



Indian Association of Dermatologists, Venereologists and Leprologists

# Viral Infections

## CONTENTS

- Classification
- Etiopathogenesis
- Molluscum contagiosum
- Human papilloma virus infection
- Herpes simplex infection
- Herpes zoster infection
- Epstein Barr virus infection
- Other herpes infection
- Viral exanthem
- Uncommon viral infection of skin
- MCQs
- Photo quiz



## Classification of virus

- DNA VIRUS
  - Enveloped (double stranded)
    - Herpesviridae
    - Hepadnaviridae
  - Non-enveloped (double stranded)
    - Papillomaviridae
    - Polyomaviridae
    - Adenoviridae
  - Single stranded (non-enveloped)
    - Parvoviridae
    - Poxviridae
- RNA Virus
  - Flaviviridae
  - Togaviridae
  - Retroviridae
  - Coronaviridae
  - Picornaviridae
  - Calciviridae
  - Orthomyxoviridae
  - Paramyxoviridae
  - Rhabdoviridae
  - Arenaviridae
  - Reoviridae



## Etiopathogenesis

- Cell lysis (Herpes)
- Cell proliferation (Pox, HPV)
- Carcinogenesis (Cervical Ca, Hepatoma)
- Exanthemata - Viraemia, Type 3 hypersensitivity (Arthus) reaction, virus lodged in dermal capillaries and replicate in epidermis.
- Persistent infection: Periods of latency and reactivation (HSV, VZV)



## Molluscum Contagiosum

- Caused by molluscum contagiosum virus , a DNA virus of Poxviridae family.
- Commonly affects children and sexually active adults.
- Most easily transmitted by direct skin to skin contact.
- Incubation period varies from 2 weeks to 6 months.
- Typical lesions are discrete, dome shaped, umbilicated papules.
- D/D: Cryptococcosis, Histoplasmosis, Penicillinosi



Molluscum Contagiosum



Molluscum in HIV



## Diagnosis and treatment

- Direct examination of expressed material when clinical diagnosis is doubtful.
- On histopathology-Henderson-Paterson bodies (molluscum bodies).
- Enucleation, Cryotherapy using liquid nitrogen, Curettage or diathermy
- Pulsed dye laser.
- Application of phenol or 40 % silver nitrate.
- 10 % KOH, 0.5 % podophyllotoxin, Imiquimod cream.
- 1 -3 % cidofovir ointment or cream, 0.9 % cantharidin.
- Povidone iodine with 15 – 20 % salicylic acid.
- Systemic : Levamisole, Cimetidine.



## Human Papilloma Virus

- More than 100 types of HPV
- Genome of HPV-Early genes (E1-E7), Late genes (L1-L2)
- Transmission : direct or indirect contact (nail biters, shaving, occupational, swimming pool)
- Sexual transmission : genital / perianal wart
- Autoinoculation



## Clinical Types

### ■ **Non genital :**

- Verruca vulgaris (Common warts)
- Verruca Plana (Plane warts)
- Filiform
- Digitate
- Palmoplantar
- Periungual

### ■ **Genital :**

- Condyloma Acuminata



## Common Wart

- HPV types-1,2,4,27 and 57
- Commonly seen in young children and adults.
- Meat butchers, frequent immersion of hand in water are risk factors
- Papules with verrucous surface.
- Commonest site-Hands
- (Fingers and palms)
- Warts do not have dermatoglyphics





## Verruca Plana

HPV types-3,10,28 and 41

- Risk factors-sun exposure, swimmers
- Common sites-Face, lower legs
- Few millimetres brown or skin coloured flat topped papules
- Koebnerisation seen





## Palmo-Plantar warts

- HPV types-1, 2, 4, 27
- Seen at pressure points
- If paring is done-multiple small black points seen (dilated capillary loops)
- Myrmecia
- Mosaic type
- Differentiate from corn and callosity





- **Filiform and digitate warts**

- Finger like projection

- **Periungual warts**

- Seen in nail biters
- Recalcitrant to treatment





## Genital Warts

- Low risk genital HPV types-6 and 11
- High risk genital HPV types-16 and 18
- **Condyloma acuminata**
  - Few mm to cms in size
  - Lobulated papules usually multifocal, cauliflower like mass may be seen in moist occluded areas
  - Sites- intraurethral in men, mucosal surface of cervix or vulva, perianal skin, vulva
- **Giant Condyloma acuminata (Buschke Lowenstein tumor)**
  - Verrucous carcinoma, may invade and metastasize to LN



## Genital Warts

### ■ **Bowenoid paulosis**

- Hyperpigmented papules or flat surface
- HPV types-16,18
- Sites- Penis, Perianal area, vulva

### ■ **Diagnosis**

- Clinically
- Histopathology-Papillomatosis, acanthosis
- DNA hybridisation, Immunohistochemistry



