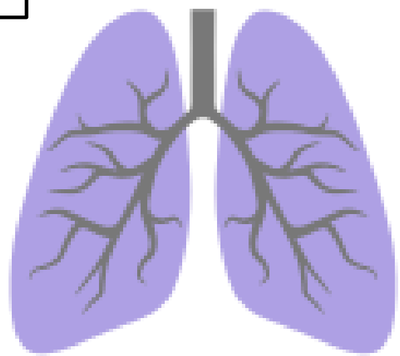
Medical Presentation of Tuberculosis (TB)

Lab 5



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Histopathological Analysis of Pulmonary TB

Introduction

Pulmonary tuberculosis (TB) is a chronic infectious disease caused by Mycobacterium tuberculosis. It is a classic example of a tissue disease where histopathological examination plays a crucial role in diagnosis and management. This report details the transformation of lung tissue from a healthy state to an infected state, outlines the methods for tissue collection, and discusses the diagnostic techniques employed.

Pulmonary Tuberculosis

Etiology : Caused by Mycobacterium tuberculosis, a slow-growing bacterium.

Pathogenesis : The bacteria typically enter the lung via inhalation, leading to a localized immune response. In susceptible individuals, the immune systems™ reaction to the bacteria results in the formation of granulomasa hallmark of TB infection.

Tissue Appearance

Infected Lung Tissue (Post-TB Infection)

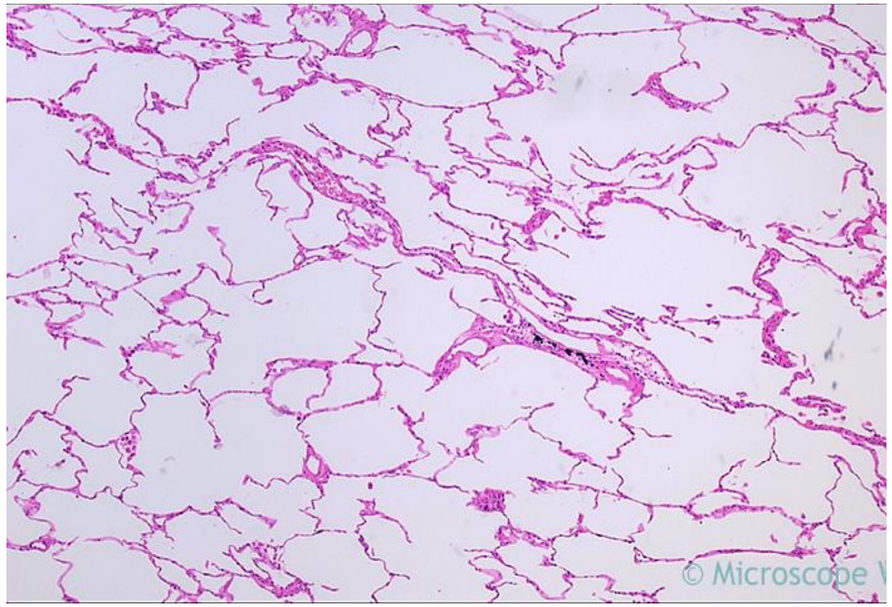
Granuloma Formation

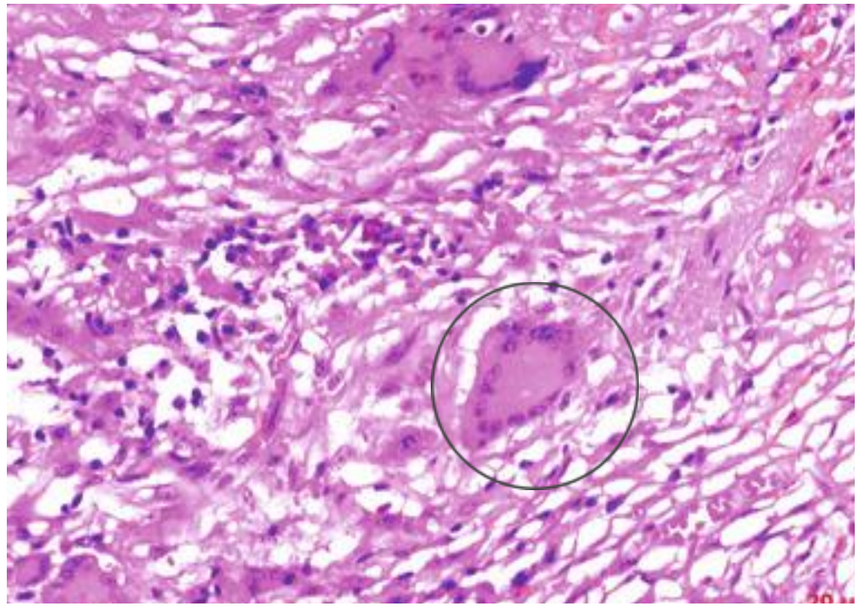
Central Caseous Necrosis : A defining feature is the presence of a central area of necrosis with a cheese-like appearance.

