

Viral Infections of the Skin and Mucus Membranes

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Virus Infections of the Skin: Rashes

Maculo-papular rashes

(flat to slightly raised colored bump)

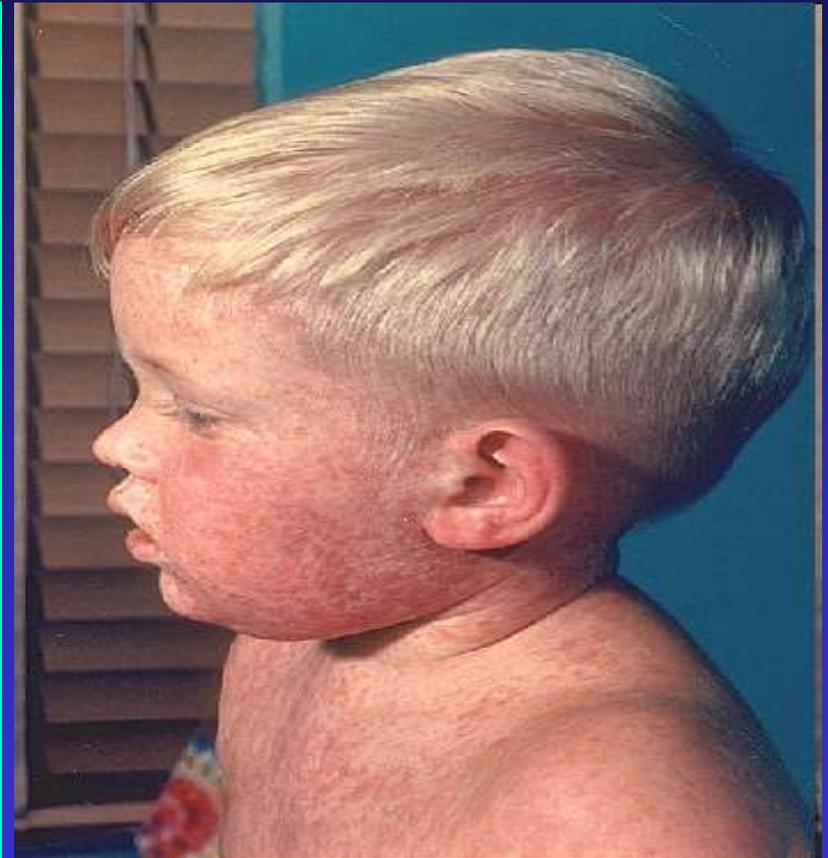
Measles virus	(Rubeola)
Rubella virus	(German Measles)
Fifth Disease	(Human Parvovirus B19)
Roseola	(Human Herpesvirus-6)

Measles

- Viral infection through aerosol droplet: One of the MOST communicable viruses
- Initial infection of the oro-pharynx
 - local infection lymph node(s) (of the neck)
 - lymphocyte associated viremia Fever, malaise
 - Spread throughout the body
 - Shed in respiratory tract secretions
 - Koplik's spots
 - Skin Rash
 - Recovery; life long immunity
- Measles causes health complications, including pneumonia, diarrhea, encephalitis, and corneal scarring.
- Effective childhood vaccine (2-3 doses): MMR (measles, mumps, rubella), but disease still exists worldwide

An example of the rash of measles

Note flat, reddened areas



Rubella

- Viral infection through aerosol droplet; systemic infection
- A ~Mild~ rash
- **Serious for a fetus when contracted in the first trimester of pregnancy**
- Disrupts fetus development of the CNS and/or other organs: Congenital Rubella Syndrome
 - Small birth weight, blindness, hearing loss, mental retardation, heart problems
 - Infection lasts for months-years in the newborn
- Vaccine highly effective (MMR)

Rubella



Virus Infections of the Skin: Vesicles

Vesicular or pustular rash
(elevated lesions filled with fluid)

- | | |
|---------------|--------------------------------|
| Cold Sores | (Herpes simplex virus 1 and 2) |
| Chickenpox | (Human Herpesvirus-3) |
| Smallpox | (Human Pox virus) |
| Coxsackie A16 | (Enterovirus) |

