**Syphilis**

**Def:** Venereal (sexually transmitted) infection.

**Causative organism:** Spirochetes called "Treponema pallidum".

**Mode of Infection:**

- Close physical contact with infected person.
- In the presence of minor abrasion of the surface, through which the organism has gained access to the tissue of the host.
- Transplacental in congenital syphilis

**Course of the disease:**

- Rapid dissemination by blood and lymphatics.
- Pathological changes and clinical manifestations occur in stages, lasting for many years.

**Classification and types**

1) Congenital (placental transmission).

2) Acquired: Occur in three stages

**I. Primary syphilis**

**Primary lesion called chancre**

- Develop 2-6 weeks after infection.
- **Site:** at the site of entry of the organism usually genital.
  2. Extra genital as anus, fingers, breasts, and lips.
- **Gross picture of chancre:**
  Usually single, painless small papule which rapidly ulcerate forming an indurated ulcer with painless enlargement of regional lymph nodes.

- **Microscopically:**
  The syphilitic infiltrate consists of lymphocytes **plasma cells**, histiocytes, and fibroblasts. Blood capillaries show endothelial proliferation and perivascular lymphocytic infiltrate. Spirochetes present.

- **Fate:** The chancre heals spontaneously in 3 months leaving minimal scarring.

**II. Secondary stage**

- **Manifests 1-3** months after the primary chancre and may be in the form of:

  A. **Skin lesions:**

    1- Skin rashes: Macula-papular type diffuse throughout the body, painless.
    
    ![Image of skin rash](image)

    2- Generalized lymphadenopathy: The nodes are shotty and discrete.

    3- Chondyloma lata (venereal warts) on the penis, vulva, or around anal verge.

    ![Image of chondyloma lata](image)
4- Ulcers in the mucous membranes of mouth, tongue which called snail track ulcer.

5- Eye changes as retinitis, iritis, and iridocyclitis

6- Alopecia (loss of hair).

☐ **M/E:**

Infiltration by lymphocytes **plasma cells**, and macrophages, with many Spirochetes. Vessels show endarteritis. Healing without fibrosis because tissue destruction is minimal

**III. Tertiary Syphilis**

☐ **Occur** 3-25 years after the primary infection in about 1/3 of untreated patients.

☐ **Site:** Any organ may be affected with marked tissue destruction and heals by dense fibrosis, so it cause marked destruction of the tissue affected. Two main lesions develop: Gumma and diffuse syphilitic reaction.

**A. Gumma:**

☐ **Def:** It is a localized mass consists of granulation tissue with central necrosis.

☐ **Sites:** Liver, testis, bone, brain, nasal septum, and skin.

☐ **N/E:**

Firm or rubbery white or grey mass in the affected organ. When it occurs in the skin or mucous membrane, it produces gummatous ulcer characterized by:
a) The edge is punched out (sharp deep).
b) The margin (outlines): Serpigenous.
c) The floor is yellowish and necrotic.
d) The base is indurated.

M/E:
1- Central area of necrosis.
2- Surrounded by lymphocytes, plasma cells and some multinucleated giant cells.
3- Fibrosis
4- Endarteritis obliterans

What are the causes of central necrosis of gumma:

- Partially due to ischemia
- Partially due to cell mediated immune reaction caused by T-lymphocytes

B. Diffuse syphilitic reaction:

- Organs affected: Meninges, tongue, periosteum, and aortic wall (causing aortic aneurysm).
- N/E: There is diffuse and irregular thickening of the involved structures.
- M/E: Diffuse infiltration of the tissue by lymphocytes, plasma cells, and fibroblasts with endarteritis.

Congenital syphilis

- Cause: Transplacental infection from syphilitic mother to fetus.
- What are the possible sequences:

  - **Abortion or stillbirth:** The foetus show damaged organs.