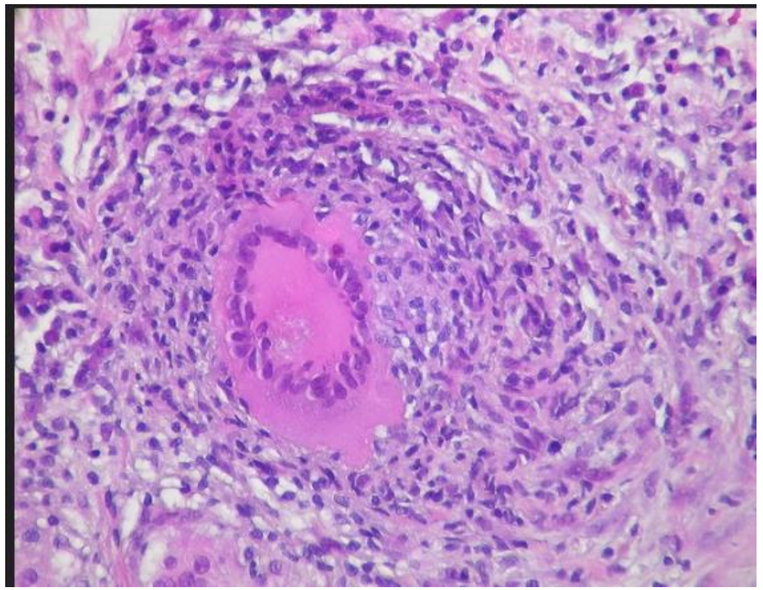
Epithelioid Cells : Surrounding the necrotic center, activated macrophages (epithelioid cells) form a tightly packed ring.

Langhans Giant Cells : These are multinucleated cells with peripheral nuclei, typically seen at the periphery of granulomas.

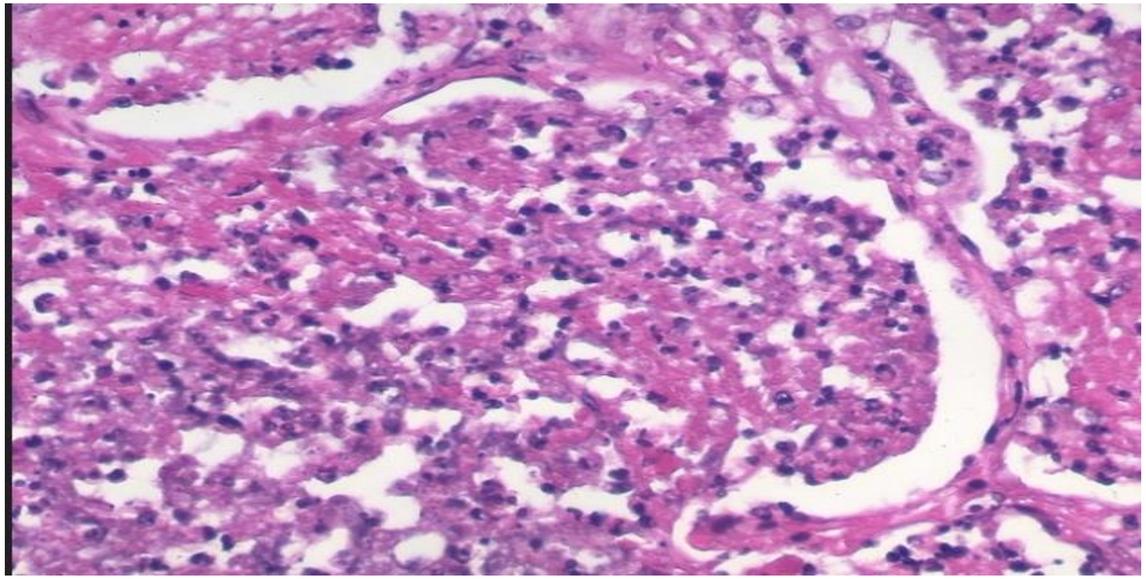
Lymphocytic Infiltrate : A dense collection of lymphocytes forms a rim around the granuloma, reflecting the immune response.





