Viral Skin Infections

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Skin lesions

- Macule: change in surface color without elevation or depression, less than either 5 or 10 mm in diameter
- Papule: circumscribed, solid elevation of skin with no visible fluid. pinhead to less than either 5 or 10 mm in diameter
- Nodule: similar to a papule. greater than either 5 or 10 mm in both width and depth. The depth differentiates a nodule from a papule
- Pustule: small elevation of the skin containing cloudy or purulent material
- Vesicle: circumscribed, fluid-containing, epidermal elevation generally considered less than either 5 or 10 mm in diameter
- Bulla: large vesicle described as a rounded or irregularly shaped blister containing serous or seropurulent fluid, equal to or greater than either 5 or 10 mm
- Ulcer: discontinuity of the skin exhibiting complete loss of the epidermis, portions of the dermis and subcutaneous fat
- Crust: dried serum, pus, or blood usually mixed with epithelial and sometimes bacterial debris
- Lichenification: epidermal thickening characterized by visible and palpable thickening of the skin with accentuated skin markings

Viruses causing skin lesions

- World wide
- Nonimmune individuals
- Humans sole reservoirs
- respiratory tract primary route
  - Mumps, Measles, Rubella .
  - Erythema infectiosum and Parvovirus B19.
  - Roseola Infantum (Exantheme Subitum) and HHV6 and HHV7.
- Poxviruses.
- Herpes viruses
- Human papilloma virus

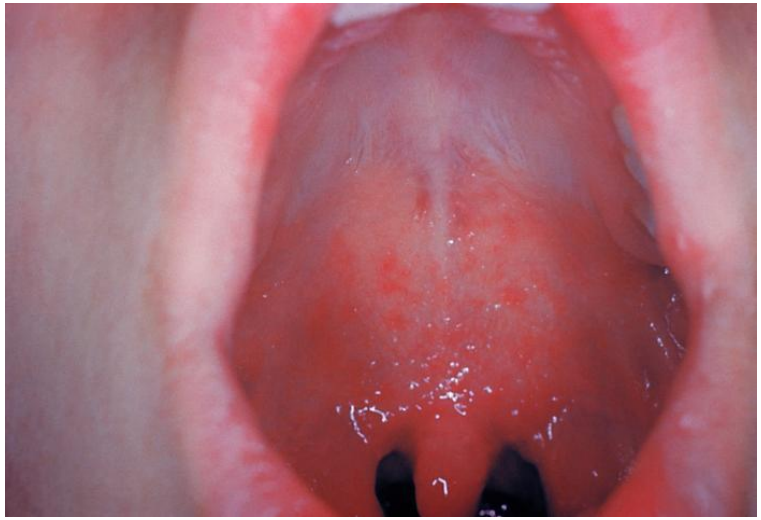
Measles (Rubeola)

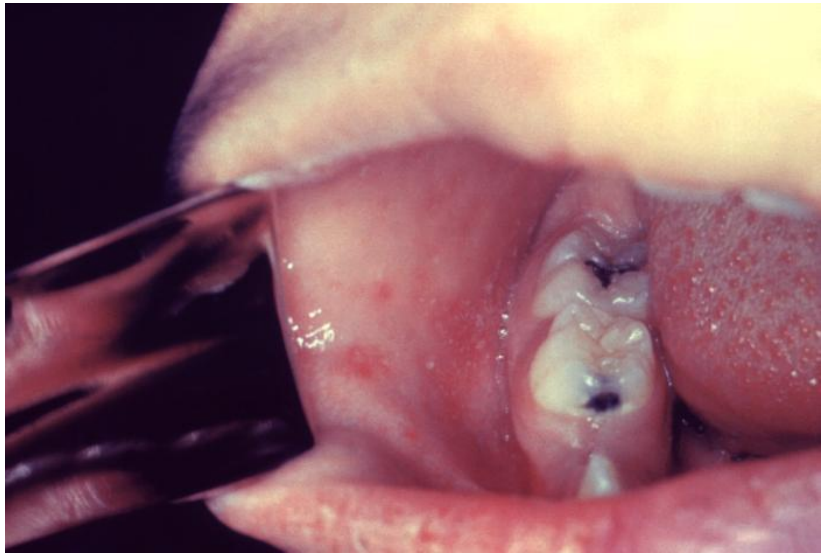
- Paramyxovirus family, Morbillivirus genus.
- -ve sense, single-stranded RNA, enveloped
- H, F proteins. Lack N protein. CD46 receptor.
- Single serotype, prone to antigenic variation
- Sever illness in children associated with fever, rash and immunosuppression.

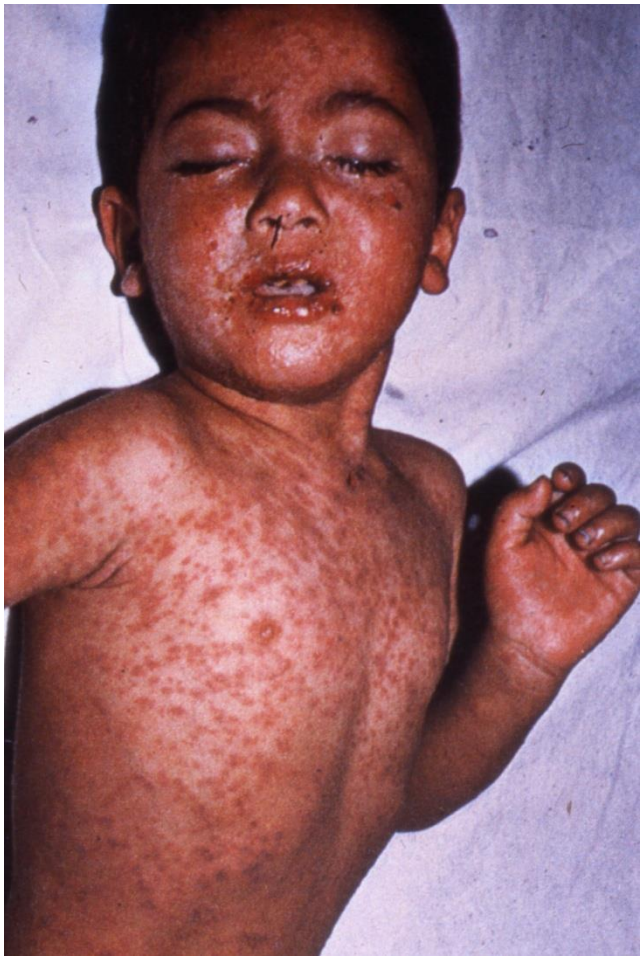
EPIDEMIOLOGY

- More than 6 months of age.
- Late winter and early spring.
- 95% infectivity. Communicability: 3-5 days before to 4 days after the appearance of the rash.