  - **Birth of syphilitic children:** Who develop early or late syphilitic lesions as:

    1. Maculo-papular rashes, mucous patches, and condyloma lata.

    2. Rhagades: Radial scars at the angle of the mouth and anus.

    3. Saddle nose (caused by gumma that leads to destruction of nasal septum).

    4. Gummata in liver (hepar-lobatum), bone, palate, tongue, skin, brain, and meninges.

    5. Diffuse syphilitic inflammation in many tissues as

       - Lung: Pneumonia alba

       - Liver: Syphilitic cirrhosis

       - Periosteum: Sabre tibia
6. Hutchinson's teeth: The permanent incisors are small, widely separated, peg-shaped, with notched cutting margin.

7. Deafness and blindness


**Actinomycosis**

Suppurative granuloma with formation of multilocular abscess caused by a special type of bacteria which is branching, filamentous, gram-positive rods (actinomyces israeli, or actinomyces bovis). Secondary infection may be the cause of suppuration.

**Method of Infection:**
- Organism found normally in mouth and intestinal mucosa.
- Aberrations of mucosa as in tooth extraction invasion of organism deeply to give multiple lesions.

**Sites:**
- a) Cervicofacial (60%).
- b) Abdominal (20%) fungus from the intestine iliocoeal area mass in Rt. Iliac fossa blood spread multiple lesions in the liver.
- c) Pulmonary (15 %) aspiration from the mouth lung actinomycosis.
- d) Skin (5%).

**N/E:**
Indurated multilocular abscess contains pus, sulphur granules or fungus colonies the abscess open on the surface by cribriform openings.

**M/E:**
- is that of suppurative granuloma formed of central area ✷ shows pus and colonies of the organism which appears as tangled mass of thread (hyphae) surrounding by radiating clubbed organism

* Macrophages, foreign body giant cells, lymphocytes, plasma cells and peripheral granulation tissue and fibrosis:

![Image of multilocular abscess]

**Spread:**
1. Direct.

   2. Blood spread rare.

   3. Lymphatic spread does not occurs (large organism cannot access lymphatics).

**Mycetoma (Madura foot, Maduramycosis):**
It differs from actinomycosis in:
- It occurs in the extremities (foot + palm). - Special sites as (assiut) and india.
- Caused by Nocardia (live in soil).
- Colonies are black.
- Spread only locally.

**N/E:** as actionmycosis (Multilocular abscess).

**M/E:** Suppurative granuloma.
Bilharziasis

- **Definition :-**
  - It is an infective parasitic granuloma.
  - It affects **200 millions**
  - Kills about **280000 per year**

- **Species :-**
  1) Schistosoma Hematoebium (S.H) (Urogenital System).
  2) Schistosoma Mansoni (S.M) (Large Intestine)
  3) Schistosoma Japonicum (S.J) (Small Intestine)

- **Life Cycle :-**
  1) Cercariae penetrate through the skin, to lungs, and then to systemic arteries→ only those that reach the portal circulation can survive.
  2) Adult male and female couples move against the blood stream to reach rectal plexus (S.M) & urogenital plexuses (S.H).
  3) Female pass to sub-mucosal venules and lay eggs.
  4) The ova penetrate to the peri-venular tissue to be extruded with urine or stools (open lesion).
Bilharzial Lesions are allergic reactions of type I (immediate) and type IV (delayed) hypersensitivity against antigens produced by cercariae, worms and ova.

Cercaria:
- a) Skin penetration leading to acute dermatitis.
- b) Its passage in the lungs leads to vermenous pneumonia.

Worms:
A) Living worms produce:
1) Haemazoin, bilharzial iron containing pigment. It results from feeding of adult worms on the host blood.
2) RES Hyperplasia in response to antigen produced by living worms.
3) They lay down ova.

B) Dead worms produce:
1- Bilharzial antigen leads to RES hyperplasia.
2- Venular and perivenular changes in the form of immediate allergic reaction (type I) with dense eosinophilic infiltrate (eosinophilic abscess), followed by chronic inflammatory reaction (type IV allergy). Such reaction is seen mostly in the liver and lungs.
3- Toxic manifestations appear after anti-bilharzial treatment.

Ova:
The oval reaction may be:
- Venular: impaction of ova in the venular wall causing endophlebitis.
- Perivenular: where various numbers of ova are retained in the perivenular tissues with tissue reactions.