HERPESVIRUSES

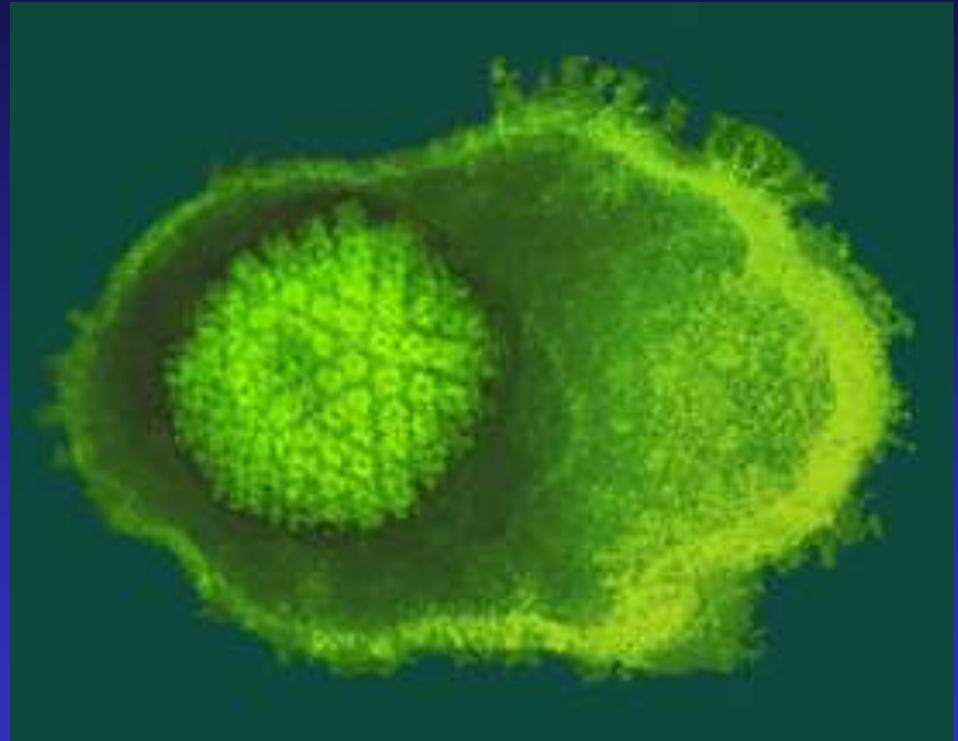
- Herpes simplex virus type 1 (HSV 1)
- Herpes simplex virus type 2 (HSV 2)
- Varicella-zoster virus (VZV)
- Cytomegalo virus (CMV)
- Epstein Barr virus (EBV)
- Human herpesviruse-6 (HHV-6)
- Human herpesviruse-7 (HHV-7)
- Human herpesviruse-8 (HHV-8)

Herpes Simplex Viruses

- Ubiquitous virus, infecting the majority of world's population
- Two types: HSV-1 and HSV-2
- Type 1 is associated primarily with mouth, eye and CNS
- Type 2 is found mostly in the genital tract
- Transmission: direct contact

Herpes Simplex Structure

- Icosahedral virus
- Lipoprotein envelope, derived from the nuclear membrane
- Genome: linear, ds DNA
- Replicate in the nucleus



Pathogenesis

- Primary Infection
- The typical lesion is the **vesicle**; ballooning degeneration of intra-epithelial cells. The roof of the vesicle breaks down, forming **ulcer**
- During the replication phase at the site of entry in the epithelium, virus particles enter through the sensory nerve endings and transported along the axon to the nerve body (neurone) in the sensory (dorsal root) ganglion by retrograde axonal flow. **Latent infection** occurs in the survived neurons that still harbor the viral genome
- Antibodies reduce the severity of the infections, although it does not prevent recurrences.

Latent Infection

- About 1% of cells in the affected ganglion carry the viral genome.
- HSV-1: causes latency in trigeminal ganglion
- HSV-2: causes latency in sacral ganglion

Reactivation

- **Reactivation can be induced by**
 - **UV light**
 - **Fever**
 - **Trauma**
 - **Stress**
- **Interval between the stimulus and lesion appearance is 2 – 5 days.**