Exanthemes and enanthemes

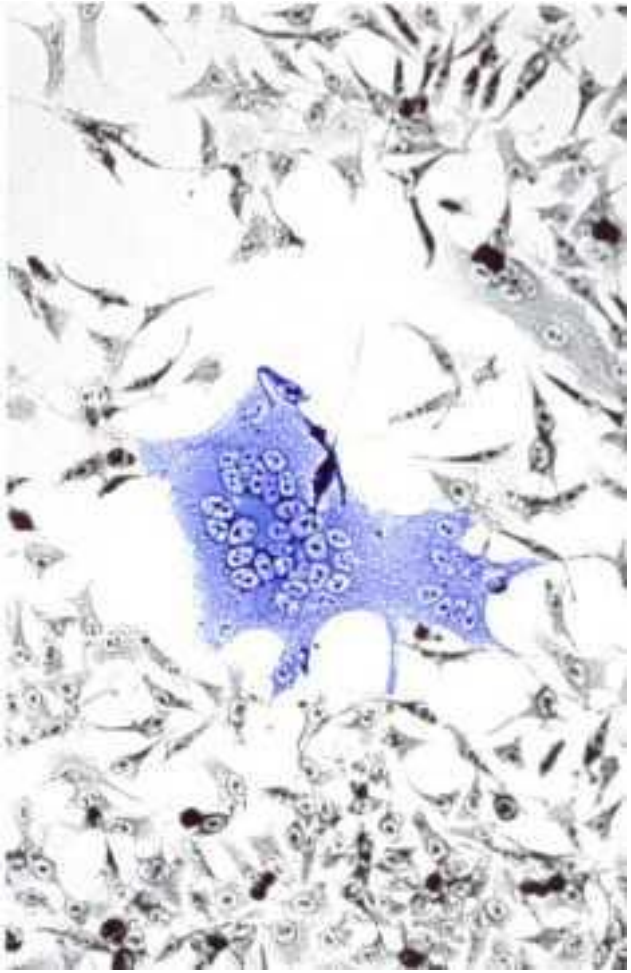


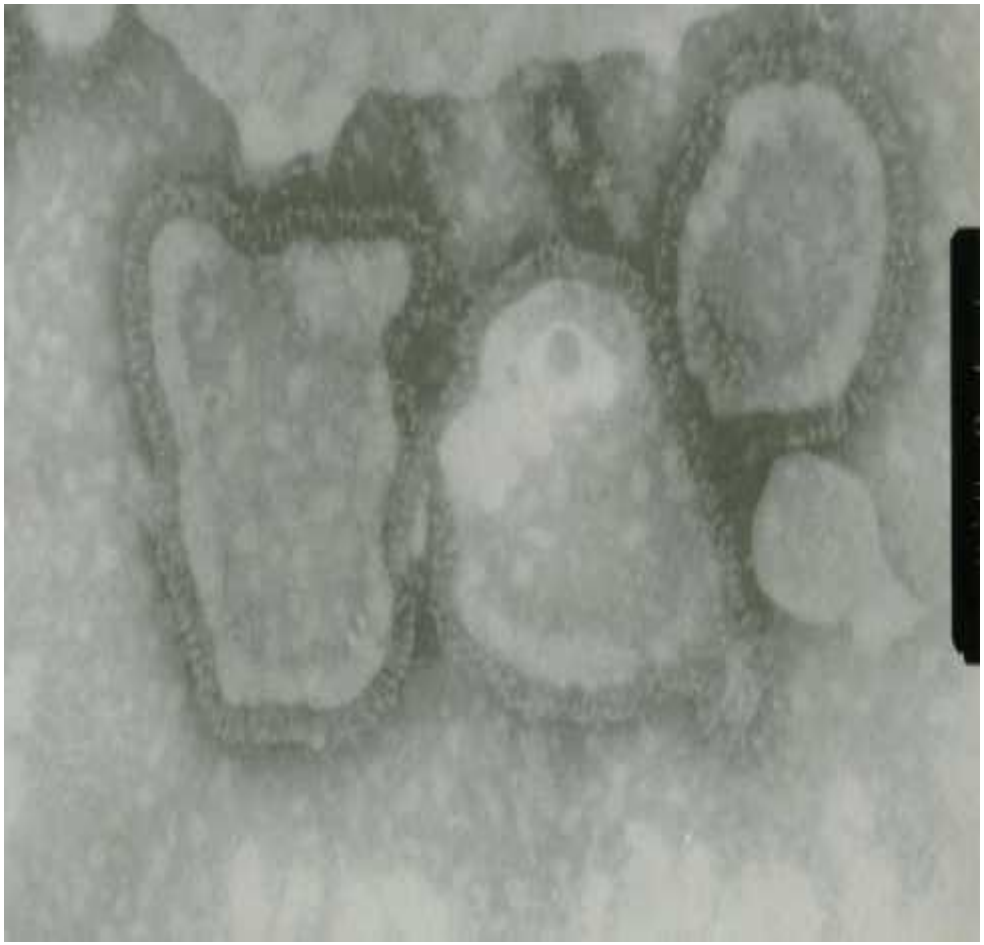




Pathogenesis

- URT, intense infection as a result of viral replication and syncytia formation. Disruption of cellular cytoskeleton leads to the formation of inclusion bodies in the nucleus and the cytoplasm.
- Viremia and lymphatic dissemination (lymphoid tissue, BM, abdomen, skin, conjunctiva, UT, CNS)
- Viremic phase: infect B and T cells, PMN's, CMI and humoral immunity depression, superinfection.
- Lymphoid tissue: Warthin-Finkeldey cells.
- Skin lesion: Vasculitis and skin rash, exantheme and enantheme (Koplik's spots: red spots with bluish-white centre on the buccal mucosa).
- CNS involvement (encephalitis) due to cytotoxic (CD8) T-cells which react with virus infected cells.





