CHAPTER

16

Bacterial and Fungal Infections

- Tuberculosis
- Actinomycosis
- Candidiasis

TUBERCULOSIS

Tuberculosis is a specific bacterial infection caused by *Mycobacterium tuberculosis*. Oral tuberculosis usually represents secondary infection from pulmonary lesions. Common oral manifestation is in the form of oral ulceration, mainly involving the tongue. Tuberculosis also manifests in the oral cavity as tubercular gingivitis, tubercular granuloma and osteomyelitis. Cervical lymph node involvement is referred to as scrofula.

Histopathology (Fig. 16.1)

Microscopic presentation of tuberculosis is in the form of granulomas, which are circumscribed lesions. These granulomas have a central area of caseous necrosis surrounded by multinucleated giant cells and epithelioid cells. The nuclei of multinucleated giant cells are seen at the periphery, having a horseshoe shaped arrangement and these cells are called Langhans' giant cells. This is surrounded by a zone of lymphocytic infiltration and fibrosis. Tubercular organisms may be demonstrated by Ziehl-Neelsen or other acid-fast stains.

Identification Points (Fig. 16.1)

Tuberculosis

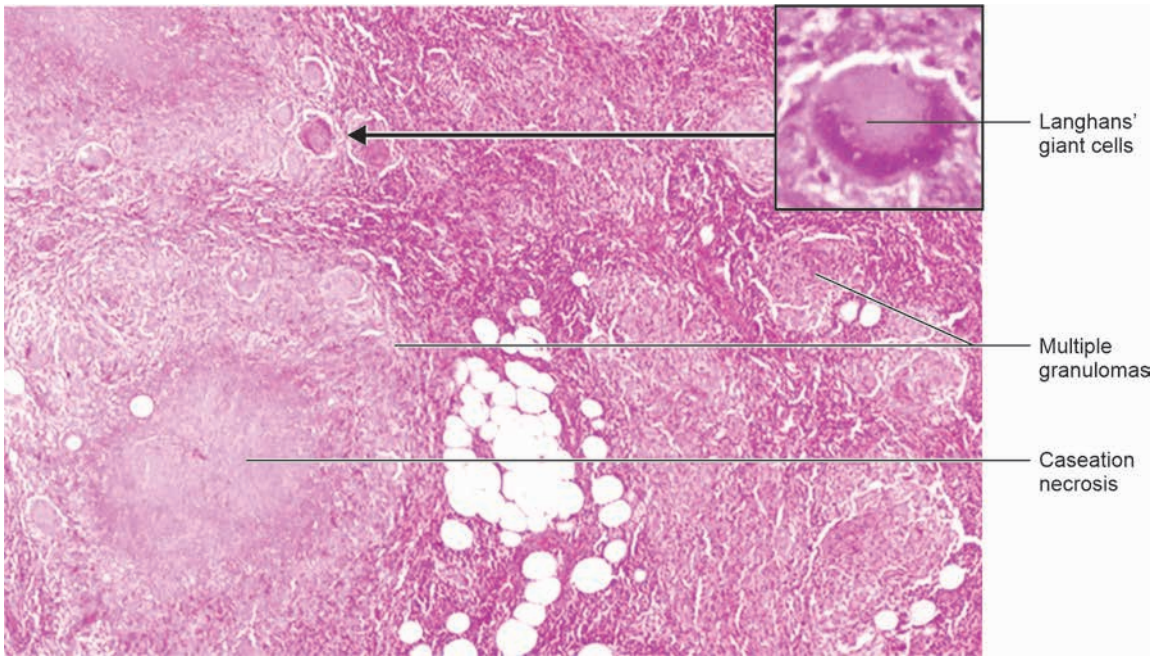
- Granuloma with central caseation necrosis
- Presence of Langhans' giant cells and epithelioid cells
- Peripheral zone of lymphocytes

ACTINOMYCOSIS

Actinomycosis is a chronic granulomatous infection caused by Actinomyces species of organisms. This disease manifest as cervicofacial, abdominal or pulmonary forms. Cervicofacial actinomycosis manifest as indurated swelling which eventually develop central abscess that drain through multiple sinuses. Actinomycosis may also manifest as osteomyelitis.