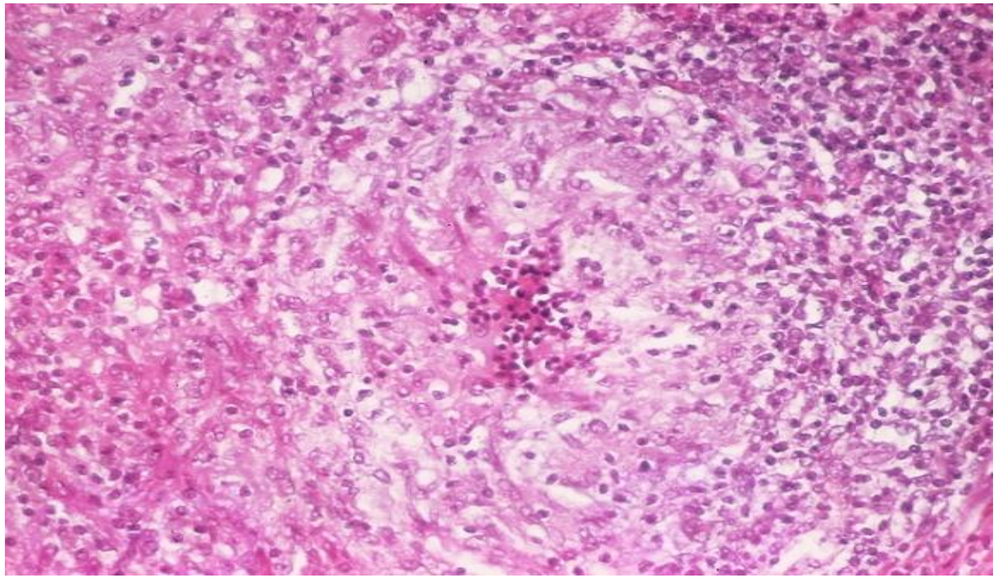


Normal Human Lung



Acute inflammatipn may be the only finding in tuberculosis occurring in patients who are immunosuppressed. Numerous acid fast bacilli can usually be found in lesions of this type.

Infected Lung (With TB)



Suppurative necrosis within granulomas is an unusual finding in tuberculosis.

Tissue Collection Methods

Accurate histopathological diagnosis begins with proper tissue collection. Common techniques include :

A. Bronchoscopic Biopsy

Procedure : A flexible bronchoscope is inserted into the airways, and tissue samples are collected from the lung parenchyma.

Advantages : Minimally invasive and allows for direct visualization of suspicious lesions.

B. CT-Guided Percutaneous Lung Biopsy

C. Surgical Lung Biopsy

Diagnostic Techniques for Detection

A. Histopathological Staining

Hematoxylin and Eosin (H&E) Stain :

Purpose : Provides an overview of tissue architecture and cellular details.

Findings : Highlights granulomatous inflammation and tissue necrosis in TB-infected lung tissue

B. Special Stains

Ziehl-Neelsen (Acid-Fast) Stain :

Purpose : Specifically stains acid-fast bacilli, which appear as red rods against a blue background

Application : Essential for confirming the presence of Mycobacterium tuberculosis within granulomatous lesions

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C. Molecular Techniques

Such As a PCR

D. Culture Methods

Thank you