 (erythema infectiosum)
  - Exanthem subitum (HHV6) Roseola infantum
  - Scarlet fever group A beta hemolytic strep
- Vesicular
  - Chickenpox (varicella)
  - Herpes simplex
  - Enteroviruses
- Purpuric rashes
  - Meningococcemia
  - Enteroviruses

Measles

- Etiologic agent is one measles serotype
- Rubeola virus is an RNA virus
- It is limited to humans and there are no asymptomatic cases, no asymptomatic cases
- It is Acquired by respiratory route by contact with infected individuals who are infectious one day before appearance of the rash
- The incubation period is usually 10 days but can be 7-14 days
- The clinical syndrome is very typical with fever and cough and conjunctivitis antedating the rash by three days. The rash which is maculopapular appears first on the face
- An enanthem, koplik spots on the buccal mucosa appears one day before the rash which appears first on the face first and then spreads to the rest of the body
- Fever continues for two to three days after the rash and unless there are complications disappears in the same way it appeared on the 3rd or fourth day with branny discoloration
- Complications include pneumonia and encephalitis which may occur after disappearance of the rash

Typical rash on day 2–3 of measles

Measles

Complications of measles

- Bronchopneumonia
- Otitis media
- Conjunctivities
- Diarrhea
- Rare complications include encephalitis
- SSPE Long term complication and very rare with slow neurologic symptoms which occurs several years after measles infection leading to neurologic deterioration

Diagnosis and treatment

- Diagnosis
  - Viral isolation
  - Antibody testing in people who were not vaccinated
  - Treatment is supportive with antipyretics and antibiotics if there is pneumonia
  - Vitamin A single dose seems to help especially in children who are malnourished
  - Measles mortality 1/1000
  - Prevention by vaccination made this a rare disease
  - In Jordan measles vaccination was started more than twenty years ago and the disease is now reportable to the MOH and is very uncommon
  - MMR is given twice after the age of one year

Rubella

RUBELLA (3 day Measles)

EPIDEMIOLOGY

- Agent- RNA Virus Togaviridae
- Natural Host - Human
- Transmission – Air Droplet, Trans placental
- Subclinical - Clinical- 2:1
- Infectivity- 1wk before & 1wk after the onset of rash

Rubella

- Incubation period – 14-21 days
- Low grade fever
- Rash - fine red rash on the face, spreads to cover the whole body within 24 hours
- Rash lasts about 3days
- Forchheimer spots on soft palate in 20% cases
- Lymphadenopathy and arthralgia may be present

Rubella

Discrete maculo papules confluent with large areas of flushing

Rubella

TREATMENT

- Supportive care
- Antipyretics like paracetamol
- Antihistamines for troublesome itching

Congenital rubella

CONGENITAL RUBELLA SYNDROME

- Congenital defects in newborn in 50% cases when infection occurs at first trimester
- Congenital rubella syndrome –
  - cataract, microphthalmia (43%)
  - sensorineural deafness (58%)
  - congenital heart disease PDA, PS (50%)
  - microcephaly, mental retardation
  - hepatosplenomegaly

Congenital rubella syndrome

Prevention of rubella

- Rubella vaccine is a live attenuated vaccine
- It is given in combination with measles and mumps vaccines
- It is safe to administer in adults
- Universal vaccination helped control congenital rubella infection
- Vaccine is administered after the age of 12 months and can be given to. None immune adults
- Rubella vaccination is needed primarily to prevent congenital infection other wise the disease is mild and rarely leads to morbidity

Roseola infantum

- Cause by Human Herpes Virus 6 (HHV6)
- Initially manifests as high fever for three days followed by maculopapular rash and fever disappears on same day
- This distinguishes Roseola infantum from other maculopapular rashes such as measles and rubella
- However the virus may persist in the body
- The infection may be severe in the immunocompromised

Roseola infantum rash

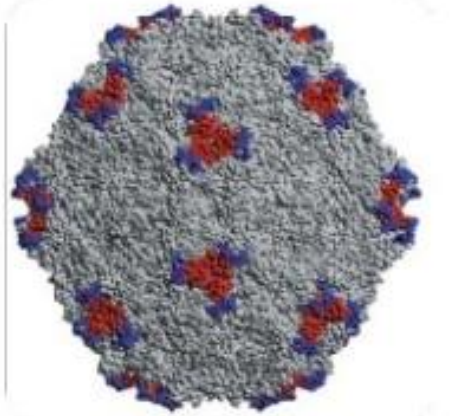
HHV6 in older immune compromised individuals

- HHV-6 was implicated as the cause of 30% of cases of pneumonitis in patients who underwent bone marrow transplantation.
- HHV-6 infection in patients with AIDS results in viremia, lymphadenopathy, disseminated organ involvement, active CNS infection, retinitis, and death.
- HHV-6A is more common in patients with AIDS than in other patients.