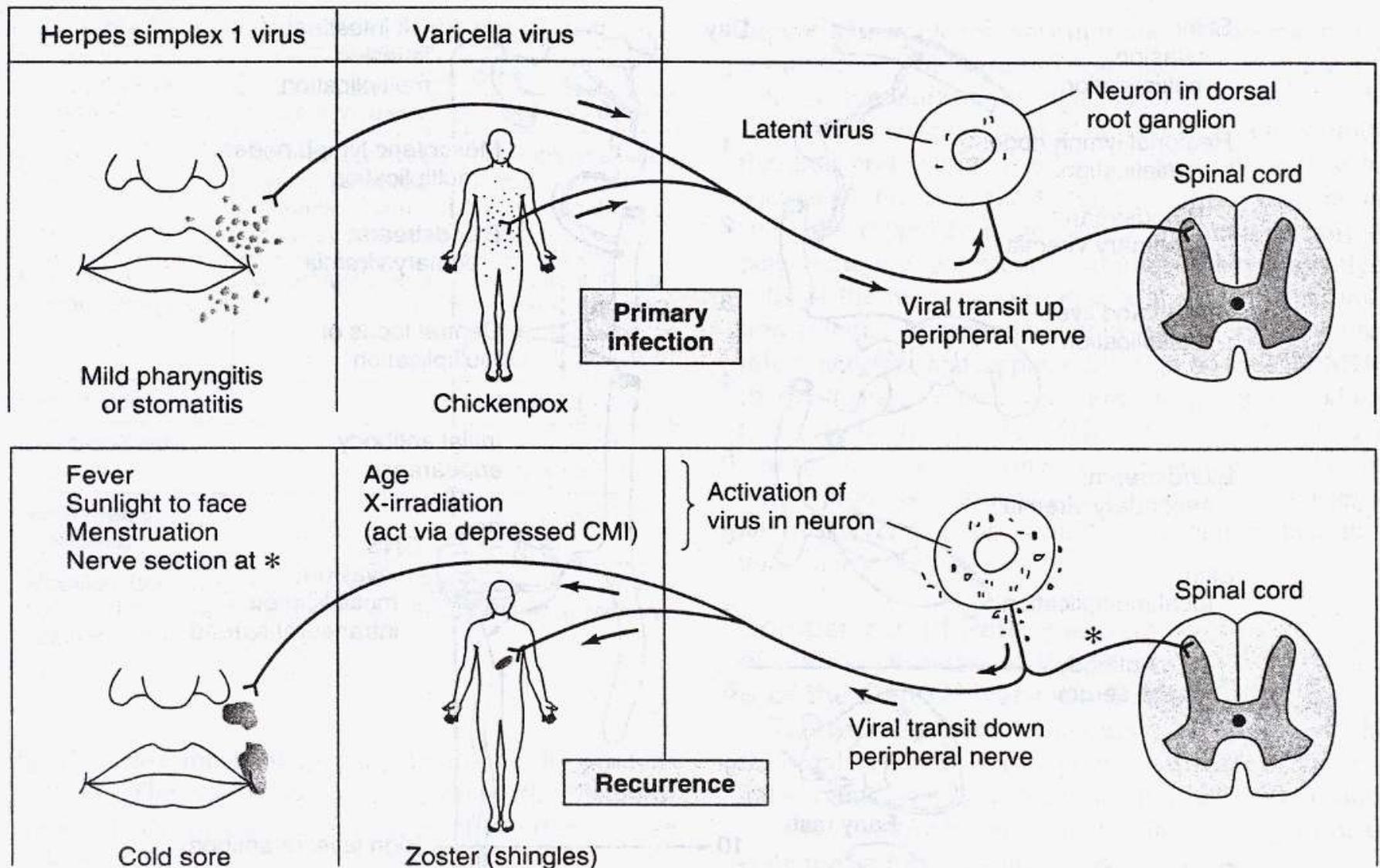


Figure 30-4. Latent infections by herpesviruses. Examples are shown for both herpes simplex and varicella-zoster viruses. Primary infections occur in childhood or adolescence, followed by establishment of latent virus in cerebral or spinal ganglia. Later activation causes recurrent herpes simplex or zoster. Recurrences are rare for zoster. (Reproduced, with permission, from Mims CA, White DO: *Viral Pathogenesis and Immunology*. Blackwell, 1984.)

Clinical Features

- Oral infection
- Acute febrile gingivostomatitis in preschool children
- Vesicular lesions ulcerate rapidly

- Skin infections
- **Herpetic whitlow:** primary lesion on the fingers or thumb of the toddler with herpetic stomatitis, due to autoinoculation. It also occurs as accidental inoculation in health care workers.
- **Eczema herpeticum:** severe form of cutaneous herpes. It may occur in children with atopic eczema.