The living ova are oval, red and cellular with yellowish brown thick refractile chitinous shell and spine. The dead ova are blue (calcified).
acellular and amorphous with fragmented shell. The transversely cut ova appear rounded.

**Tissue reaction against ova:**

1) **living ova** lead to bilharzial reaction in the form of:

   - Immediate allergic reaction (type I).

   - Granulomatous reaction (Delayed hypersensitivity- Type IV)

   Consists of lymphocytes, plasma cells, eosinophils, macrophages, foreign body giant cells and outer granulation tissue. The reactions is either diffuse or in the form of small nodules (called bilharziomas or pseudotubercles). The center of the reaction may show minimal necrosis.

   *The pseudotubercles differ from tubercles in that the inflammatory cells are not regularly arranged, ova are seen, and necrosis is minimal while eosinophils are many.*

   * Ova from gastrointestinal tract infection form emboli in the portal blood reaching the liver while ova from urinary system infection form emboli in the systemic venous blood, reaching the lungs.

2) **Dead ova** excite mild or no inflammatory reaction.
**Bilharzial lesions**

1. **Bilharzial lesions of solid organs:**

   Bilharzial lesions in solid organs consist of tissue destruction and fibrosis.

2. **Bilharzial lesions of Hollow organs:**

   The submucosa of the urinary bladder and intestine (rich venous plexus) is mostly involved followed by the mucosa, muscle layer and subserosa.

a- **Lesions due to living ova:** Pass through the following sequences:

   - Passage of bilharzial ova through the intestinal wall to reach the lumen leading to multiple submucosal haemorrhagic spots as well as tiny mucosal erosions.
   - Secondary bacterial infection due to devitalization of tissue and mucosal ulceration.
   - Polyp formation, occurs in the following steps:
     - Hyperaemia of the mucosa and submucosa due to immediate allergic reaction.
     - Granularity (small elevations) due to bilharzial reaction.
     - Epithelial hyperplasia (adenomatoid formation).

N/E of the polyp:

- Variable in number.
- It is composed of many coalesced bilharzial granulomas.
- A small polyp is sessile and simple (unbranched), as it enlarges it becomes pedunculated and compound (branched).
- The covering mucosa may be intact or ulcerated.
- It is usually reddish in colour and showing haemorrhagic spots.
- It is soft in consistency.
M/E of the polyp:

It is formed of a central core of connective tissue containing bilharzial granuloma. The covering mucosa may be intact, hyperplastic or ulcerated.

b- Lesion due to dead ova (Sandy patches):

Heavy ova deposition compresses the blood vessels causing necrosis in the submucosal area containing the ova. The area is fibrosed and the ova become dead and calcified. It compresses the overlying mucosa; interfere with its blood supply causing atrophy and thinning of the mucosa. The calcified ova shine through it.

N/E:

Circumscribed, raised patch, rough and dirty yellow. Gritty sensation is felt when the patch is sectioned with knife.

M/E:

Calcified ova with minimal or no bilharzial reaction. The surrounding tissue is fibrosed. The overlying mucosa is atrophied and may be ulcerated.

c - Lesion due to fibrosis:

1- If there is severe fibrosis of the submucosa and mucosa (saturated with ova), the ova deposition in these sites stop. No ova pass in urine or stool (closed lesion). The ova deposition continues in the muscle, subserous and peritoneal layers causing fibrosis in these sites. The organ becomes small and contracted with obstructive manifestations.

2- Pericolic or perivesical masses formed of bilharzial reaction may be formed.

3- Parasitic emboli to the liver & pulmonary blood vessels may also occur.
**d- Ulcers:**

Ulcers are common finding in bilharziasis.

- **Pathogenesis:**
  1. Passage of ova.
  2. Fissure ulcer (linear).
  3. Tip of a polyp.
  4. Twisting of polyp.
  5. Secondary bacterial infection.
  6. Allergic necrosis
  7. Over a sandy patch.

- **N/E:**
  Ulcers may be single or multiple, small rounded or large irregular, superficial or deep, with sharp edge, irregular margin, granular floor and indurated base.