Histopathology (Fig. 16.2)

Classic lesions of actinomycosis are granulomatous with central abscess formation. The central area may show characteristic colonies that appear to be floating in a collection of polymorphonuclear leukocytes. These colonies appear round or lobulated and made up of meshwork of filamentous organisms that stain hematoxylin and show eosinophilia of peripheral clubs. Since the colonies have peripheral radiating filaments forming a



Tubercular granuloma (photomicrograph 4X)

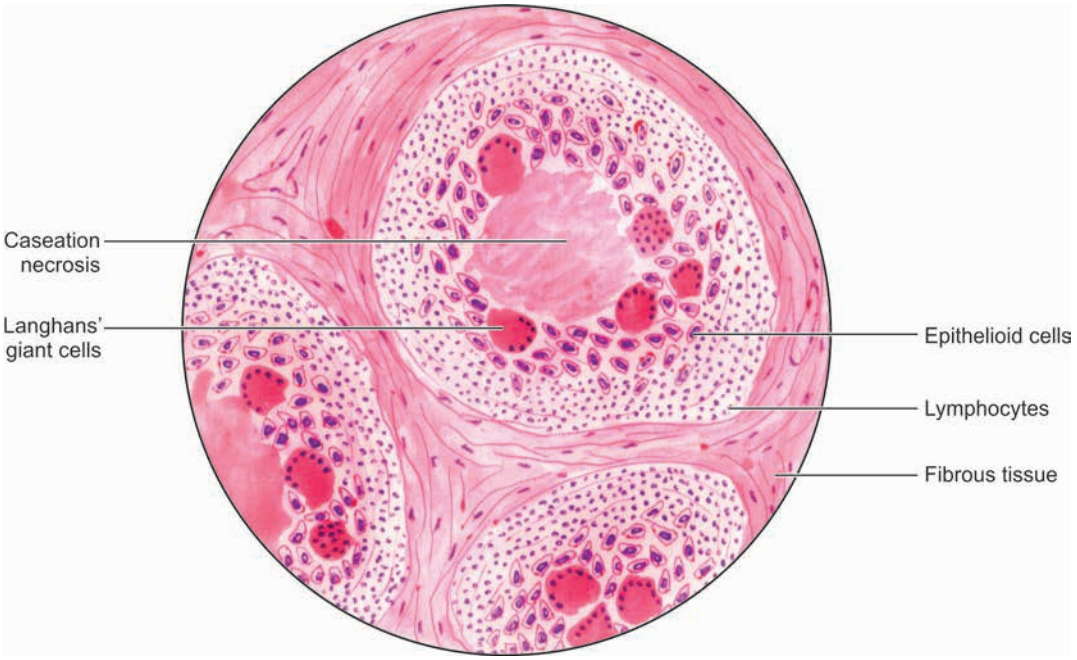
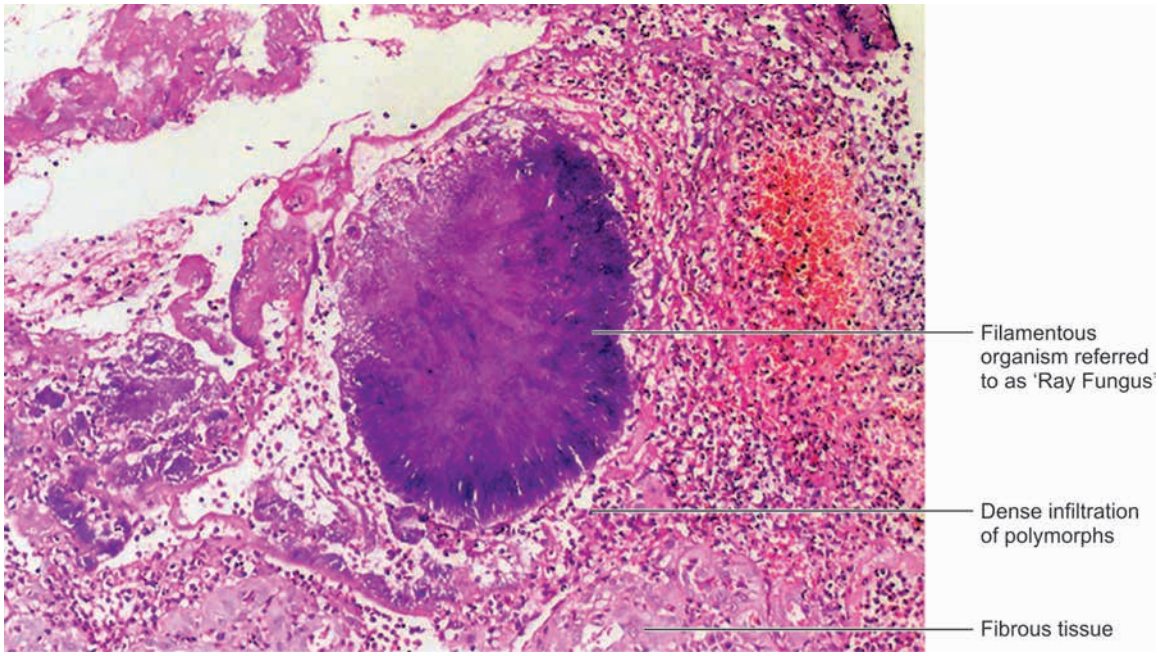