Erythema Infectiosum

Parvovirus B19

- Family: *Parvoviridae*
  - Latin *parvus* means small
- ~20 nm in diameter
  - (0.02 μm)
- Single-stranded DNA virus
- Icosahedral capsid
- No envelope
- Only known human parvovirus



X-ray crystallographic image of parvovirus

Parvovirus B 19 complications

- Most serious in the immune compromised and pregnant women
- The infection may lead to intrauterine infection with hydrops fetalis occurring in the fetus

and

- Aplastic anemia in older individuals since the virus infects the bone marrow cells

Parvovirus infection

Body source & Transmission

- Replication in human cells restricted to erythroid progenitor cells
  - Adult bone marrow
  - Fetal liver
- Transmission by close contact
  - Airborne droplets
  - 50% of a household may become infected
  - 10-60% of students in school outbreaks

Erythema Infectiosum, parvovirus B 19

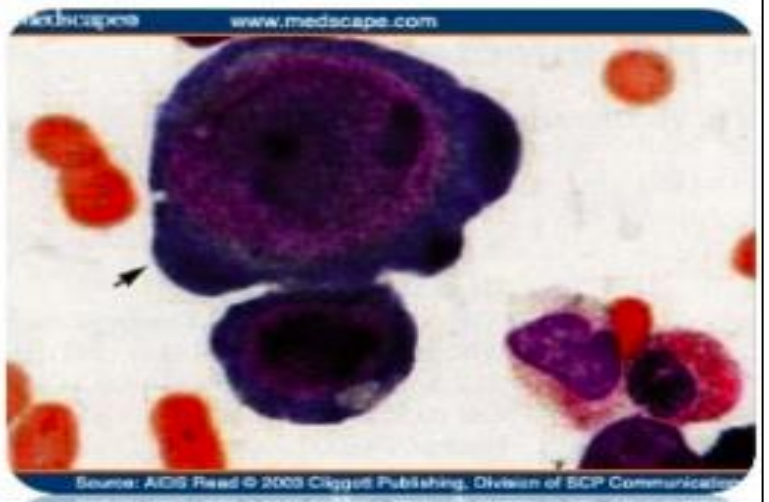
- Incubation period of 1–2 weeks
- Three overlapping stages.
- Rash appears first on the cheeks slapped cheeks appearance.
- In the second stage, macular or urticarial exanthem 1–4 days after the slapped cheek eruption, is mainly seen over the proximal extremities.
- In the third stage, the exanthem recurs intermittently in response to stimuli.
- Arthropathy may occur in up to 60% of adults with EI, whereas it will only occur in approximately 10% of children with joint symptoms.
- In children, the arthropathy affects larger joints, such as the knees, wrists and ankles, and in an asymmetric pattern.[12]

Slapped cheek appearance

Complications of parvovirus B19 infection

Symptoms – Aplastic Crisis

- Anemic patients
  - Pallor, fatigue, drop in hemoglobin >1g/dL
  - Destroys infected red blood cells
  - No reticulocytes to replace aging or damaged erythrocytes
  - This normally happens in disease but is symptomatic in anemic patients
- Thrombocytopenic patients
  - Bruising



Typical giant proerythroblast (arrow) seen in parvovirus B19-associated pure red cell aplasia with highly uncondensed chromatin and pale purple intranuclear inclusions. Bone marrow aspirate.

Vesicular rashes

- Vesicles have lesions which have fluid
- Examples include herpes simplex, chicken pox, some enteroviruses
- Vesicular rashes also may be due to insect bites and drug eruptions
- Important infectious disease that lead to vesicular rash include
  - Herpes simples
  - VZV, Chickenpox

Varicella Epidemiology

- Reservoir
  - Human
- Transmission
  - Person-to-person
  - Direct contact with vesicular fluid or inhalation of aerosols
- Temporal pattern
  - Peak in winter and early spring
- Communicability
  - 1 to 2 days before onset of rash until all lesions have formed crusts

Chickenpox, VZV virus

- DNA virus is a member of the herpesvirus group. Human host only
- Persists in the body as a latent infection after the primary (first) infection.
- Can reactivate resulting in herpes zoster (shingles).
- Clinical Features
  - Incubation period 14 to 16 days (range, 10 to 21 days)
  - Prolonged incubation period if postexposure prophylaxis with varicella specific immune globulin was given
  - Usually mild unless immunecompromised

Chickenpox , note lesions at different stages

Varicella

- Primary Infection with Varicella zoster virus (Varicella)
- Rash often first sign of disease in children; adults may have 1 to 2 days of fever and malaise before rash
- In unvaccinated individuals, generalized and pruritic rash progresses rapidly
- Clinical course in healthy children is mild; adults may have more severe disease
- Recovery usually results in lifetime immunity

Complications

- Bacterial infection of skin lesions
- Pneumonia
- Central nervous system manifestations including encephalitis
- Reye syndrome (rare)
- In the immune compromised may lead to generalized varicella infection including encephalitis and pneumonitis

Infection in pregnancy

Congenital VZV Infection

- Results from maternal infection in the first 20 weeks of gestation
- Associated with newborn limb hypoplasia,
- skin scarring, localized muscular atrophy,
- encephalitis, cortical atrophy, chorioretinitis
- microcephaly
- low birth weight

Varicella vaccine schedule

- 2-dose series at age 12 through 15 months and age 4 through 6 years
- Minimum age for dose 1 is 12 months
- Minimum interval for dose 1 to 2 is:
  - 3 months for children age 12 months–12 years (although a 4-week interval is valid)
  - 4 weeks for persons age 13 years and older (VAR only)