Genital Wart



## Treatment

- Salicylic Acid, Lactic acid / Salicylic Acid combination
- Chemical cautery : Podophyllin, TCA (35%-85%)
- Imiquimod, Green Tea Extract (Sin catechins), 5FU
- Cryotherapy
- Electrocautery
- Radiosurgery
- CO2 Laser
- Newer therapies - Mycobacterium W vaccine, MMR vaccine



## Human Herpes Virus

- Human Herpes virus 1 (Herpes simplex virus 1 (HSV 1))
- Human Herpes virus 2 (Herpes simplex virus 2 (HSV 2))
- Human Herpes virus 3 (Varicella-Zoster virus (VZV))
- Human Herpes virus 4 (Epstein Barr virus (EBV))
- Human Herpes virus 5 (Cytomegalovirus (CMV))
- Human Herpes virus 6 (HHV 6)
- Human Herpes virus 7 (HHV 7)
- Human Herpes virus 8 ( Kaposi's sarcoma associated Herpes Virus (KSV)(HHV 8))



## Herpes Virus

- **Herpes Simplex Virus I :**

Herpes Labialis, Herpetic Gingivostomatitis, Herpetic whitlow, Herpetic gladiatorum, Herpes sycosis, Keratoconjunctivitis

- **Herpes Simplex Virus II :**

Herpes progenitalis, Herpetic vulvovaginitis

- **Complicated :**

Eczema herpeticum, Disseminated HSV

- **Herpes Simplex Virus in HIV :**

Chronic, recurrent, ulcer, eschar formation and dissemination



## Herpes simplex infections

- Primarily involve the skin and mucous surfaces
- Can be disseminated in neonates and immunocompromised hosts
- Produces primary infection - enters a latent or dormant stage, residing in the sensory ganglia - can be reactivated at any time
- HSV-1 : >90% of primary infections caused by HSV-1 are subclinical; more common
- HSV-2- usually the genital pathogen and usual pathogen of neonatal herpes



## Orolabial Herpes

- 95 % HSV – 1
- Presentation :
- Grouped vesicles on an erythematous base.
  - Often prodrome of tingling or itching.
  - Variable severity of recurrent lesions.
  - Mild flu like symptoms may be present.





## ■ Herpetic Gingivostomatitis

- High fever, irritability, anorexia, mouth pain, drooling
- Gingivae becomes intensely erythematous, edematous, friable and tends to bleed
- Symptoms last 5-14 days, but virus can be shed for weeks following resolution



## Differential diagnosis

- Aphthous ulcer
- Herpangina
- Stevens Johnson Syndrome
- Syphilis





## Diagnosis

- Tzanck smear-
  - Method-scraping base of freshly ruptured vesicle
  - Staining with Giemsa or Wright stain
  - Look for multinucleated giant cells
- HSV antibody titre : IgG/IgM
- Immunofluorescence, PCR-most sensitive



## Herpetic Infections ( contd)

### ■ Herpetic Sycosis

- Shaving after facial herpes induces a slowly spreading folliculitis of the beard with few isolated vesicles.

### ■ Herpes Gladiatorum

### ■ Herpetic whitlow

- Herpetic infection of the fingers.
- Children (thumb sucking)
- Adults : 2/3 cases HSV-2, Children nearly 100% HSV-1



## Genital Herpes

- Infection of HSV-2 in majority of cases.
- Spread by Skin to Skin contact
- Active lesions are infective
- Asymptomatic shedding accounts for the majority of transmission.
- Prior HSV-1 infection does not protect from HSV-2 infection but may lessen severity of first outbreak.
- **Primary infection :**
  - Grouped vesicles which appear for 7-14 days.
  - Fever, Flu like symptoms, inguinal lymphadenopathy, proctitis if rectal involvement.
- **Recurrent** lesions with typical prodrome of burning/itching followed by outbreak which is less severe than the primary infection healing in 6-10 days.



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Genital Herpes simplex infection

## Treatment

- **Symptomatic**
- **Topical** : Acyclovir, Penciclovir, Cidofovir
- **Systemic** :

| Antiviral    | Primary<br>(10 days) | Recurrence<br>(5 days) | Suppressive<br>6 months - 1yr |
|--------------|----------------------|------------------------|-------------------------------|
| Acyclovir    | 200 mg 5 times / day | 400 mg tid             | 400 mg bd                     |
| Valaciclovir | 1 gm bd              | 500 mg bd              | 500-1000 mg bd                |
| Famciclovir  | 250 mg tid           | 125 mg bd              | 250 mg bd                     |



## Intrauterine and Neonatal Herpes

- Extent of initial involvement predicts outcome:
  - Localized : rarely fatal
  - Disseminated disease fatal
- Presentations in newborns
  - Majority present with vesicles.
  - Disseminated herpes with CNS involvement may occur without skin involvement.
  - Few cases never have vesicles.
  - **Treatment:** Acyclovir 250 mg/(m)<sup>2</sup> q8 hours x7 days