Immunity

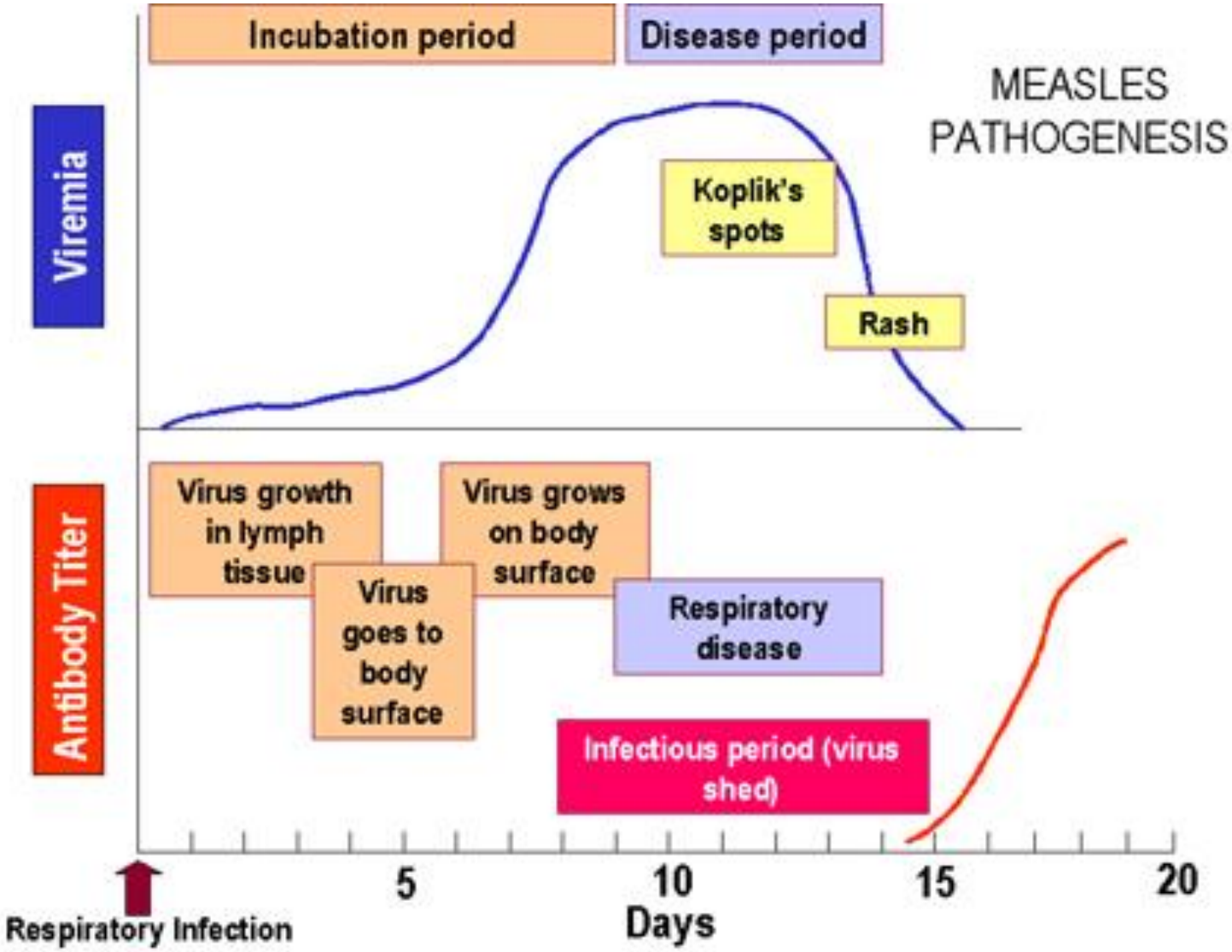
- CMI suppression for several months
- CMI at early stage mediate rash formation and is necessary for recovery
- Humoral peaks in 2-3 weeks, persist at low level.
- Life long immunity with neutralizing Abs

Clinical manifestations

- 5 day measles
- IP=7-18 days
- URT symptoms, conjunctivitis, fever. 1-3 days later Koplik's spots (1-2 days), skin rash (maculopapular) 3-5 days, Lymphadenopathy (cervical lymph nodes).
- Infectivity: 3-5 days before and 4 days after rash appearance
- Mortality could reach 15-25% esp. in immunocompromised and malnourished.

COMPLICATIONS

- Bacterial superinfection in 5-15% (OM, sinusitis, pneumonia, encephalitis and mastoiditis)
- SSPE (1 in 100,000) chronic measles virus infection to CNS. Occur 2-10 yrs after infection. No treatment
- SSPE: personality change, intellectual deterioration, myoclonus, spasticity, tremor and ocular abnormalities.


