29 Common Infections and Infestations

Objective

To define the gross and microscopic features of the following lesions:

1. Bacterial colonies
2. Tuberculosis lymph node
3. Tuberculosis intestine
4. Rhinosporidiosis nasal mucosa
5. Eumycetoma foot
6. Zycomycosis lung
7. Cysticercosis
8. Echinococcosis liver

Bacterial colonies

Figure 29.1 shows foci of necrotic acellular material and fibrin with basophilic **bacterial colonies**.

Tuberculosis lymph node

Tuberculosis (TB) can affect almost any organ; however, the most common manifestations relate to the lungs and lymph nodes. TB affecting lymph nodes manifests as matted lymphadenopathy. The matting is due to periadenitis or extension of inflammation to the pericapsular area. Size of the lesion can vary from a few millimeters to the entire node.

Gross features: The lesions are typically white, soft, granular, and cheesy. Late healed lesions are replaced by fibrosis and appear white and hard. Dystrophic calcification may take place, giving rise to a chalky white appearance.

Microscopy

- Irrespective of the organ affected, TB is characterized by granulomas, with epithelioid cells and Langhans giant cells.
- Typically, tubercular granulomas undergo central caseation necrosis, which is surrounded by lymphocytes, plasma cells, and fibroblasts.
- Granulomatous tubercles evolve to become confluent and may replace the entire lymphoid tissue (Figure 29.2).

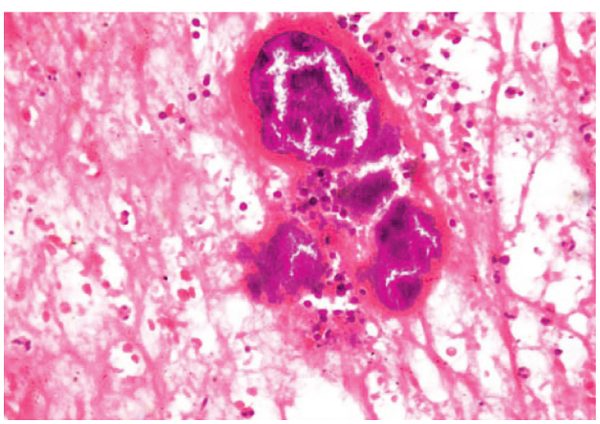


Figure 29.1 Histology of the skin shows hematoxyphilic (*blue*) colonies of cocco-bacilli.

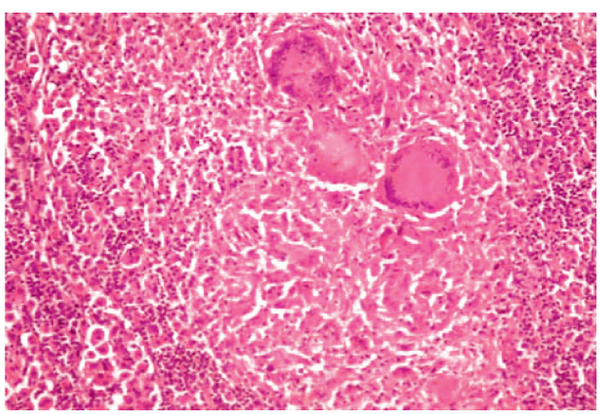


Figure 29.2 Tuberculosis of lymph node.

Tuberculosis intestine

It usually affects the ileocecal area, may be primary (when the organism is ingested with milk from infected animals) or secondary (which is due to swallowing of infected sputum in pulmonary TB).

Gross features: The disease localizes in the small bowel and spreads via lymphatics. **Annular (transverse) ulcers** raised above mucosa, sometimes with strictures, are seen in **ulcerative TB**. Another morphological type is **hyperplastic TB**, which shows marked thickening of the intestinal wall due to formation of extensive tubercular granulation tissue and fibrosis. Hyperplastic TB may be confused with malignancy. Local lymph nodes may be enlarged and show caseation.

Microscopy

- Large, closely packed granulomas are scattered throughout the wall.
- Caseation is surrounded by a cuff of epithelioid cells, Langhans giant cells, lymphocytes, and fibroblasts.
- The granulomas undergoing healing tend first to be circumscribed by hyalinized connective tissue and later are completely replaced by it (Figure 29.3).

Rhinosporidiosis nasal mucosa

It is an infection caused by *Rhinosporidium seeberi*, which was previously considered to be a fungus. It is now considered to be a parasite, classified under *Mesomycetozoea*. Rhinosporidiosis is endemic in some Asiatic regions and primarily involves the mucosa of nose, nasopharynx, oropharynx, conjunctiva, rectum, and urogenital organs. Clinically, the lesion presents as a polypoid, soft mass, sometimes pedunculated.

