GIARDIASIS

**ORO- INTESTINAL - UROGENITAL FLAGELLATES**

1. **Oro-intestinal**
   - *Trichomonas hominis*
   - *Giardia intestinalis*
   - *Chilomastix mesnili.*
   - *Trichomonas tenax*
   - *Dientamoeba fragilis*
   - *Embadomonas intestinalis.*
   - *Enteromonas hominis.*

2. **Uro-genital** - *T. vaginalis*

3. **Haemo-somatic**

**General Characters:**
- Infection occurs in the buccal cavity, intestine/ uro-genital tract.
- The infective stage is either the vegetative or the cystic form.
- Transmission of infection is direct one.

**GIARDIA LAMBLIA**

Geographical distribution: world-wide.
- main cause of diarrheal outbreaks from contaminated water supplies
- important cause of traveller’s diarrhea
- opportunistic and nosocomial parasites.

**MORPHOLOGY**

<table>
<thead>
<tr>
<th>TROPHOZOITE</th>
<th>CYST</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shape</strong></td>
<td></td>
</tr>
<tr>
<td>Oval</td>
<td>Oval double-colourless wall</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td></td>
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<tr>
<td>15 x 8μ.</td>
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**TROPHOZOITE**
- pear-shaped with an anterior rounded & posterior tapering parts.
- bilaterally symmetrical.
- convex dorsal surface
- flat ventral one which is modified in its anterior part forming a sucking disc acting as an attachment organ.
- Two vesicular nucleus.
- Two median bodies (curved rods) lie posterior to the sucking disc called parabasal bodies.
- Four pairs of flagella.
- The intracytoplasmatic part (axonemes) of posterior two flagellae (axostyle) extend through the body dividing it and become free posteriorly.

**Cyst**
- Cytoplasm is often retracted at one side
- contains four nuclei usually gathered at one pole.
- Remnants of the flagellae, median bodies and axostyle are clearly seen.

**LIFE CYCLE**

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<th>Definitive host</th>
<th>Reservoir hosts</th>
<th>Infective stage</th>
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<td>Man is the natural host</td>
<td>Many animals (dogs, rodents, monkeys, pig) <em>Giardia</em> is a zoonotic disease.</td>
<td>Mature quadrinucleated cyst.</td>
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**Definitive host**
- Man is the natural host
- *Giardia* is a zoonotic disease.

**Reservoir hosts**
- Many animals (dogs, rodents, monkeys, pig)

**Infective stage**
- Mature quadrinucleated cyst.

**Habitat**
- In the upper part of small intestine (duodenum & upper jejunum).
- Trophozoites:
  - stick closely to the mucosa & may penetrate the crypts of mucosa
  - found in the gall bladder & bile ducts.
- Cysts: free in the lumen.

**Predisposing factors to symptomatic giardiasis:**
1. Achlorohydria, hypogammaglobinaemia, blood group A & relative ↓ secretory IgE.
2. Young age (infants and children).
3. Bacterial colonization ↑ damage by *Giardia* trophozoites.

**Mode of infection**
- is atypical faeco-oral transmission cycle.
- Cysts may be ingested with contaminated food & water/ transmitted by house flies, cockroaches.
- Person to person transmission occurs especially among school children, prisoners & in nurseries.
- Autoinfection by hand-to-mouth transmission.
1. Trophozoites replicate by longitudinal binary fission.
2. Excystation occurs in upper part of the small intestine stimulated by alkaline pH there.
3. Cyst → two trophozoites.

**Thuy's**
PATHOGENECITY AND CLINICAL PICTURE

- Trophozoites live closely to intestinal mucosa attached by their sucking discs→ mechanical irritation.
- Attachment is facilitated by a parasite secreted lectin which is activated by duodenal secretion→ derangement of normal villous architecture.
- Shortening, blunting of villi up to total atrophy.
- Inflammatory foci in crypts and lamina propria.

RESISTANCE TO GIARDIASIS

- It is indicated by spontaneous cure of the disease that may occur after about 40 days.
  - Lymphocytes, macrophages and secretory IgA are important for resistance.
  - Human Milk is able to kill Giardia trophozoites via lipase and IgA, so it can afford protection to breast fed babies.
- The prepatant period is 10-36 days.
- The disease may be asymptomatic in many cases.

SYMPTOMS

1) Diarrhea, flatulence, distension, epigastric pain, crampy abdominal pain, anorexia and weight loss.
2) Malabsorption syndrome
   - ↓ absorption of carotene, folate and vit B12
   - ↓ activity of lipase
   - ↓ secretion of disaccharidases, lactose & other enzymes → Lactose intolerance.
   3) Steatorrhea (fatty diarrhea)
      → greasy, pale yellow, frothy foul smelling & bulky stool may occur due to:
      - Physical occlusion of mucosa by attached parasites.
      - Enterotoxin secretions by the parasite.
      - Deconjugation and consumption of the bile salts.
      - Villous atrophy.

SEVERE SYMPTOMS: (in immunocompromized)
- Persistent steatorrhea.
- Fat-soluble vitamins deficiency.
- Hypoproteinaemia
- Cholangitis and cholecystitis → jaundice & biliary colic

DIAGNOSIS

1) Clinical diagnosis: C/P of the disease.
2) Laboratory diagnosis:
A- Direct:
1. Stool examination
   - by direct smear- concentration methods.
   - Repeated ex. for 3 times must be done (due to intermittent shedding of the parasite).
2. Examination of duodenal fluid which may be taken by duodenal aspiration or by Enterotest (string-test).
B- Indirect:
   - Serological tests: IFA and ELISA.
   - Detection of copro-antigen by ELISA.

TREATMENT

1. Fasigyn as a single dose.
2. Metronidazole (Flagyl).
3. Albendazole (Not given to pregnant women: teratogenic)

PREVENTION AND CONTROL

- Environmental sanitation as: anti-fly measures, proper sewage disposal and safe water supply.
- Faeces must not be used as fertilizer.
- Health education for: washing of green vegetables, fruits and hands before eating.
- Treatment of cases especially the carriers.