Clinical Features

- Eye infection
- CNS infection
- The most likely route of infection is central spread from trigeminal ganglion
- Genital tract infection
- Both types can infect genital tract, but **HSV-2** is more common. The lesions are vesicular at first but rapidly ulcerate.
- Recurrent genital herpes is common but attacks are milder and shorter than first episodes

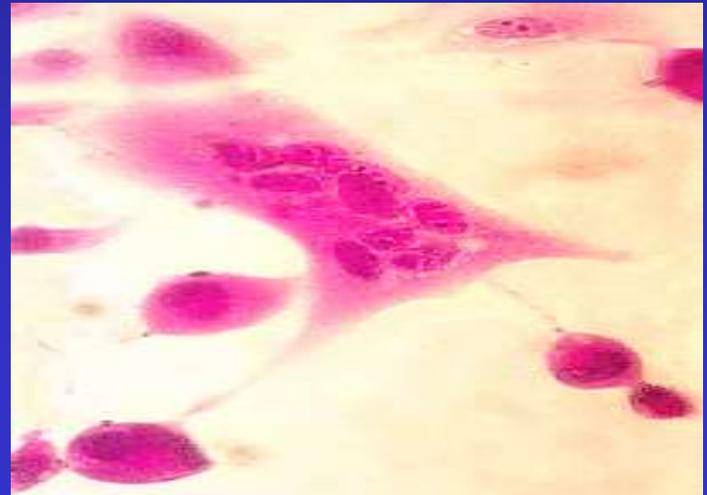


Herpesvirus Keratitis (Human simplex 1)



Laboratory Diagnosis

- Isolation of HSV in cultures of human diploid fibroblast cells.
- Detection of **viral antigens** in cell scraped from the base of lesions
- Detection of amplified **viral DNA** by PCR in CSF
- Giant cell formation induced by Herpes simplex infection



Treatment

- **Acyclovir**: inhibits viral DNA synthesis
- Prophylactic to prevent reactivation in the immunocompromized
- Available for topical, oral and intravenous route

Chickenpox

“Varicella – Zoster”

- Benign disease with life long immunity
- Life-threatening for immunocompromised individuals

Two forms

- Primary infection is a generalized eruption (**chicken pox**)
- Reactivation is localized to one or few dermatomes (**shingles, Varicella Zoster**)
- Only one antigenic type

Chickenpox virus in the body

- Viral infection through aerosol droplet; systemic infection
 - local infection in lymph node(s) (of the neck)
 - lymphocyte associated viremia, Fever, malaise
 - Spread throughout the body
 - Shed in respiratory tract secretions **and** Skin Vesicles (**small blisters of clear fluid**)
 - Recovery with virus latency in neurons
 - Life long immunity
- **The vesicles lie in the middle of the epidermis. The fluid becomes cloudy with the influx of leucocytes. These pustules dry up, scabs form and desquamate.**
- May re-emerge as shingles and spread to others (skin vesicular lesions)