Microscopy

- The biological agent has a mature stage that consists of large, thick-walled spherical structures (called sporangia) containing smaller "daughter cells" (called "sporangiospores").
- It can be visualized with fungal stains such as Gomori methenamine silver (GMS) and periodic acid–Schiff (PAS), as well as with standard hematoxylin and eosin (H&E) staining (Figure 29.4).

Eumycetoma foot

Mycetoma is a chronic granulomatous subcutaneous infection that may be caused by **actinomycetes** (**actinomycetoma**) or by true **fungi** (**eumycetoma**). **Eumycetoma** commonly affects the foot (*Mycetoma pedis*) and is also known as **Madura foot**. It is usually induced by traumatic inoculation of the causative organism and presents clinically with swelling and formation of sinuses. The sinuses discharge purulent or seropurulent exudate containing **grains**.

Microscopy

- Dermis and subcutaneous tissue contain localized abscesses, which have one or more grains embedded in their center.
- In stained sections, the grain appears rounded to oval and has a cortex, which is dark brown (due to pigment produced by the organism), and a lighter medulla. The grain filaments are usually embedded

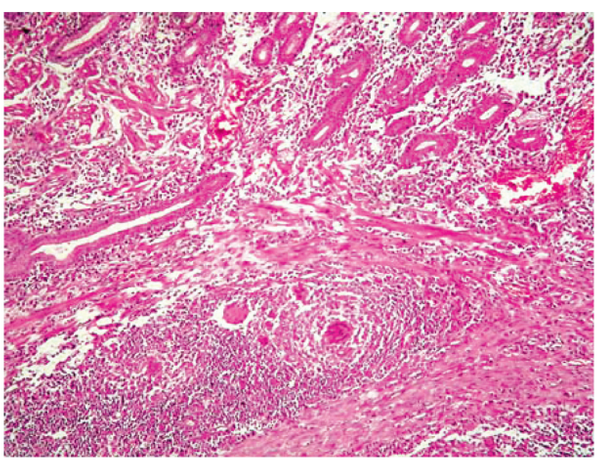


Figure 29.3 TB intestine.

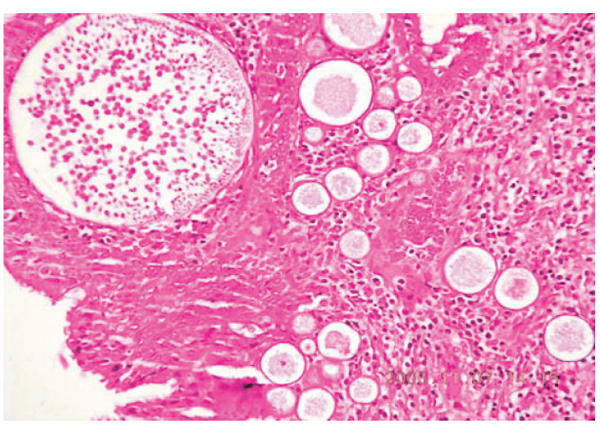


Figure 29.4 Rhinosporidiosis nasal mucosa.

in a hard brown cement matrix. Brown septate and branched hyphae that may be slightly more swollen toward the periphery are seen. In the cortex, the filaments are arranged radially, whereas in the medulla, they tend to run multidirectionally.

- A suppurative or granulomatous inflammatory reaction is usually noted.
- The large, branching, septate hyphae embedded in the matrix stain positively with PAS or GMS stains; on the other hand, actinomycetes are gram positive and GMS negative (Figure 29.5).

Zycomycosis lung

Zygomycosis is a filamentous fungus that occurs only rarely in immunocompetent hosts. The disease manifestations reflect the mode of transmission, with rhinocerebral and pulmonary diseases being the most common manifestations.

Microscopy

Zygomycetes produce broad (6–16 m), ribbon-like hyphae with wide-angle branching, whereas the other filamentous fungi (often *Aspergillus* species) produce as thin as 2–3 m wide septate hyphae with acute angle branching (Figure 29.6).

Cysticercosis

It is a parasitic tissue infection caused by larval cysts of the pork tapeworm. These cysts infect brain, muscle, or other tissues and are a major cause of adult-onset seizures. The scolex has four suckers and a double crown of prominent hooks, which attach to the intestinal mucosa. The cysticercus larva is semitransparent,

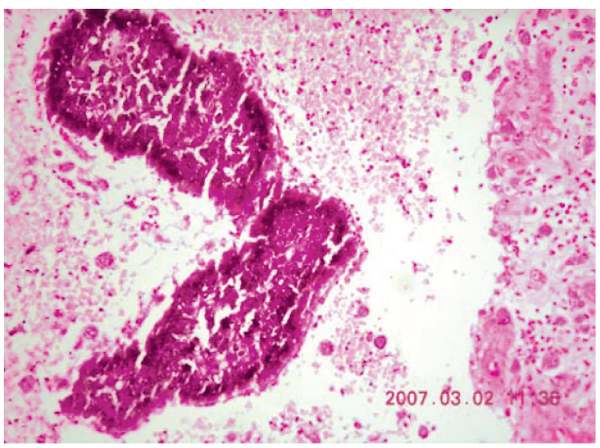


Figure 29.5 Eumycetoma.