Fig. 16.1: Tubercular granuloma



Actinomycosis (photomicrograph 10X)

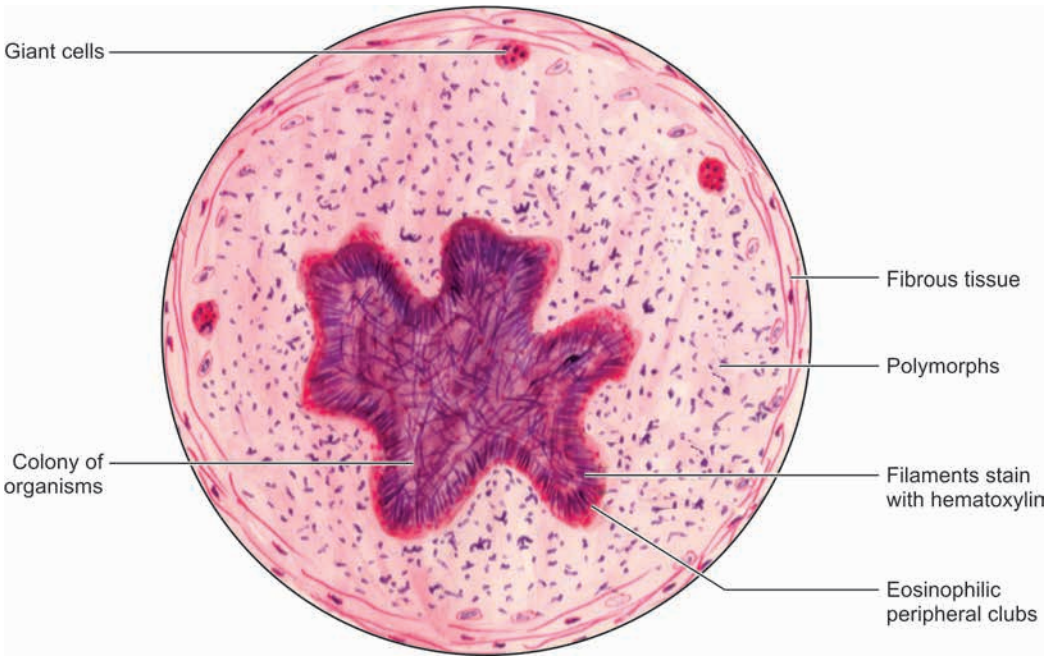


Fig. 16.2: Actinomycosis

rosette pattern, these are referred to as 'ray fungus'. Around the polymorphs there is a zone of histiocytes and multinucleated giant cells. A zone of fibrosis is seen at the periphery.

Identification Points (Fig. 16.2)

Actinomycosis

- Colony of organisms described as 'ray fungus'
- Organisms surrounded by polymorphs
- Presence of a few multinucleated giant cells and histiocytes

CANDIDIASIS

Candidiasis is the commonest fungal infection affecting oral cavity caused by *Candida albicans* and other related organisms. *Candida albicans* are the commensal organisms of the oral cavity. Invasion of the oral mucosa by these organisms occurs in certain conditions, producing candidiasis. Although there are various predisposing factors, the most important one is immunosuppression.