MEASLES PATHOGENESIS
Incubation period
Disease period
Viremia
Koplik's spots
Rash
Antibody Titer
Virus growth in lymph tissue
Virus goes to body surface
Virus grows on body surface
Respiratory disease
Infectious period (virus shed)
Respiratory Infection
5
10
15
20
Days

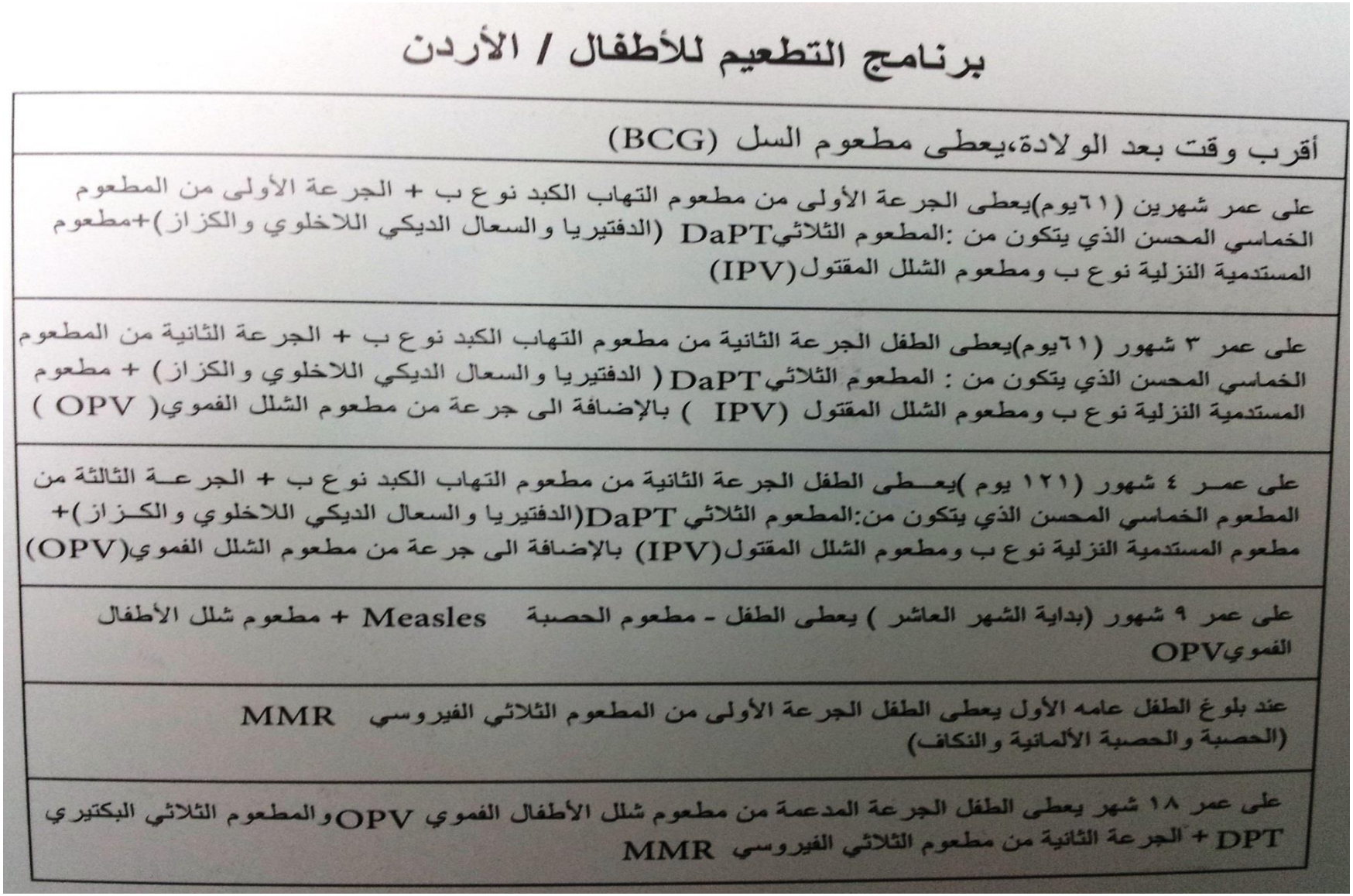
Diagnosis

- Clinical Diagnosis.
- Viral isolation from oropharynx or urine.
- Multinucleated giant cells.
- Serology: ELISA, IF. PCR

TREATMENT AND PREVENTION

- Supportive treatment, observe complications (bacterial super infection)
- Live attenuated vaccine
- MMR: first (12 to 15 months) second (4-6 years), contraindicated: immunocompromised and pregnant women except AIDS pts.
- Immunocompromised pts (including infants) may be given IM immunoglobulin. Best results if given within 6 days of exposure.
- **Mild Problems**
- Fever (up to 1 person out of 6)
- Mild rash (about 1 person out of 20)
- Swelling of glands in the cheeks or neck (about 1 person out of 75)
- If these problems occur, it is usually within 7-12 days after the shot. They occur less often after the second dose.
- **Moderate Problems**
- Seizure (jerking or staring) caused by fever (about 1 out of 3,000 doses)
- Temporary pain and stiffness in the joints, mostly in teenage or adult women (up to 1 out of 4)
- Temporary low platelet count, which can cause a bleeding disorder (about 1 out of 30,000 doses)
- **Severe Problems (Very Rare)**
- Serious allergic reaction (less than 1 out of a million doses)