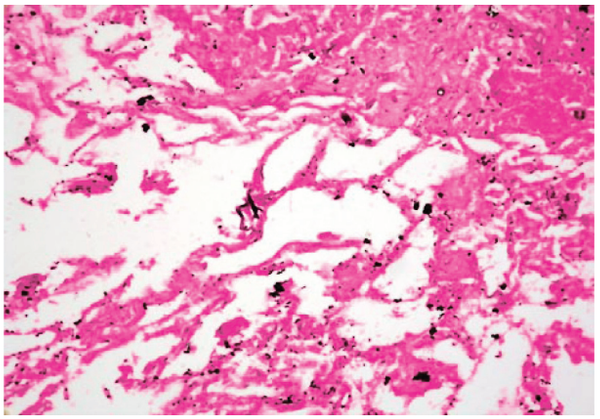


Figure 29.6 Zycomycosis lung.

opalescent white, elongate to oval in shape, and may reach a length of 0.6–1.8 cm.

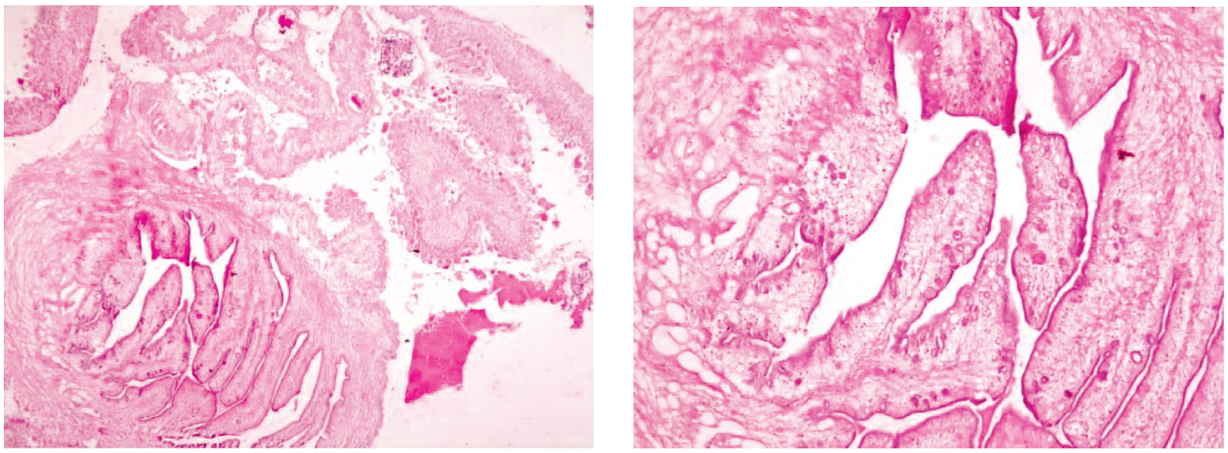
A gross specimen shows a cystic cavity containing clear watery fluid and white membranous flecks.

Microscopy

- Histopathology shows the wall of the worm, which is usually seen embedded within the cyst.
- Dead and degenerated parasites invoke an intense inflammatory reaction and may undergo dystrophic calcification.
- The cyst wall is lined by palisading histiocytes and eosinophils and may sometimes induce a well-formed granulomatous reaction [Figure 29.7(a) and (b)].

