

# VIRAL INFECTIONS

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# CLASSIFICATION OF VIRUS

## ■ DNA Virus

- Double stranded
  - Enveloped
    - **Herpesviridae**
    - Hepadnaviridae
  - Non-enveloped
    - **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, Penicillinosis



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)
- 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 (KSHV)(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.



Genital Herpes simplex infection

# Treatment

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

<b>Antiviral</b>	<b>Primary (10 days)</b>	<b>Recurrence (5 days)</b>	<b>Suppressive 6 months - 1yr</b>
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)

- Varicella is caused by **Herpes Zoster Virus.**
- 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.





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.



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, inflammed tympanic membrane, periorbital edema, hematuria and maculopapular rash.
- Complications : seizures, thrombocytopenia, intussusception, hemophagocytic syndrome and fatal hepatitis.

# HUMAN HERPES VIRUS 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!*

*Thank You!*