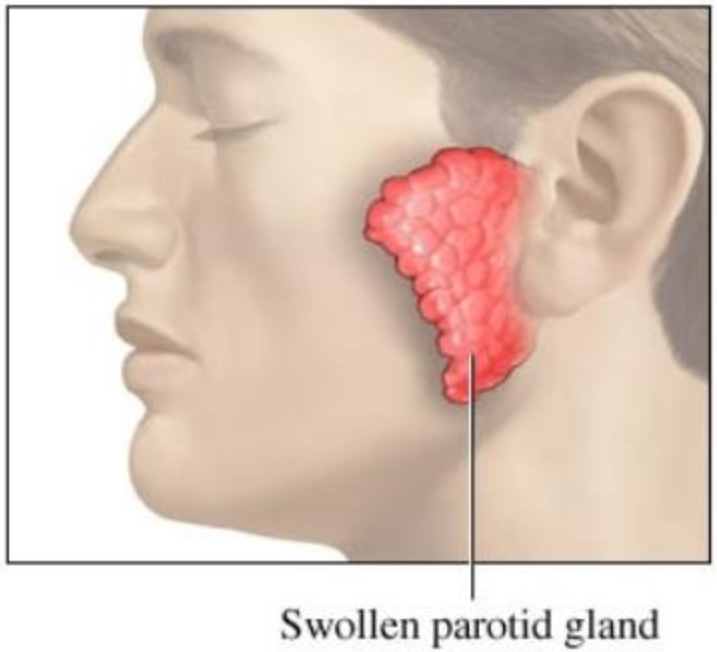
National vaccination program

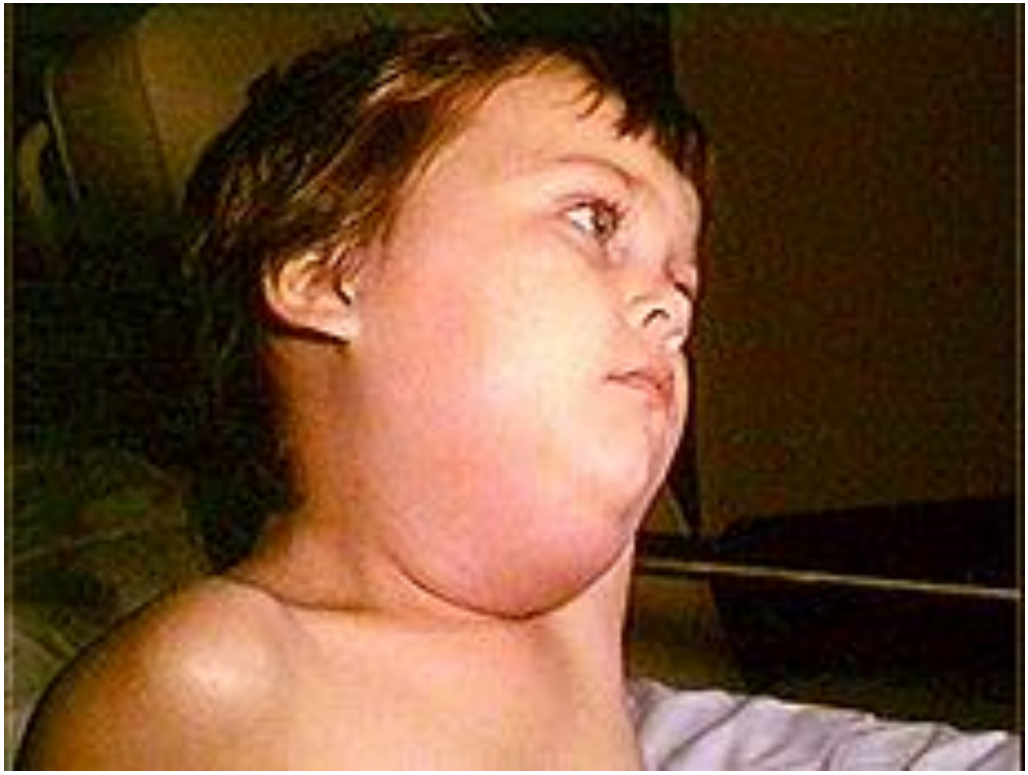


برنامج التطعيم للأطفال / الأردن

أقرب وقت بعد الولادة،يعطى مطعوم السل (BCG)
على عمر شهرين (٦١يوم)يعطى الجرعة الأولى من مطعوم التهاب الكبد نوع ب + الجرعة الأولى من المطعوم الخماسي المحسن الذي يتكون من :المطعوم الثلاثيDaPT (الدفتيريا والسعال الديكي اللاخلوي والكزاز)+مطعوم المستدمية النزلية نوع ب ومطعوم الشلل المقتول(IPV)
على عمر ٣ شهور (٦١يوم)يعطى الطفل الجرعة الثانية من مطعوم التهاب الكبد نوع ب + الجرعة الثانية من المطعوم الخماسي المحسن الذي يتكون من : المطعوم الثلاثيDaPT (الدفتيريا والسعال الديكي اللاخلوي والكزاز) + مطعوم المستدمية النزلية نوع ب ومطعوم الشلل المقتول (IPV) بالإضافة الى جرعة من مطعوم الشلل الفموي(OPV)
على عمر ٤ شهور (١٢١ يوم)يعطى الطفل الجرعة الثانية من مطعوم التهاب الكبد نوع ب + الجرعة الثالثة من المطعوم الخماسي المحسن الذي يتكون من:المطعوم الثلاثي DaPT(الدفتيريا والسعال الديكي اللاخلوي والكزاز)+ مطعوم المستدمية النزلية نوع ب ومطعوم الشلل المقتول(IPV) بالإضافة الى جرعة من مطعوم الشلل الفموي(OPV)
على عمر ٩ شهور (بداية الشهر العاشر) يعطى الطفل - مطعوم الحصبة Measles + مطعوم شلل الأطفال الفموي OPV
عند بلوغ الطفل عامه الأول يعطى الطفل الجرعة الأولى من المطعوم الثلاثي الفيروسي MMR (الحصبة والحصبة الألمانية والنكاف)
على عمر ١٨ شهر يعطى الطفل الجرعة المدعمة من مطعوم شلل الأطفال الفموي OPV والمطعوم الثلاثي البكتيري DPT + الجرعة الثانية من مطعوم الثلاثي الفيروسي MMR

Mumps





Mumps

- Paramyxovirus one antigenic type.
- -ve, ss-RNA, enveloped
- NH for attachment and F for fusion on envelope.
- Parotitis, aseptic meningitis in children.
- Acute orchitis and encephalitis in adults.

