### Herpes Simplex Virus Infection

**Epidemiology**

- Herpesviridae – DNA Virus
  - HPV 1 – infection above the Umbilicus
    - Happens during pre-school day
  - HPV 2 – infection below the Umbilicus
    - Happens due to sexual intercourse
- Only 10% are symptomatic during primary infection

**Transmission**
- Direct contact with infected individual through sexual intercourse and broken skin
  - Sexual contact
  - Saliva
  - Newborn during birth
- Incubation period: 5 days (range between 2-12 days)

**Treatment**
- Antiviral drugs
  - Acyclovir
  - Valaciclovir
  - Vidabine
- Does not cure but reduce severity of disease

**Prevention**
- Patients and careers with active lesion should cover the lesion and avoid vulnerable person
- Neonatal Herpes
  - Cesarian section if mother have active genital lesion
- Genital Herpes
  - Avoid sexual activity
  - Cover the active lesion

### Diseases

<table>
<thead>
<tr>
<th>Genital Herpes</th>
<th>Pathogenesis</th>
<th>Clinical Features</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Upon entry, the virus multiply locally</td>
<td>1. Mainly due to HSV2 due to sexual activity</td>
<td>Neurological Syndrome</td>
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<td>2. The virus then travels along the nerve ending to the regional Ganglia for further multiplication</td>
<td>2. Can also be due to HSV1 – Orogenital sexual activity</td>
<td>o Acute Encephalitis</td>
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<td>3. Then it descends across the nerve and affect the skin and mucosa that’s being supplied by the corresponding nerve</td>
<td>3. Primary Infection</td>
<td>o Aseptic Meningitis</td>
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<td>4. Contagious spread to local area also takes place</td>
<td>o Signs and symptoms</td>
<td>o Transverse Myelitis</td>
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<tr>
<td>a. Affected cells are undergoing ballooning degeneration</td>
<td>- Asymptomatic normally</td>
<td>o Sacral Radiculopathy</td>
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<td>b. Characteristic giant cells</td>
<td>- Painful vesicle</td>
<td>o Disseminated and Visceral Herpes</td>
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<td>c. Intracellular inclusion bodies</td>
<td>- Ulcers on</td>
<td>o Happens in</td>
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<td>5. Primary subsides</td>
<td>- Vulva</td>
<td>- Immunocompromised patient</td>
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<tr>
<td>a. Formation of humoral and cellular immunities</td>
<td>- Vaginal mucosa</td>
<td>- Neonates</td>
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<td>b. Dormant virus remains inside the Basal Ganglia</td>
<td>- Penis</td>
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<td>c. Subside within 2-4 weeks</td>
<td>- Perineum</td>
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<tr>
<td>6. Dormant virus may reactivate later leading to</td>
<td>4. Recurrence Infection</td>
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<tr>
<td>a. Recurrent infection</td>
<td>o Milder</td>
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<tr>
<td>b. Asymptomatic virus shedding</td>
<td>o Less extensive</td>
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<tr>
<td>7. Reactivation factors</td>
<td>o Short lived</td>
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<tr>
<td>a. Intercurrent illness</td>
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<td>b. Stress</td>
<td>Can be either happen during</td>
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<td>c. Trauma</td>
<td>o In utero</td>
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<td></td>
<td>o Delivery</td>
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<td>Risk</td>
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<td>o 30-50% in mother having primary Genital Herpes during time near to delivery</td>
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<td>o 1% during first trimester</td>
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<td></td>
<td>Signs and symptoms</td>
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<td></td>
<td>o Vesicles on</td>
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<td></td>
<td>- Skin</td>
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<td></td>
<td>- Eyes</td>
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<td></td>
<td>- Mouth</td>
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<td></td>
<td>o Encephalitis</td>
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<td></td>
<td>o Disseminated Herpes</td>
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<td>Mortality 50% in untreated cases</td>
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### Cutaneous Herpes