Oral candidiasis may manifest in different forms—acute pseudomembranous (thrush), acute atrophic (antibiotic sore mouth), chronic atrophic (denture sore mouth) and chronic hyperplastic.

Histopathology (Fig. 16.3)

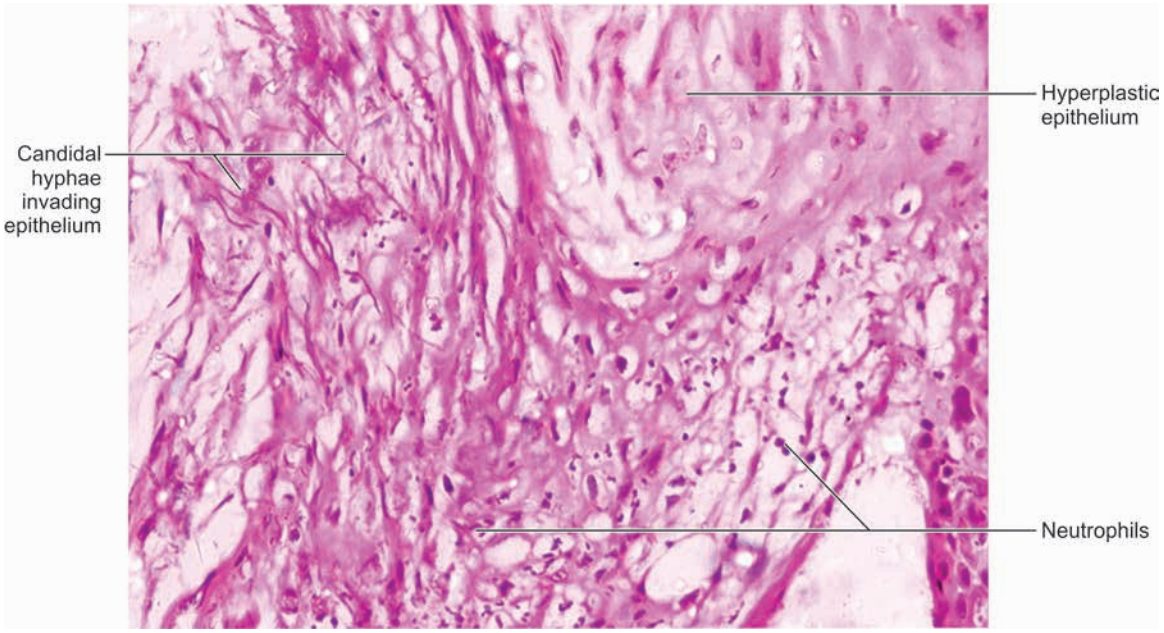
Candidal organisms can be demonstrated in a smear stained by PAS (periodic acid–Schiff) stain. The organisms appear as magenta color hyphae or pseudohyphae. Hyphae vary in length and approximately of 2 microns in diameter.

In a biopsy specimen, these hyphae are seen perpendicular to the epithelium invading the superficial layers. The epithelium shows hyperkeratosis with elongation of rete ridges and collection of neutrophils in the parakeratin layer and superficial spinous layer. Candidal organisms can be demonstrated by silver stains also.