EPIDEMIOLOGY

- Frequent in 5-15 years old
- 30-40% of contacts do not develop clinical illness
- Communicable 7days before to 9 days after.
- Late winter to spring.

Pathogenesis and immunity

- Local replication in RT and local lymph nodes, 1^{ry} viremia, reach salivary glands and CNS, 2^{ry} viremia then spread to organs (kidney).
- Viruria is common
- Tissue response characterized by cell necrosis and inflammation.

- IgM, then IgG (for life)
- CMI might contribute to pathogenesis and recovery from infection.
- Permanent immunity through neutralizing Abs

Clinical manifestations

- IP=12 to 29 days avg. 16-18 days.
- Fever and parotid swelling, Unilateral or Bilateral (7-10 days)

COMPLICATIONS

- 1-3 weeks after disease onset
- Meningitis 10%, encephalitis, transverse myelitis, Pancreatitis, orchitis 10-20%, Oophoritis.
- Rare: Myocarditis, nephritis, arthritis, thyroiditis, sensorineural deafness.
- Most complications resolve without sequale in 2-3 weeks.

Diagnosis and prevention

- Isolated in Saliva, CSF, Pharynx and urine
- Grown in primary monolayer of monkey kidney cell culture.
- Syncytial giant cells, viral hemagglutination.
- PCR
- Serology: ELISA, IF and neutralization test

- No specific therapy, only MMR two doses.
- Single dose 80% seroconversion; 90% after two doses.

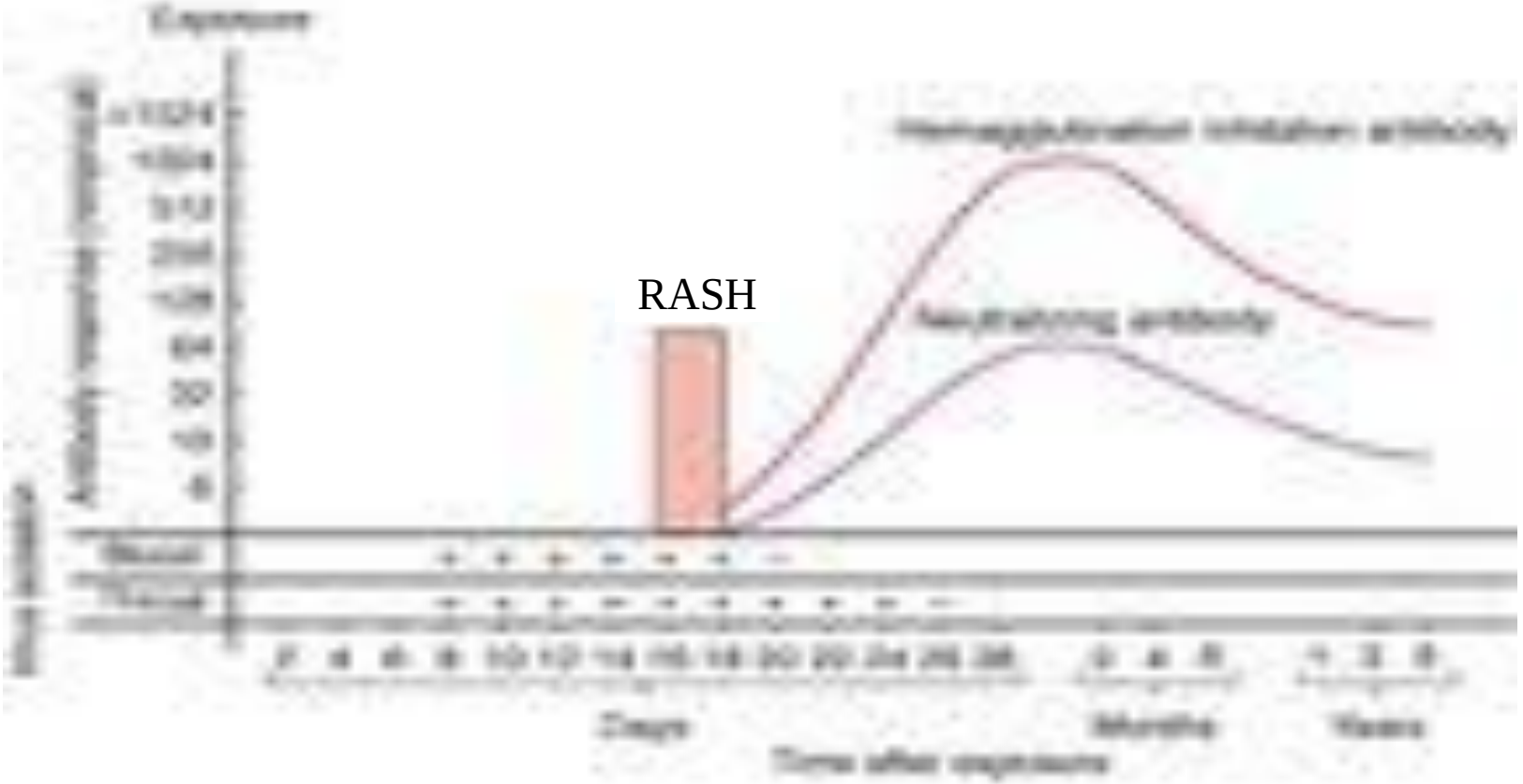
Rubella (German measles)

- Mild benign childhood exantheme; Malaise, faint rash and arthralgia
- Profound effects on developing fetuses.
- Togavirus family, rubivirus genus.
- Enveloped, icosahedral, +ve ss-RNA genome
- Two glycoproteins E1 and E2
- One serotype, only in humans.
- Agglutinates chicks RBC's, Trypsin treated human type O RBC's.
- Virus enter the cell by viropexis. Genomic RNA encodes for nonstructural proteins and subgenomic RNA for structural proteins. Assembly occurs at the golgi or cytoplasmic membrane.

