NOTES
CESTODES (TAPEWORMS)

GENERALLY, WHAT ARE THEY?

PATHOLOGY & CAUSES

- Human gastrointestinal tract parasites; AKA tapeworms
  - Adult tapeworms live in intestines
  - Larvae live in different tissue (brain, liver, eye, etc.)
- Tripartite body
  - Head/scolex (contain suckers, hooks/ attachment organs)
  - Thin neck
  - Trunk (made of numerous proglottids)
- Hermaphroditic
  - Each proglottid has male, female organs
- Transmission
  - Egg/larvae-contaminated water/food ingestion

RISK FACTORS

- Poor hygiene
- Low socioeconomic status
- Raw/undercooked fish/meat
- Livestock exposure
- Living/travelling in endemic areas

COMPLICATIONS

- Cysticercosis (*Taenia*)
- Cyst rupture
- Intestinal obstruction
- Malabsorption → vitamin B_{12} deficiency → megaloblastic anemia

SIGNS & SYMPTOMS

- Tapeworm species-dependent
- Can be asymptomatic, abdominal pain. nausea/vomiting, weight loss

DIAGNOSIS

DIAGNOSTIC IMAGING

MRI, CT scan, ultrasound

- Cyst presence

LAB RESULTS

- Microscopy
  - Identify eggs/proglottids in stool
- Complete blood count (CBC), serology

TREATMENT

- Tapeworm species-dependent

MEDICATIONS

- Anthelmintics

DIPHYLLOBOTHRIUM LATUM

osms.it/diphyllobothrium-latum

PATHOLOGY & CAUSES

- AKA fish tapeworm
- Longest human-infecting tapeworm (4–15m/13–49ft)
- Causes diphyllobothriasis in humans
- Proglottids
  - Width > length
- Competes for vitamin B_{12} → vitamin B_{12} deficiency

CAUSES

- Raw/undercooked fish → larvae ingestion

COMPLICATIONS

- Tapeworms → mechanical intestinal obstruction
- Malabsorption → weight loss
- Vitamin B_{12} deficiency → megaloblastic anemia

SIGNS & SYMPTOMS

- Vitamin B_{12} deficiency
  - *Impaired oxygen delivery:* fatigue, activity intolerance, pallor, compensatory mechanisms (↑ heart rate, bounding pulse)
  - *Neuronal demyelination:* numbness, tingling, weakness
- Weight loss
- Abdominal pain

DIAGNOSIS

LAB RESULTS

- Megaloblastic anemia; e.g. increased mean corpuscular volume (MCV)
- Microscopy
  - Identify eggs/proglottids in stool
- ↓ serum vitamin B_{12}

TREATMENT

MEDICATIONS

- Anthelmintics

ECHINOCOCCUS GRANULOSUS (HYDATID DISEASE)

osms.it/echinococcus-granulosus

PATHOLOGY & CAUSES

- Parasitic infection caused by *E. granulosus*
  - AKA echinococcosis
- Produce protoscoleces
  - Juvenile scolex invaginated in cysts
  - Tapeworm maturation in definitive host's intestine
- Humans (incidental hosts); herbivores (intermediate hosts); canids (definitive hosts)

CAUSES

- Viable parasite egg-containing food consumption

RISK FACTORS

- Parasite/egg-contaminated food/water ingestion
- Close contact with infected animals

Figure 61.2 The gross pathology of hydatid cysts excised from the lung.

Figure 61.1 A scolex of the organism *Echinococcus granulosus*, the causative agent of hydatid disease.

COMPLICATIONS

- Arise as cysts migrate, grow in size, rupture
  - *Liver:* eosinophilia, pruritus, jaundice, urticaria, liver abscess, anaphylaxis
  - *Peritoneal cavity:* peritonitis, pancreatitis
  - *Pleural space:* abscess formation → pneumothorax/pleural effusion
  - *Bronchial tree:* respiratory distress, hemoptysis
  - *Heart:* cardiomegaly/pericardial effusion
  - *Kidney:* glomerulonephritis
- Large cyst compression effect
  - *Heart:* large cyst in liver → compression of right heart
  - *Cerebral/spinal cord (CNS):* neurological deficits
  - *Liver/biliary tree cysts:* obstructive jaundice/cholangitis; venous drainage obstruction → portal hypertension → Budd–Chiari syndrome (abdominal pain, ascites, hepatomegaly)

SIGNS & SYMPTOMS

- Initially asymptomatic
- Depend on affected organs
  - *Liver:* right upper quadrant pain, hepatomegaly, nausea, vomiting
  - *Lungs:* cough, chest pain, dyspnea, hemoptysis
- Other organs (rarely affected)
  - *Heart:* jugular venous distention, dyspnea
  - *Musculoskeletal:* diffuse pain, pathologic fractures
  - *Kidney:* hematuria, flank pain
  - *CNS:* headache, motor deficit, seizure, coma

DIAGNOSIS

DIAGNOSTIC IMAGING

Ultrasound/MRI/CT scan

- Cyst presence

LAB RESULTS

- Enzyme-linked immunosorbent assay (ELISA)
  - Echinococcal antigen detection in cystic fluid
- Indirect hemagglutination
  - Echinococcal antigen detection
- Immunodiffusion/immunoelectrophoresis
  - Echinococcal-specific antibody detection
- Biopsy/cyst aspiration

TREATMENT

MEDICATIONS

- Albendazole/ mebendazole
  - Uncomplicated cases

SURGERY

- Complicated cases
  - Rupture, vital structure compression, cysts with diameter > 10cm/3.94in
- Puncture-aspiration-injection-reaspiration (PAIR)
  - Ultrasound/CT scan-guided cyst puncture
  - Aspirate cystic fluid
  - Inject scolicidal solution
  - Reaspirate cystic solution
  - Repeat procedure until aspirate clears
  - Fill cyst with isotonic saline

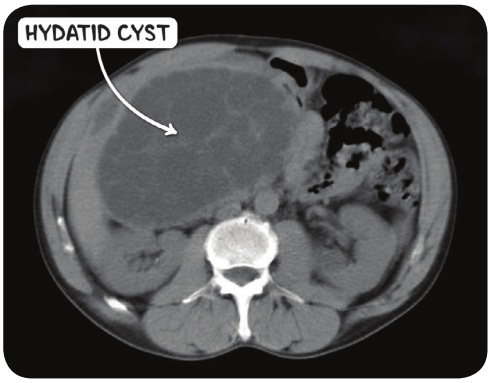

Figure 61.3 A CT scan of the abdomen in the axial plane demonstrating a large hepatic hydatid cyst. The numerous daughter cysts are faintly visible.

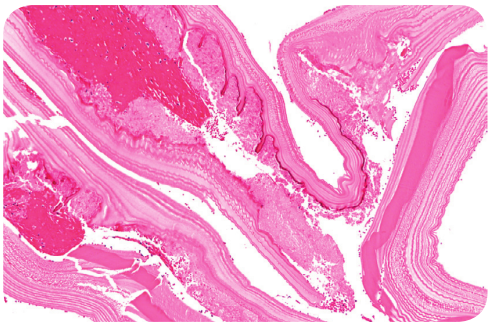

Figure 61.4 A histological section through a hydatid cyst wall showing a typical laminated structure.