CASE DISCUSSIONS
INFLAMMATION
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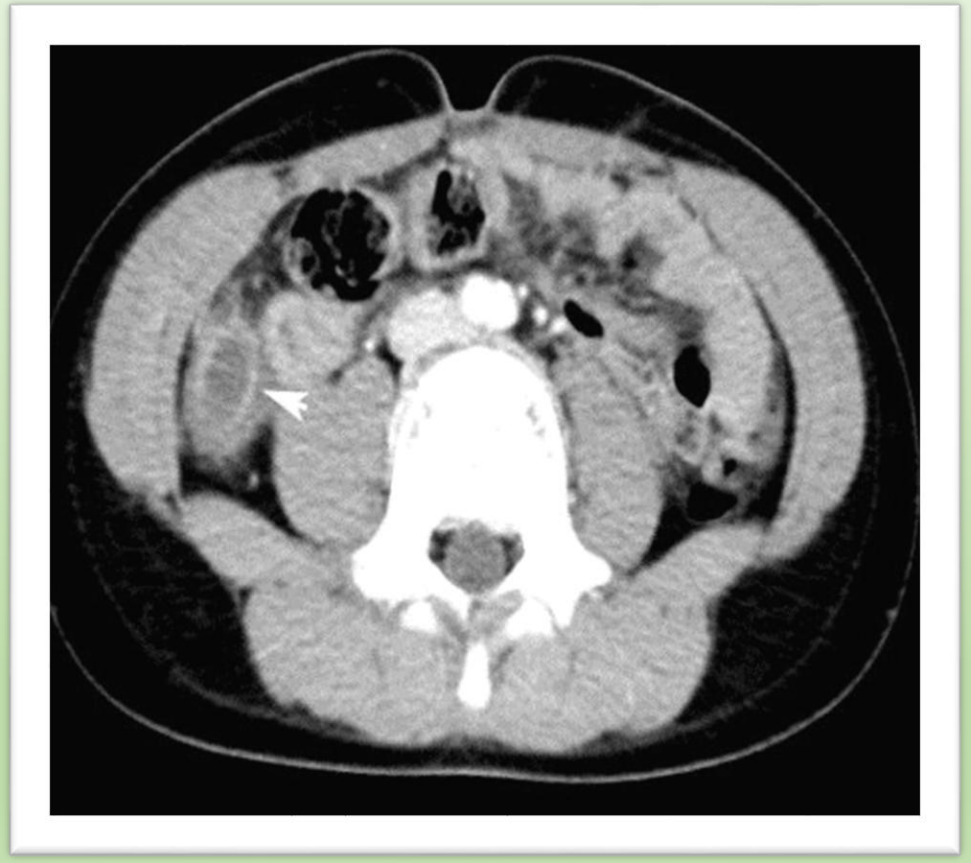
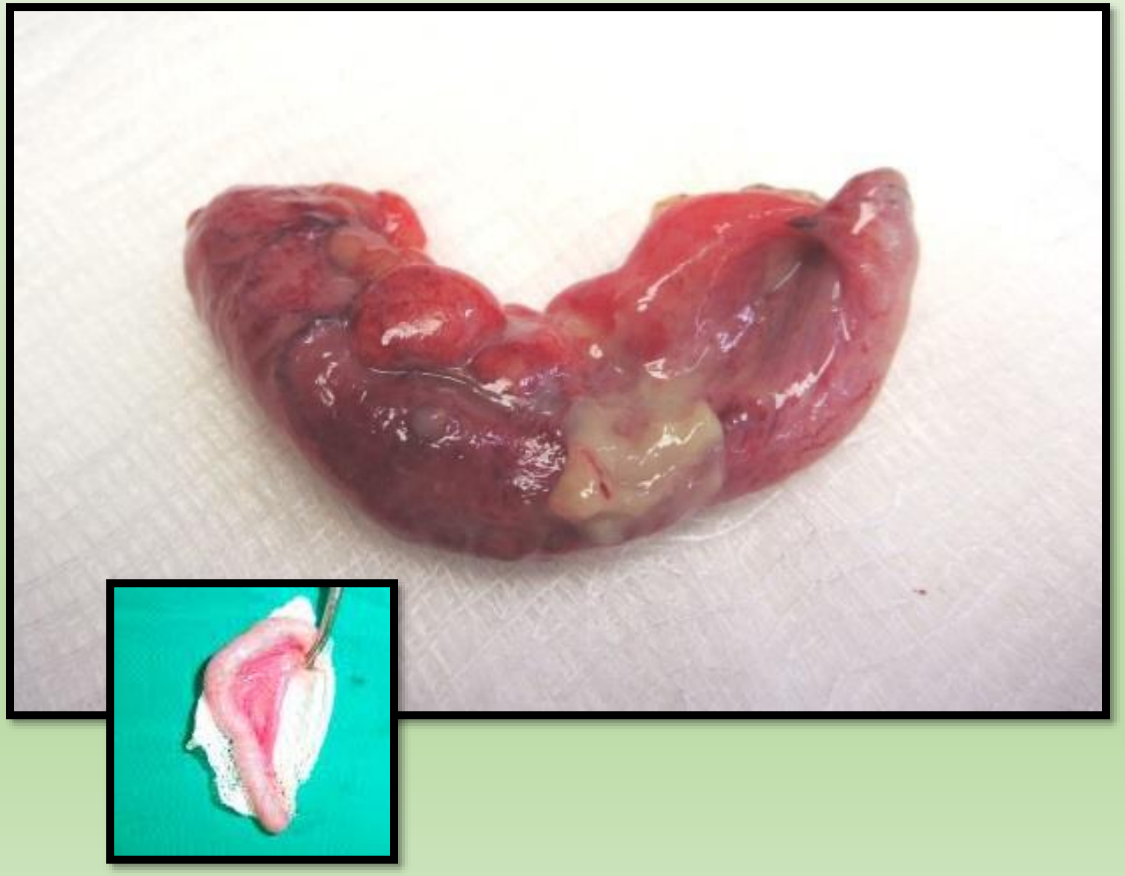
CASE 1