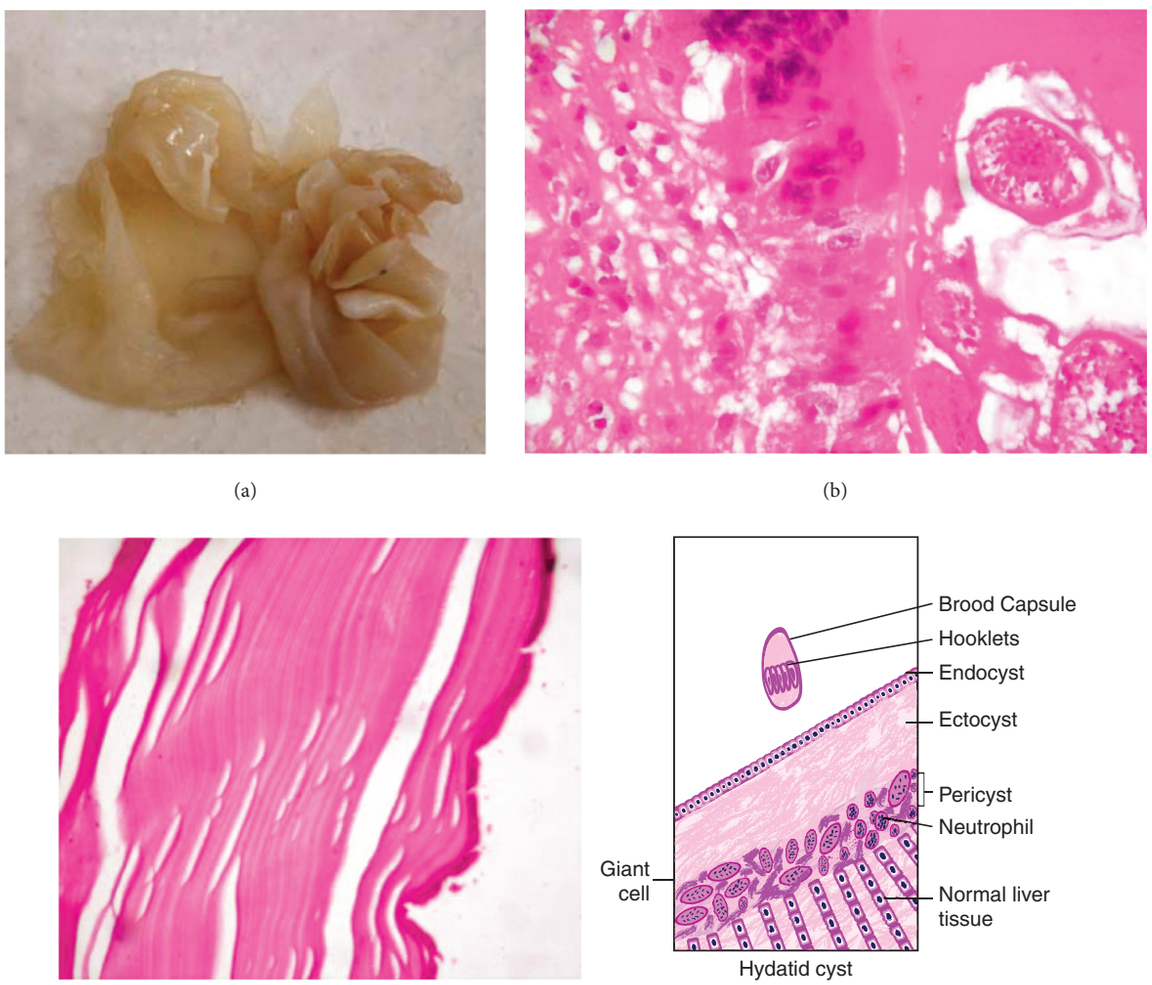
Echinococcosis liver

Echinococcosis (hydatid disease) is a parasitic disease that affects both humans and other mammals, such as sheep, dogs, rodents, and horses. There are three different forms of echinococcosis found in humans, each of which is caused by the larval stages of different species of the tapeworm of genus **Echinococcus**, namely, **cystic echinococcosis** caused by *Echinococcus granulosus*, **alveolar echinococcosis** caused by *E. multilocularis*, and **polycystic echinococcosis** caused by *E. vogeli*. Unilocular cysts caused by *E. granulosus* are most common. Multilocular cysts are caused by *E. multilocularis*. The cysts are ovoid and white to opalescent, rarely exceeding 1.5 cm, and contain an invaginated scolex with hooklets that are bathed in clear cyst fluid [Figure 29.8(a)]. About two-thirds of human *E. granulosus* cysts are found in the liver, 5–15% in the lung, and the rest in bones and brain or other organs.



(a) (b)

Figure 29.7 (a) Cysticercosis muscle (low-power view). (b) Cysticercosis muscle (high-power view).



(a) (b) (c) (d)

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Figure 29.8 (a) Echinococcosis liver cyst wall (gross). (b) Echinococcosis liver. (c) Echinococcal cyst wall.

Microscopy

- In the various organs, the larvae lodge within the capillaries and first incite an inflammatory reaction composed principally of mononuclear leukocytes and eosinophils.
- Many such larvae undergo encystation. The cysts have an inner, nucleated, germinative layer and an outer, opaque, nonnucleated layer. The outer nonnucleated layer is distinctive and has innumerable delicate laminations as though made up of many layers of gelatin.
- Outside this opaque layer, there is a host inflammatory reaction that produces a zone of fibroblasts, giant cells, and mononuclear and eosinophilic cells. In time, daughter cysts develop within them.

Author Query

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