Eczema herpeticum  
(Kaposi's varicelliform eruption)

- Multiple crops can appear over 7-10 days (like varicella)
- Can be mild or fulminant,
- If area of involvement is large, can be lots of fluid loss and potentially fatal
- Onset of high fever, irritability, and discomfort
- Lesions appear in crops in areas of currently or recently affected skin (for those with atopic eczema or chronic dermatitis)
- Lesions begin as pustules, then rupture and crust over the course of a couple of days
- Lesions can become hemorrhagic.
- Risk of secondary bacterial infections



## Varicella (chicken pox)

- Acute and highly contagious exanthem that occurs mostly in children.
- Rash begins on face, scalp and spreads to trunk.
- Lesions scattered than clustered and progress from rose colored macules to papules, vesicles, pustules and crust.
- Individuals are infectious 4 days before and 5 days after exanthem appears.



## Varicella

- Secondary bacterial infection may result in scarring.
- Other complications :
  - Pneumonia : neonates and adults (1/400)
  - Reyes syndrome: encephalitis, hepatitis with aspirin use.
  - Thrombocytopenia
  - Purpura Fulminans : DIC with low proteins C and S
- **Treatment :**
  - Acyclovir (800mg 5 times a day/1week) for severe cases, high risk individuals and adults (>13 years).
  - No Aspirin
  - Isolate from immunocompromised.



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Varicella



## Prevention

- Varicella Vaccine
  - Live attenuated virus
  - At present immunity appears to be lasting.
  - Modified Varicella-like syndrome (MLSV)
    - 15 days after exposure to varicella virus.
    - 35-50 macules and papules, few vesicles.
    - Mild, afebrile course lasting 5 days



## Varicella in Pregnancy

- Increased risk of spontaneous abortion (3% by 20 wks), congenital varicella syndrome and fetal death. Possible increase in pre-term labor.
- Mother at increased risk for varicella pneumonia.
- Congenital Varicella Syndrome
  - Hypoplastic limbs, scars, ocular and CNS disease.
  - F > M
  - 1-2% risk, highest between weeks 13 and 20.



## Herpes Zoster

- Reactivation of latent herpes zoster infection from the dorsal root ganglia
  - Over 1-5 days new lesions develop, these become pustular and crust.
  - Typically along a dermatome at times involving adjacent dermatomes.
  - Preceded by pain, itching
- Duration of the lesion is dependent on age
- Young 2-3weeks, Elderly 5-6 weeks
  - Severity of lesions, immunosuppression
- Incidence of H.Z. increases with age (>50 yrs) and immunosuppression.



## Herpes Zoster

- Heals without scarring in young.
- Increased incidence of scarring in elderly and severe eruptions.

### **Disseminated Zoster**

- Defined as >20 vesicles outside dermatome.
- Chiefly elderly or Immunocompromised
- Hemorrhagic/gangrenous lesions with outlying vesicles or bullae.
- Systemic symptoms include fever, meningeal irritation.



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Herpes Zoster



## Herpes Zoster Ophthalmicus

- Involvement of fifth cranial nerve, ophthalmic branch
- Lesion location on tip/side of nose- 'Hutchinson's sign'
- Ocular complications
  - Uveitis , Keratitis
  - Less common: glaucoma, optic neuritis
- Encephalitis



Herpes Zoster Ophthalmicus



## Ramsay Hunt syndrome

- Facial and auditory nerve involvement with inflammation of geniculate ganglion
- Zoster of external ear or TM, herpes auricularis, with ipsilateral facial paralysis
- Herpes auricularis, facial paralysis and auditory symptoms.



## Diagnosis and Treatment

- **Diagnosis :** Tzanck, direct fluorescent antibody, culture, PCR.

- **Symptomatic treatment**

- **Antivirals :**

Acyclovir 800mg x 5times/day for 1 week (may lessen severity of symptoms in acute outbreak. May lessen incidence of PHN).

Famciclovir 250-500 mg TDS

Valaciclovir 1gm TDS

Duration : 1week in immunocompetent

2 weeks in immunosuppressed



## Post Herpetic Neuralgia

- Postherpetic neuralgia - nerve pain due to damage caused by VZ virus.
- Constant burning pain, intermittent stabbing pain or shooting pain, stimulus evoked pain including Allodynia.
- Risk factors : prodromal pain, severe pain during acute phase, greater rash severity, ophthalmic zoster.