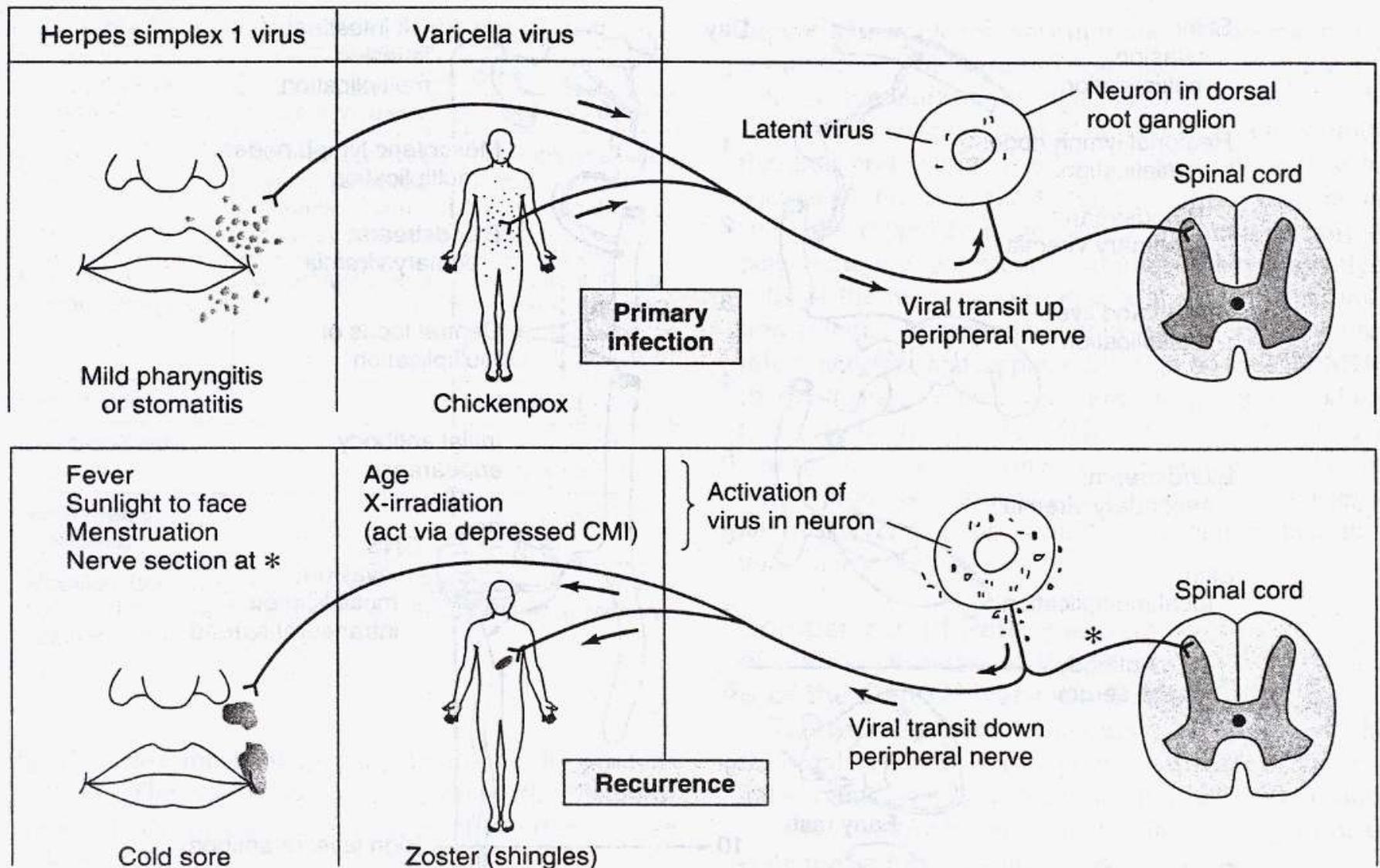


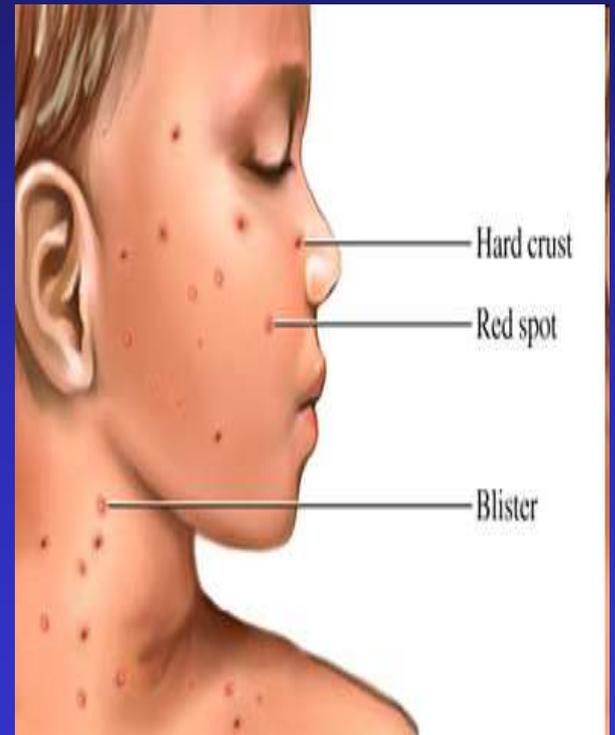
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Clinical Features