Epidemiology and pathogenesis

- Winter and spring, only 30-60% develop clinical apparent disease.
- Women of childbearing age, carry a risk of exposure during pregnancy
- Contagious 7 days before to 7 days after onset of rash
- Infected babies spread the virus 6 M after birth.

- URT, LNs, viremia, skin and organs.
- CMI and Immune complexes, rash, arthritis.
- Maternal viremia, placental infection, spread to fetus and congenital infection.
- Pathogenesis of congenital defects: 1) vasculitis with impaired fetal oxygenation. 2) chronic viral infection leads to impaired mitosis, cellular necrosis and chromosomal breakage.
- Shedding of the virus in infected infants is prolonged (up to 30 months)
- Produce IgM and IgG antibodies to the virus, decrease to undetectable levels in 3-4 yrs.

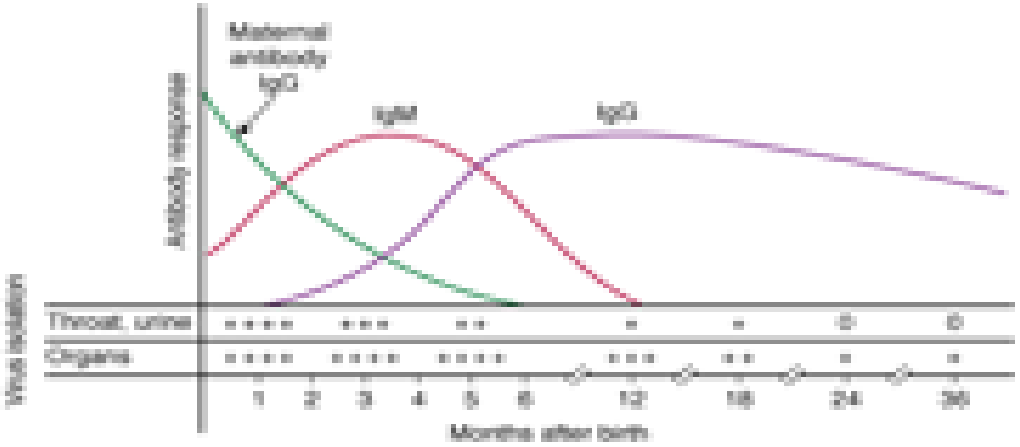


- Viremia up to 8 days before rash to 2 days after.
- Virus shedding from oropharynx can be detected up to 8 days after onset of rash

Pathology and immunity

- Mononuclear cell infiltration in tissues, Ca++ deposition is delayed in the metaphyses of long bones (Celery stalk).
- Ab titer peak after 2-3 weeks of onset
- Secretory IgA in respiratory tract
- Life long immunity.
- Reexposure: Transient

Respiratory tract infection.



Clinical manifestations

- Three day measles.
- IP=14 – 21 days (16 average)
- Fever, URT symptoms, LNs (post cervical and postauricular).
- Macular rash 1-3 days (head, neck and trunk), faint rash
- Complications: arthralgia, arthritis, encephalitis and TCP.
- Risk for fetal damage is up to 80% in 2w, 6 – 10% by 14^{th}, 20-30% over all.
- Cardiac: PDA, Pulmonary valvular stenosis.
- Eye: Cataract, chorioretinitis, Glucoma, Coloboma, cloudy cornea, microophthalmia.
- Sensorineural deafness, enlarged Liver and Spleen.
- Thrombocytopenia, intrauterine growth retardation.
- CNS defects: microcephaly, encephalitis and mental retardation
- Late including DM, chronic thyroiditis, Subacute panencephalitis (SPE).

Diagnosis and treatment

- Diagnosis: Clinically is not enough.
- Isolated in Respiratory secretions, Urine and feces with
  - Cell culture.
  - RT-PCR.
  - Serology, IgM significance: (5%) not produced at all or persist for 200 days

- Supportive treatment
- Live attenuated vaccine
- MMRV: RA 27/3 human diploid fibroblast cell culture, female adults, hospital staff at risk, seroconversion in 95%
- Contraindications: IC and pregnant women
- Avoid conception for 3 months

Erythema infectiosum

- Parvovirus B19.
- Naked, icosahedral, SSDNA
- Three capsid proteins VP1-3
- cultured in BM cells, fetal liver cells.
- Globoside (P antigen) receptor found on erythroid progenitors, erythroblasts, megakaryocytes and endothelial cells.
- Primary site of replication is the nucleus of immature cell in the erythrocyte lineage.
- Clinical consequence is minimal unless pt compromised by chronic hemolytic process: sickle cell and thalassemia
- These pts might present with fever only. Then found to have anemia, and aplastic crises.
- Immunosuppressed pts (AIDS) with bone marrow failure, think of Parvovirus infection

Manifestations and diagnosis

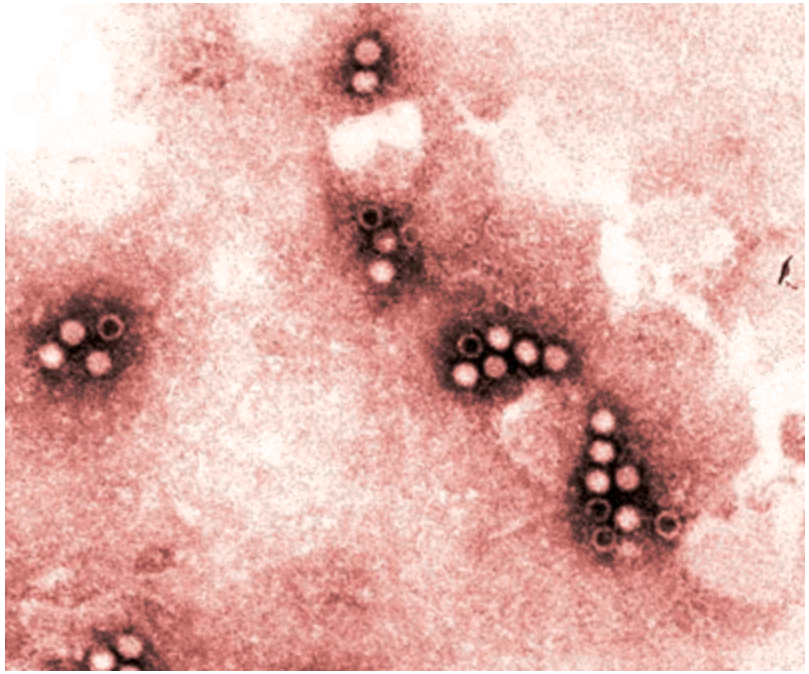
- IP 4-21 days
- Fever, malaise, headache and myalgia and itching
- Indurated rash on the face (slapped-cheek) which spreads in 1-2 days to arms and legs
- LNs, enlarged spleen and liver.
- Illness lasts 1-2 wks, but rash may recur for 2-4 wks upon: exposure to heat or sun light, on excersise or emotionl stress.
- Some times associated with arthritis and vasculitis.
- Rare complications: hepatitis, Thrombocytopenia, nephritis and encephalitis.