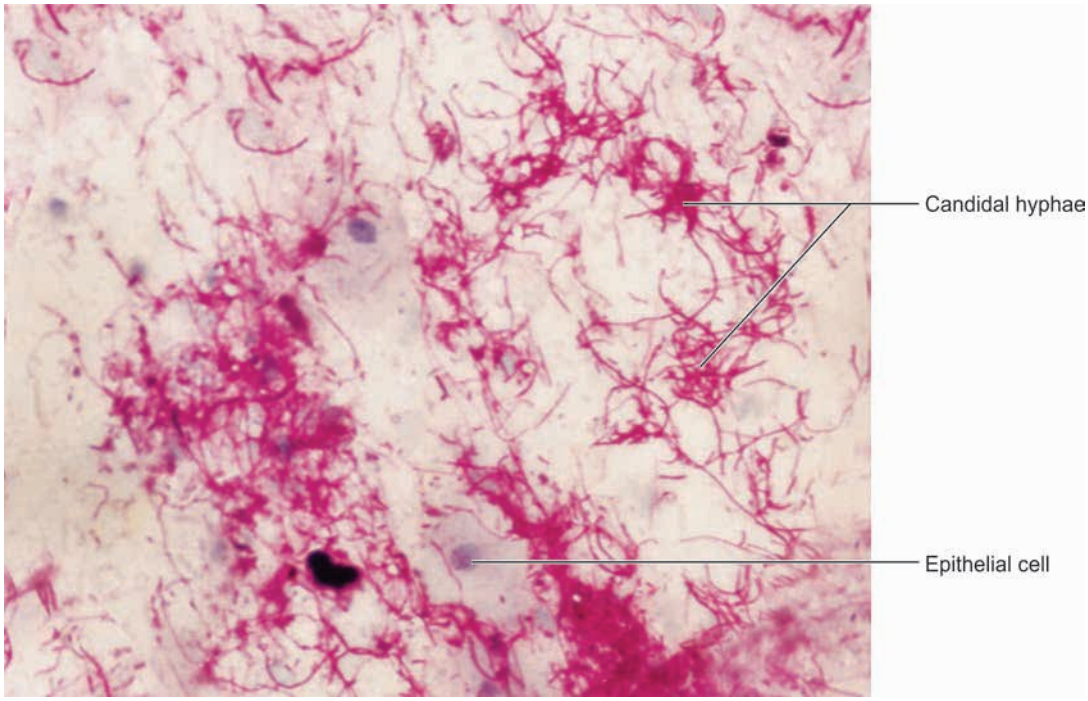
Identification Points (Fig. 16.3)

Candidiasis

- PAS positive candidal hyphae invading the epithelium
- Epithelium may show hyperkeratosis and elongated rete ridges
- Collection of neutrophils in the epithelium



Candidiasis—PAS stain (photomicrograph 40X)



Candidal hyphae in PAS stained smear preparation (photomicrograph 10X)

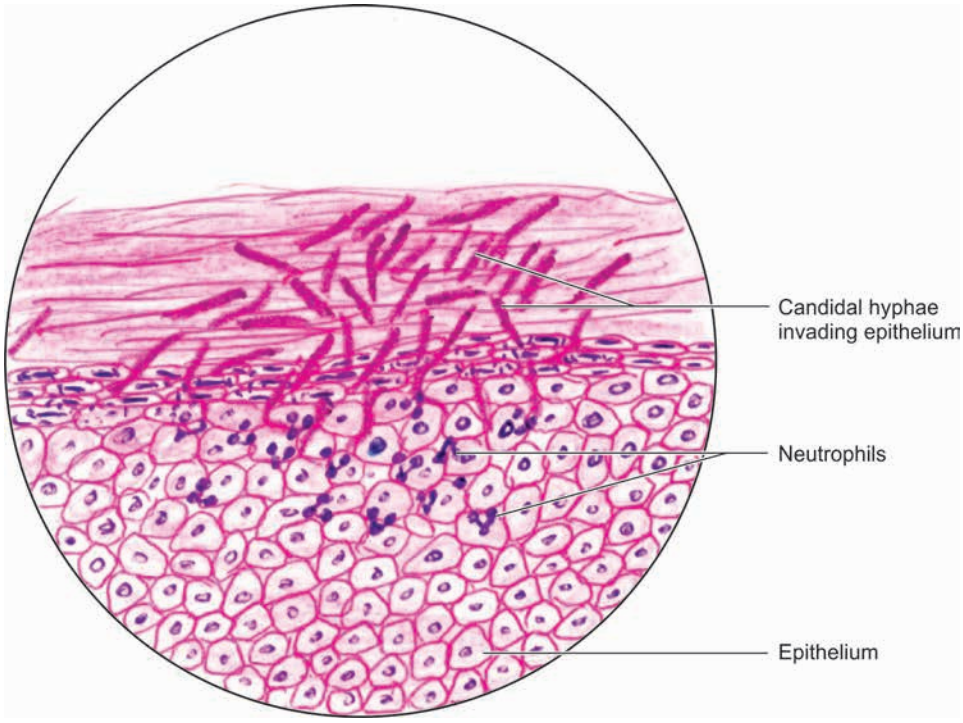


Fig. 16.3: Candidiasis (PAS stain)