- **M/E:**
  The base of the ulcer shows bilharzial granulomas.
Urogenital Bilharziasis

1. It is more common in the trigone and superior surface (rich blood supply).
2. The bladder lesions are characterized by:
   A - The polyps are few in number, not more than two.
   B - Sandy patches are more common.
   C - In closed lesions the bladder capacity decreases and the peritoneum shows small nodules.
   D - Ulcers take many forms, especially linear (fissure) ulcer.

- Epithelial changes are found; these are due to bilharzial reaction and secondary bacterial infection. **These epithelial changes include:**

  **i- Hyperplasia** takes the form of:
  - Focal increase in the epithelial thickness.
  - Dipping down of the hyperplastic epithelium.

  **ii- Brunner's nests:** These are cellular masses formed of the dipped cells that are later separated from the surface epithelium. Degeneration in the central cells of the masses produces cystitis cystica and/or cystitis glandularis.
iii. Cystitis cystica

- Large in size.
- Lined by 1-2 layers (flat cells).
- contains watery secretion.
- It is due to secondary infection.
- It is not precancerous.

iv. Cystitis glandularis

- Small in size.
- Lined by 1-2 layers (columnar cells).
- contains mucus.
- It is due to metaplasia.
- It is precancerous.

v. Atrophic changes over the sandy patches

vi. Squamous metaplasia (leukoplakia):

These are irregular patches of whitish colour. They are thick, opaque and formed of keratinized stratified squamous epithelium. They are precancerous.

Complication of urinary bilharziasis:

1- Microcytic hypochromic anaemia which is due to repeated haematuria caused by ulceration.
2- Stone formation caused by secondary bacterial infection of bladder wall (alkaline urine).
3- Obstructive uropathy which is caused by polyps and bladder fibrosis.

4- Carcinoma of the bladder.

5- Pulmonary bilharziasis.

Other urogenital Bilharziasis:

1) Bilharziasis of the ureter: common in the lower third and the lesions are more or less like that of the bladder. The complications here are also like that of the bladder.

2) Bilharziasis of the kidney: Ova are deposited in the interstitial tissue causing fibrosis, hydronephrosis, pyelonephritis, pyonephrosis and nephritic syndrome.

3) Bilharziasis of seminal vesicles causes tissue destruction with haemospermia.

4) Bilharziasis of prostate causes bladder neck obstruction.

5) Bilharziasis of testicle leads to hydrocele.

6) Bilharziasis of spermatic cord leads to diffuse thickening.

7) Bilharziasis of urethera causes stricture and fistula formation

Intestinal Bilharziasis

Caused by Schistosoma Mansoni and characterized by…

1- The ova deposition is commonest in the rectum, gradually decreasing as the small intestine is approached.

2- The intestinal lesions differ from that described in the following:

- The polyp are numerous.
- Sandy patches (due to heavy ova deposition) are few or even absent.
In closed lesions, the peritoneum shows large pericolic mass and the intestinal lumen may be narrowed.

Ulcerations are common while fissure ulcers are absent.

**Complications of intestinal bilharziasis are:**

1. Bilharzial dysentery.
2. Microcytic hypochromic anaemia which is due to repeated bleeding caused by ulceration.
3. Chronic intestinal obstruction which is caused by fibrotic stenosis (rare).
4. Abnormal peristalsis with intussusception caused by bilharzial polyps.
5. Bilharzial hepatic fibrosis.
6. No relation to malignancy.

**Hepatic Bilharziasis**

**Characters:**

1) Diffuse hepatic fibrosis.
2) Emboli of ova and worms from the intestinal lesion.
3) Fibrosis not cirrhosis.
4) Portal tracts are the main site.
5) Not related to hepatocellular carcinoma

**Pathogenesis:** It is a diffuse hepatic affection due to emboli of ova and worms from the intestinal bilharziasis reaching the liver through portal circulation.

1- The ova: leave the intestine if it is densely fibrosed, pass as emboli to the liver. In the liver it produces:

a- Venular reaction: impaction of the ova in the vein cause intimal and subintimal proliferation with venous thrombosis and fibrosis.
**b-Perivenular reaction:** It is a localized Bilharzial reaction.