### **Treatment**

- Topical : Capsaicin, topical lidocaine.
- Oral :analgesics ( NSAIDS), tricyclic antidepressants (amitryptiline), anticonvulsants : gabapentin
- Injectable : lidocaine / steroids



## Epstein Barr Virus

### Infectious mononucleosis

- After 3-7 wk incubation period
- Bilateral enlargement of cervical and other lymph glands
- High grade fever, malaise, splenomegaly.
- Pharyngitis with hyperplasia of lymphoid tissue are the most frequent signs.
- Ampicillin triggers maculopapular eruption.
- Macular or morbilliform rash.
- Mucous membranes with 5-20 pinhead sized petechiae at junction of soft palate with hard. (Forscheimer spots)
- Atypical lymphocytosis with more than 10 % atypical cells.



## Epstein Barr Virus

- Lab findings :
  - WBC count 10,000 to 40,000.
  - Abnormal large lymphocytes (Downey cells) are 10% of total leukocyte count.
  - Heterophile antibodies 1:160 or higher
- EBV is associated with lymphoma esp. Hodgkin's disease.
- **Treatment**: supportive.



## Oral Hairy Leukoplakia

- Associated with chronic shedding of EBV in the oral cavity.
- Presentation: Poorly demarcated, corrugated, white plaques on lateral aspect of tongue.
- Unlike thrush, cannot be removed by scraping.
- Occurs with immunosuppression (esp AIDS) and warrants HIV workup.
- **Treatment**
  - Not required
  - Podophyllin and tretinoin are used but lesions recur



## Human Herpes virus 6

- HHV 6A causes **multiple sclerosis** and HHV 6B causes **Exanthem subitum or Roseola Infantum**.
- Roseola Infantum (sixth disease) presents as abrupt fever, inflamed tympanic membrane, periorbital edema, hematuria and maculopapular rash.
- Complications : seizures, thrombocytopenia, intussusception, hemophagocytic syndrome and fatal hepatitis.



## Human Herpesvirus 7

- HHV 7 has been associated with febrile illness in children, exanthem subitum and questionably pityriasis rosea.
- There is persistent infection in salivary glands and is believed to be the mode of infection.
- HHV 7 infection can reactivate HHV6 from latency.



## Human Herpesvirus 8

- Three proliferative diseases are associated with HHV 8:  
**Kaposi sarcoma, Primary effusion lymphoma and Castelman's disease.**
- Kaposi's Sarcoma
  - Includes AIDs, African and Mediterranean cases.
  - Seroprevalence correlates with prevalence of KS in a given population.
  - Infection predicts and precedes subsequent development of KS.
  - HHV 8 is found in KS lesions, saliva, blood and semen of infected individuals.



## Viral Exanthems

### ■ **Macular :**

- Rubella
- EBV (infectious mononucleosis)
- Human herpesvirus 6 (roseola)
- Human herpesvirus 7

### ■ **Maculopapular :**

- Togavirus
- Measles
- Human parvovirus B19 (erythema infectiosum)



## Viral Exanthems

- **Maculopapular - vesicular :**
  - Coxsackie A (5, 9, 10, 16)
  - Echovirus (4, 9, 11)
- **Maculopapular – petechial :**
  - Togavirus (Chikungunya)
  - Bunyavirus haemorrhagic fever (Lassa)
- **Urticarial :**
  - Coxsackie A9 and Hepatitis B



## Uncommon Viral Infections of the Skin

### ■ **Pox Viruses :**

- Cowpox, Orf, Milker's nodule

### ■ **Epstein Barr Virus :**

- Infectious Mononucleosis, OHL, Gianotti Crosti,
- Lymphomas

### ■ **Viral insect-borne and haemorrhagic fevers:**

(Toga, Flavi, Arena, Filo, Bunya)

- Chikungunya, Dengue, Kyasanur Forest Disease, Lassa

### ■ **Picorna Viruses :**

- Herpangina, hand, foot and mouth disease.



## MCQ's

**Q.1)** Henderson-Paterson bodies is seen in

- A. Wart
- B. Herpes simplex
- C. Molluscum Contagiosum
- D. EBV

**Q.2)** The following diseases are associated with Epstein-Barr virus infection, except :

- A. Infectious mononucleosis
- B. Bowenoid papulosis
- C. Nasopharyngeal carcinoma
- D. Oral hairy leukoplakia



## MCQ's

**Q.3)** Kaposi's Sarcoma is associated with

- A. HHV 6
- B. HHV 7
- C. HHV 8
- D. HHV 3

**Q.4)** All are differential diagnosis of plantar wart except -

- A. Corn
- B. Callosities
- C. Punctate Keratoderma
- D. Plantar psoriasis



## MCQ's

**Q.5)** HPV is responsible for cancer of

- A. Brain
- B. Lung
- C. Cervix
- D. Prostate



## Photo Quiz



**Q.** Diagnose and describe the lesions



## Photo Quiz



**Q.** Identify the Phenomenon and describe the condition where it is seen



## Photo Quiz



**Q.** Identify the condition and the causative organism?



Thank You!