Chicken Pox

- Incubation period: 14 – 15 days
- The patient is infectious for 2 days before and up to 5 days after onset
- The rash is most dense on the trunk and head
- Macules ---- Papules ---- Vesicles ---- Pustules



Complications

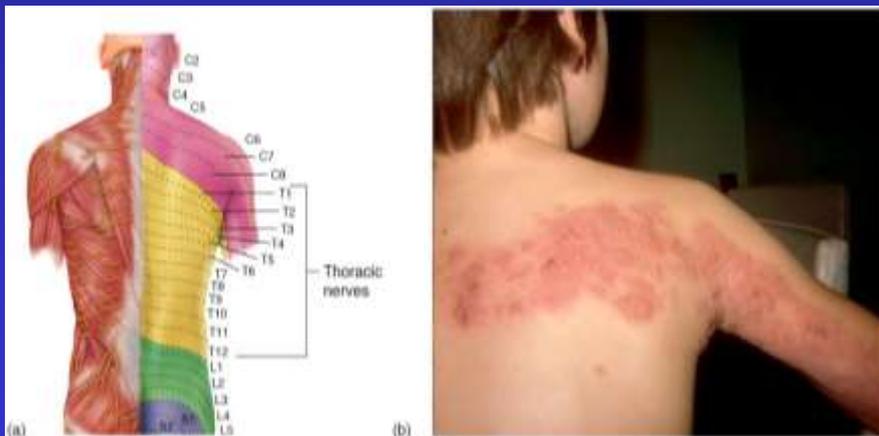
- **Secondary bacterial infection (commonest)**
- **Pneumonia**
- **CNS**
 - **cerebellar ataxia syndrome**
 - **acute encephalitis**

Herpes Zoster

- Localized eruption, unilateral, typically confined to one dermatome
- Prodromal paraesthesia and pain in the area supplied by affected nerve are common before skin lesions develop
- Postherpetic neuralgia
 - Most common complication of zoster
 - 50% risk in patients aged over 60 years
 - pain persisting for 1 month or more after the rash

Chicken pox reemerges as Shingles

Causes: stress, X-ray treatments, drug therapy, or a developing malignancy



Pathogenesis of Varicella Zoster

- VZV stays latent in the sensory ganglia
- Reactivation can occur at any age but the rate is much increased in persons aged 60 years or over.
- Zoster is usually limited to one dermatome; in adults most commonly in the thoracic or upper lumbar region.

Ophthalmic zoster

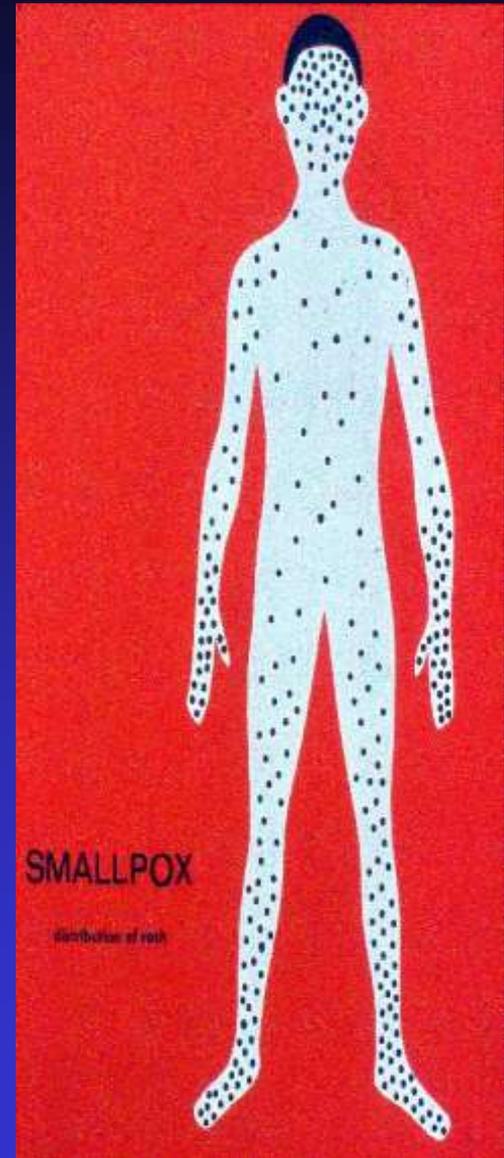
- Involvement of ophthalmic division of the trigeminal nerve
- corneal ulceration, stromal keratitis
- permanent scarring and loss of sight



Treatment

- Acyclovir
- Given to high-risk of complication
 - Neonates (first 3 weeks of life)
 - Ophthalmic zoster
 - Immunocompromized

Small pox



Coxsackieviruses

HAND, FOOT & MOUTH DISEASE

Definition

Hand-foot-mouth disease is a relatively common infection viral infection that usually begins in the throat.