- Transmitted through respiratory route
- Spring months
- Viremia last 7-12 days

- Diagnosis: PCR, and serology:IgM-specific Ab

- Treatment: no definitive treatment, immunoglobulin

Parvovirus B19



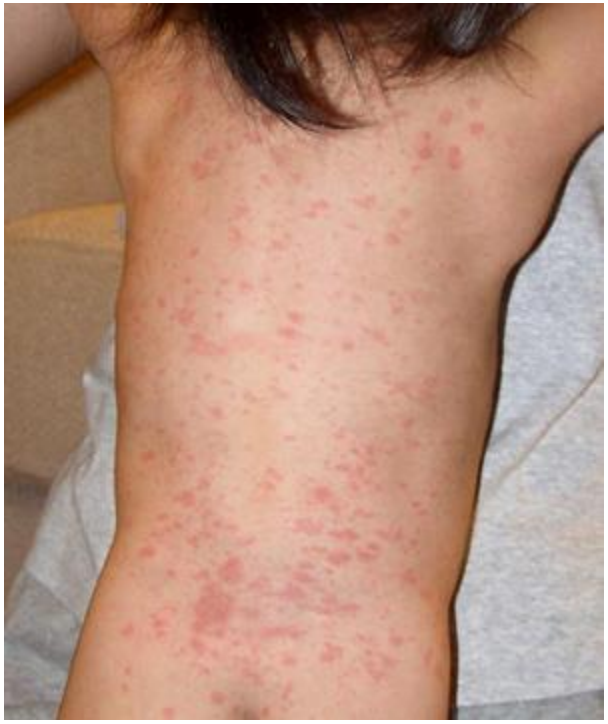
Roseola Infantum (Exanthem Subitum)

- HHV6, HHV7.
- HHV6 has two variants A and B.
- Replicates in CD4+ T-lymphocytes
- All population has Abs aginst it by age 5yrs
- HHV6-B associated with Exanthem Subitum. A and B associated with febrile illness with or without seizure and rash.
- Common in 6 months- 2 years
- Exanthem Subitum: Fever (39C°), 3-5 days later Faint macular rash appears that spread from trunk to extremities.
- EBV, Adenovirus, coxsakieviruses and echoviruses cause similar manifestations.
- Can cause latent infection in T-cells and become reactivated with immunosuppressive status.

- Diagnosis: seroconversion, culture and PCR

- Treatment: ganciclovir and foscarnet.

Roseola infantum



	RUBEOLA	RUBELLA	ROSEOLA	ERYTHEMA INFECTIOSUM
Etiology	Paramyxoviridae	Togaviridae	HHV6,7	Parvovirus b19
Incubation Period	7 – 18	14 - 21	unknown	7– 10
Transmission	Respiratory	Respiratory	Oral secretions	Respiratory
Epid	All ages >6 months	6 -18 months	6months-2yrs	All ages 5-15 yrs
Rash	Maculopapular	Maculopapular	Maculopapular	Maculopapular
Distribution	Begins on the head, then trunk and extremities	Begins trunk → arms & neck face- legs – 3d	Begins trunk → extremities	Face → arms & legs
Prodrome	3 – 5 d low-mod fever, hacking cough, coryza, conjunctivitis, kopliks after 2-3 days	Mild catarrhal , retroauricular, post cervical, post occipital lymphadenopathy	Mild URT illness	Headache, fever, sore throat, coryza and abd pain for 2-3 days

	RUBEOLA	RUBELLA	ROSEOLA	ERYTHEMA INFECTIOSUM
Symptoms	Fever, cough, conjunctivitis, koplik's spots	Low grade fever, upper respiratory symptoms	High fever, occasional late sudden rash	Mild fever, malaise, headache, myalgia and itching
Infectivity	3-5 days before and 5 days after rash appearance	7days before – 7 days after onset of rash	From time of exposure till symptom development	3rd day of fever and 1st day of rash
Rash	Lateral neck, ears, hairline → back, abdomen, thigh → feet on 2nd	Faint rash over head, neck and trunk last 1-3 days	rash appears on the trunk and spreads over the body. The rash's spots blanch (turn white) when touched	Rash 3 stages 1. Slapped cheek 2. Maculopapular on 3rd as face fades 3. Lacy or reticulated appearance rash – fades central clearing pruritic lasts 2-39 days

	RUBEOLA	RUBELLA	ROSEOLA	ERYTHEMA INFECTIOSUM
Illness duration	3-5 days	1-3 days	3-5 days	1-2 weeks
Complications	Bacterial superinfection, encephalitis, keratitis, SSPE	Arthritis, congenital infection		Aplastic crisis, arthritis, arthralgia
Fetal infection	No	Yes- Multiple defects	No	Yes- still birth
Vaccine	Live attenuated	Live attenuated	No	No