2- **The dead worms:** (especially after anti- bilharzial treatment)

**a- In mild cases:** the affected veins are occluded due to intimal and sub- intimal proliferation.

**b- In severe cases:** there is acute endophlebitis with thrombosis. Canalization of the thrombus forming multiple new vascular channels which communicate with the adjacent vessels to produce angiomatoid lesion. Also bile duct proliferation are seen.

**Pathology:** Hepatic bilharziasis is of two types:

1- Fine bilharzial hepatic fibrosis.  
2- Coarse bilharzial hepatic fibrosis.

It is called fibrosis and not cirrhosis because the lesion is restricted mainly to the portal tracts. The hepatic cells are more or less spared from the lesion.

<table>
<thead>
<tr>
<th></th>
<th>Fine Bilharzial fibrosis</th>
<th>Coarse Bilharzial fibrosis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site:</strong></td>
<td>Small portal tracts</td>
<td>Large portal tracts.</td>
</tr>
<tr>
<td><strong>Incidence:</strong></td>
<td>Less than 50% of cases.</td>
<td>More than 50% of cases.</td>
</tr>
<tr>
<td><strong>Intestinal bilharziasis:</strong></td>
<td>Mild or moderate.</td>
<td>Severe</td>
</tr>
</tbody>
</table>

**Pathogenesis**

1- Ova  
- Few in number.  
- In small portal vein at one time.  
2- Worm  
- No worm impaction.  
3- Repetition  
- No repetition of the process.  

**N/E:**

- Few in number.  
- In large portal vein or marginal vein.  
- Worm impaction.  
- Repetition is found.
<table>
<thead>
<tr>
<th>1- Size of the liver</th>
<th>- Decrease</th>
<th>- Marked decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>2- Surface</td>
<td>- Finely granular.</td>
<td>- Coarsely irregular.</td>
</tr>
<tr>
<td>3- Capsule</td>
<td>- Thick</td>
<td>- Thick</td>
</tr>
<tr>
<td>4- Consistency</td>
<td>- Firm</td>
<td>- Firm</td>
</tr>
<tr>
<td>5- Cut surface.</td>
<td>- Opaque small portal tracts.</td>
<td>- Opaque broad, irregular portal tracts.</td>
</tr>
<tr>
<td>6- Color</td>
<td>- Brownish due to bile pigment</td>
<td>- Brownish due to bile pigment</td>
</tr>
</tbody>
</table>

**M/E:**

<table>
<thead>
<tr>
<th>Small portal tracts show:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Ova deposition with reaction.</td>
</tr>
<tr>
<td>- Fibrosis and thickening</td>
</tr>
<tr>
<td>- Little liver cell necrosis.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Large portal tracts show:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Dead worms and ova deposition with reaction.</td>
</tr>
<tr>
<td>- Excess fibrosis and thickening.</td>
</tr>
<tr>
<td>- Very little liver cell necrosis.</td>
</tr>
</tbody>
</table>

**Effects:**

<table>
<thead>
<tr>
<th>- Hepatic hypofunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Portal hypertension.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>- Hepatic hypofunction</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Portal hypertension.</td>
</tr>
</tbody>
</table>

**Pathogenesis of the Portal Hypertension:**

1- Vascular lesions in the form of endophlebitis, epithelial proliferation, thrombosis and obliteration.

2- Extrahepatic portal and splenic veins thrombosis.

3- Intrahepatic portosystemic anastomosis.

4- Pressure by fibrosis on the marginal veins.

**Effects of portal hypertension:**

1- Varicosities at porto-systemic anastomosis

2- Splenomegaly which is due to portal
congestion and RES hyperplasia.

3-Ascites.

4- Congestion of the gastro-intestinal tract

**Bilharziasis of the spleen "Egyptian Splenomegaly"**

It is a syndrome characterized by intestinal Bilharziasis, hepatic fibrosis, splenomegaly, pancytopenia and irregular fever.