Causes

coxsackievirus A16, a member of the enterovirus family.

Symptoms

Fever, headache, Loss of appetite and Rash with very small blisters on hands, feet, and diaper area; may be tender or painful if pressed.

Sore throat. Ulcers in the throat (including tonsils), mouth, and tongue

Treatment

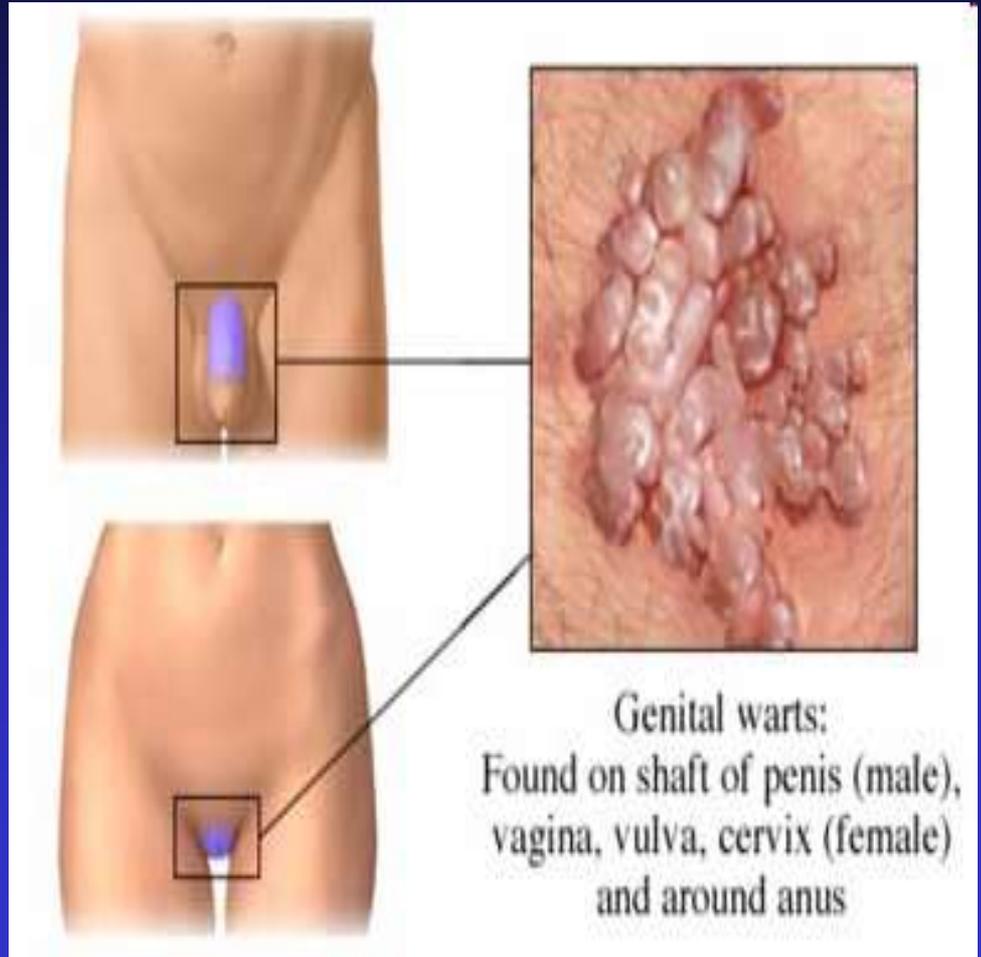
There is no specific treatment for the infection other than relief of symptoms.



Warts and Papillomas

- Mostly a benign viral infection
- Nearly everyone is infected!
- Contact transmission; fomite transmission
- Different virus types
 - Plantar warts (HPV-1)
 - Flat warts (HPV-3,10,28,49)
 - Genital Warts (HPV 6,16,18,31)

warts



Please don't miss my Disease