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Pathogenesis</th>
<th>Clinical Features</th>
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</thead>
</table>
| Gingivostomatitis | 1. Upon entry, the virus multiply locally  
2. The virus then travels along the nerve ending to the regional Ganglia for further multiplication  
3. Then it descends across the nerve and affect the skin and mucosa that’s being supplied by the corresponding nerve  
4. Contagious spread to local area also takes place  
a. Affected cells are undergoing ballooning degeneration  
b. Characteristic giant cells  
c. Intracellular inclusion bodies  
5. Primary subsides  
a. Formation of humoral and cellular immunities  
b. Dormant virus remains inside the Basal Ganglia  
6. Dormant virus may reactivate later leading to  
a. Recurrent infection  
b. Asymptomatic virus shedding  
7. Reactivation factors  
a. Intercurrent illness  
b. Stress  
c. Trauma | • Multiple shallow painful ulcer affecting  
o. Tongue  
o. Gums  
o. Buccal mucosa  
• Vesicles around the lip  
• Tonsilopharyngitis less common  
• Tender Cervical Lymphadenopathy  
• Presented with  
o. Fever  
o. Salivation  
o. Irritability  
o. Food refusal  
• Symptoms subside within 5-7 days | • Invasion of virus through non-intact skin  
• Usually due to HSV 1 but can also be due to HSV2  
• Recurrence may occur at the same area  
• Special forms  
o. Herpes Whitlow  
o. Herpes Gladitorum  
o. Herpes Herpeticum |
| Cold Sore         | 6. Dormant virus may reactivate later leading to  
a. Recurrent infection  
b. Asymptomatic virus shedding  
7. Reactivation factors  
a. Intercurrent illness  
b. Stress  
c. Trauma | • Due to reactivation of HSV1 infection  
• Cluster of vesicles develop  
o. Around the lip  
o. Mouth  
• Last for few days | |
| Keratoconjunctivitis | 7. Reactivation factors  
a. Intercurrent illness  
b. Stress  
c. Trauma | • Conjunctivitis  
• Vesicles on eyelids  
• Keratitis  
• Corneal ulcer  
• Blindness | |

**Diagnosis of HSV Infection**

- **Specimen**  
o. Vesicle fluid  
o. Skin swab  
o. Saliva  
o. CSF  
o. Corneal scrapping  
- **Serological test**  
o. ELISA  
o. PCR  
- **Culture – CPE of the virus**  
o. BHK21 –Hamster Kidney Cell Line  
o. Human Embryo Lung Cells  
- **Antiserum or Interferon**
### Human Papillomavirus Infection

#### Epidemiology
- Papovavirus – DNA virus
- The common cause of warts in human
- Pathogenic genotypes
  - Types 1&2 – common and plantar warts
  - Type 6&11 – genital and laryngeal warts
  - Type 16&18 – genital dysplasia and cancers

#### Transmission
- Direct contact
- Sexual contact
- Vertical transmission

#### Pathogenesis
- Virus multiply in the Stratum Basale of the Epidermis
- This leads to proliferation and Keratosis
- Incubation period – 3-4 months (range 1-2 years)

#### Disease | Clinical Features | Diagnosis | Treatment
--- | --- | --- | ---

### Genital Warts

#### Types
- Condylomata Acuminata – cauliflower-like
- Smooth, Popular
- Keratotic
- Flat-topped Papules

#### Symptoms
- Burning
- Itching
- Irritation
- Bleeding

#### Located at
- **Men**
  - Foreskin
  - Coronal Sulcus
  - Shaft
  - Urethral Meatus
  - Perianal
- **Female**
  - Vaginal Introitus
  - Labia
  - Perineal

#### Diagnosis
- Clinical examination
- Biopsy
  - Histopathology in atypical cases

**HPV CANNOT be cultured in vivo or in vitro**

#### Treatment
- Surgical removal of the warts
  - Removal doesn’t ensure complete eradication of the virus
  - Decrease infectivity and transmission risk
  - Reduce risk of development of cancer
- Topical therapy
  - Podophyllotoxin cream/sol
  - Imiquimod cream
- Other
  - Podophyllin tincture
  - Trichloroacetic acid
  - Cryotherapy with liquid nitrogen

### Gardasil Vaccine
- Prevention of Cervical Carcinoma and wart
- Inactivated vaccine
  - Type 6, 11, 16, 18
- Given in 3 doses
  - 1, 2 and 6 months interval
- Protection only if never being exposed to the virus
- Given to women age 9-26 years