Splenomegaly may be either early or late:

<table>
<thead>
<tr>
<th>Pathogenesis:</th>
<th>Early Splenomegaly</th>
<th>Late Splenomegaly</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bilharzial antigen causes REC hyperplasia.</td>
<td>Portal hypertension with dilated blood sinuses.</td>
</tr>
<tr>
<td></td>
<td>Ova deposition produce bilharzial reaction.</td>
<td>haemosiderin deposition and fibroblastic proliferation.</td>
</tr>
</tbody>
</table>

**N/E:**

<table>
<thead>
<tr>
<th>Size</th>
<th>Slight increase (twice).</th>
<th>marked increase (10-30 times).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capsule</td>
<td>Stretched.</td>
<td>Thick and whitish due to fibrosis</td>
</tr>
<tr>
<td>Consistency</td>
<td>Firm.</td>
<td>Firm</td>
</tr>
<tr>
<td>Cut surface</td>
<td>bilharzial brown pigment.</td>
<td>Dark red due to bilharzial pigment and hemosiderin.</td>
</tr>
</tbody>
</table>

**M/E:**

<table>
<thead>
<tr>
<th>Lymphoid follicles hyperplasia.</th>
<th>- Lymphoid follicle atrophy due to dilated blood spaces.</th>
<th>Splenic vein is dilated, thick, adherent to the surroundings.</th>
</tr>
</thead>
<tbody>
<tr>
<td>REC hyperplasia.</td>
<td>- Hyaline degeneration of the arterioles.</td>
<td>Subcapsular haemorrhage, fibrosis and perisplenitis</td>
</tr>
<tr>
<td>Congested red pulb containing excess eosinophils.</td>
<td>- Prominent red pulp, with no eosinophils in it.</td>
<td></td>
</tr>
<tr>
<td>Ova are rarely seen.</td>
<td>- Increase fibrous framework, fibrosiderotic nodules (Gamna-Gandi nodules) formed of</td>
<td></td>
</tr>
</tbody>
</table>
Effects:

- No effect

- Compression of the surrounding organs.
- Hypersplenism (pancytopenia and irregular fever).

### Pulmonary Bilharziasis:

#### Cercariae lesion:
1. Bronchopneumonia.

#### Ova lesions:
3. The interstitial lesions:

#### Worm lesions:
1. Verminous pneumonia.

#### Effects of pulmonary Bilharziasis:
1. Pulmonary hypertension ending in right side heart failure (cor pulmonale).
2. Pulmonary aneurysm.
Hydatid disease

**Definition:** It is an infective parasitic disease transmitted from animal (dog) to man.

**Pathogenesis:** It is caused by ingestion of the eggs of *Echinococcus granulosus*. It contaminates food ingested by man, hatch in the intestine and pass with portal blood to the liver where it matures into larval stage (hydatid cyst). It may pass to the systemic circulation reaching to different organs.

**Pathology:** Hydatid cyst may reach 20cm in diameter. It is composed of:

a- A lumen contains straw-coloured fluid.

b- Inner germinal layer; that forms scolexes.

c- Outer chitinous laminated layer.

d- Surrounding fibrous capsule.

**Complications:**

1- Allergic manifestations with anaphylactic shock.

2- Abscess formation owing to secondary bacterial infection of the cyst.

3- Pressure atrophy on the surrounding tissue.

Filariasi

**Definition:** It is an infective disease caused by microlarvae by the bites of mosquito culex. The larvae pass to the lymphatics where it grows to maturity.

**Pathology:**

1- **Lymphangitis**

   especially in the lymphatics of genitalia and lower limbs. The lymph vessels are dilated *(lymph varix)* and perilymphatic tissue is the seat of chronic inflammatory infiltrate with some giant cells and many eosinophils. Necrosis may occur to the lymphatics with formation of *filarial abscess*. Healing occurs by fibrosis.
2- **Lymphadenitis** to the draining lymph nodes.

3- **Elephantiasis**

occurs due to lymphatic obstruction followed by infection by beta streptococcus haemolyticus. Rupture of the obstructed lymphatics leads to the release of the lymph fluid in the tissue. Such lymph fluid stimulates the proliferation of fibrous tissue. This is seen mainly in the lower half of the body.