A 25-year-old male presents to the emergency department with severe abdominal pain, nausea, and vomiting. Physical examination reveals tenderness in the right lower quadrant. Laboratory tests show elevated white blood cell count (leukocytosis of 18,000 / ML). Preoperative CT scan is shown. The patient undergoes surgery. Gross and histological examination of organ removed is shown.

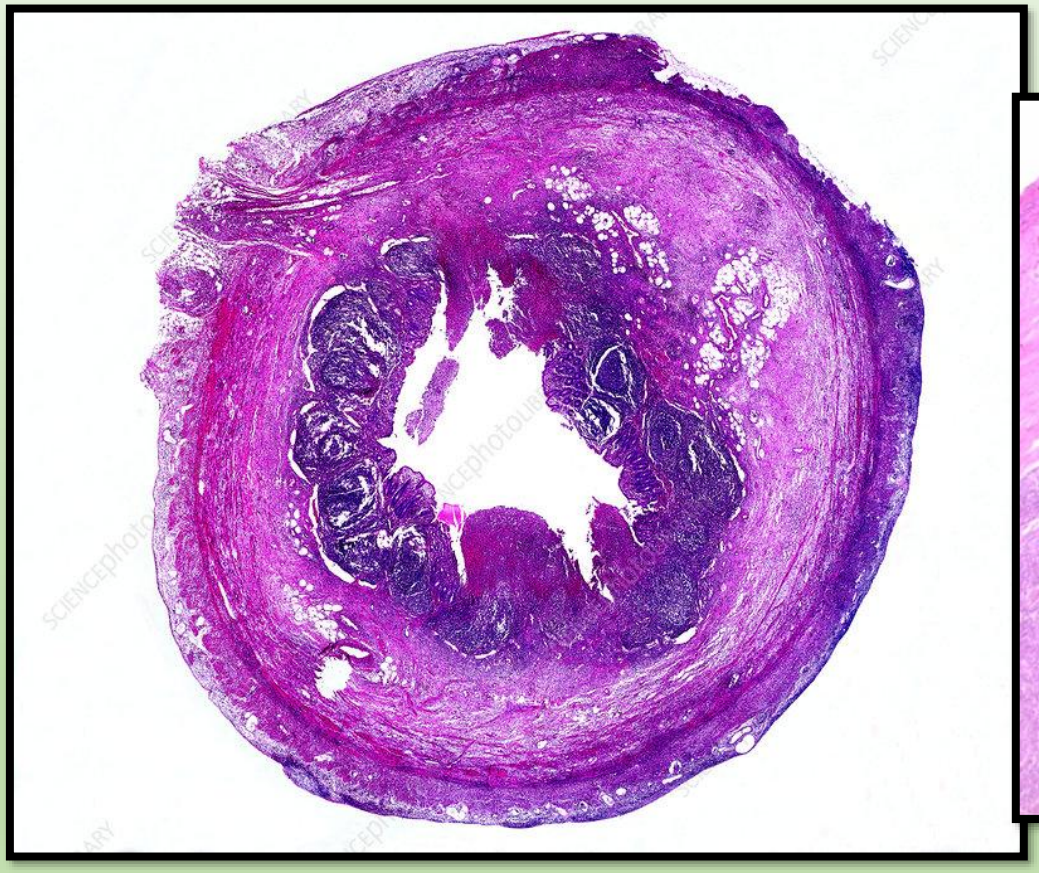
CT SCAN

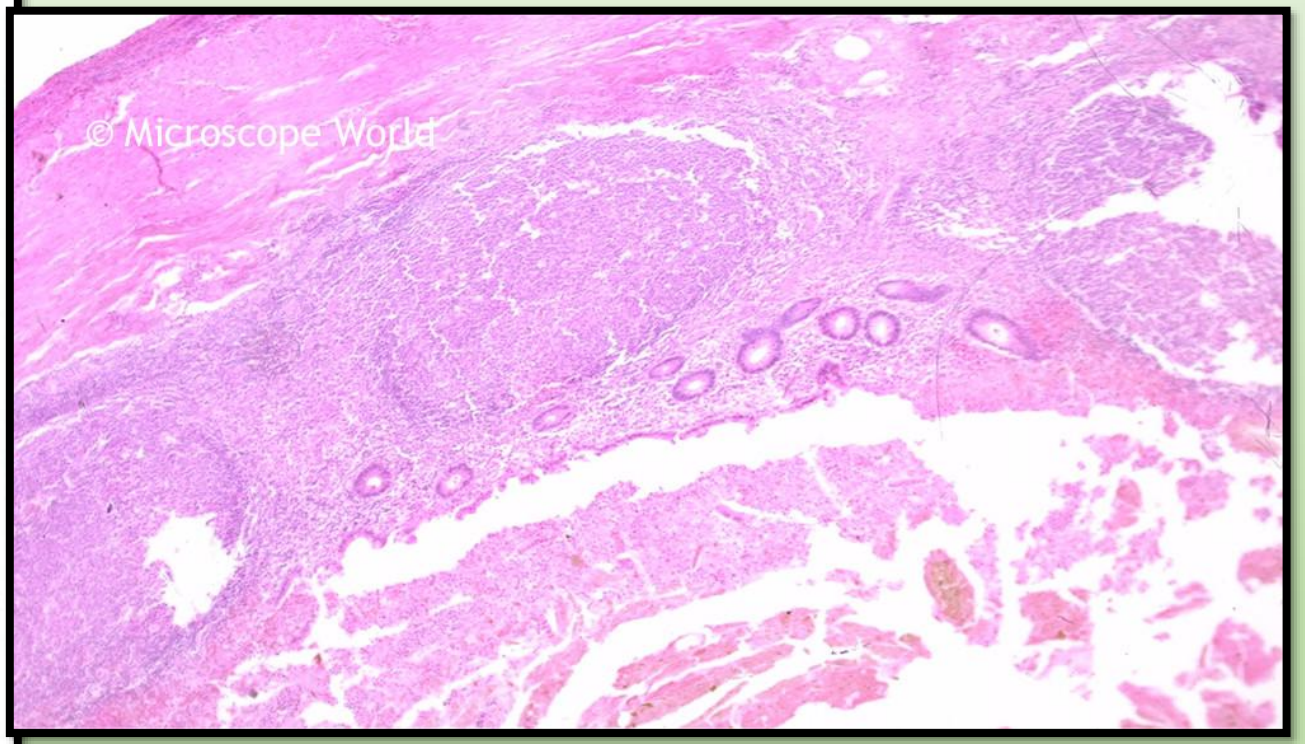


GROSS

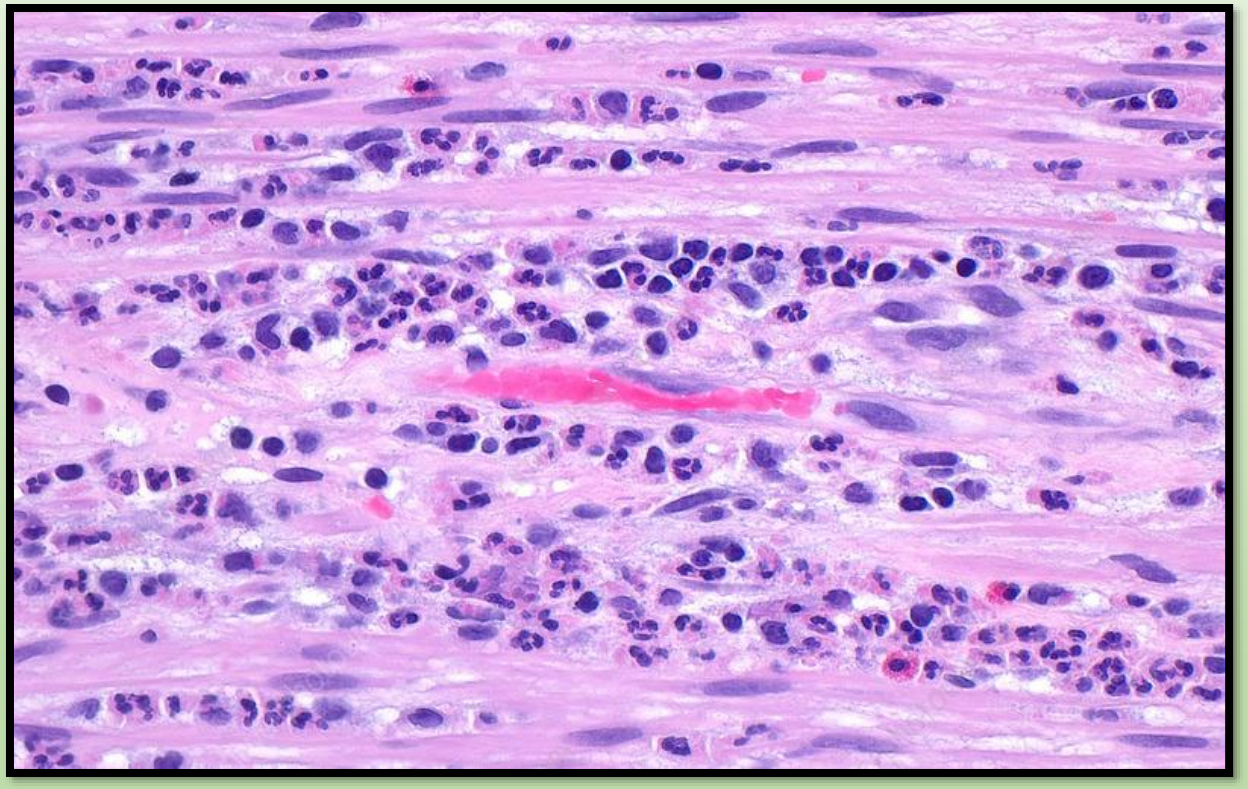


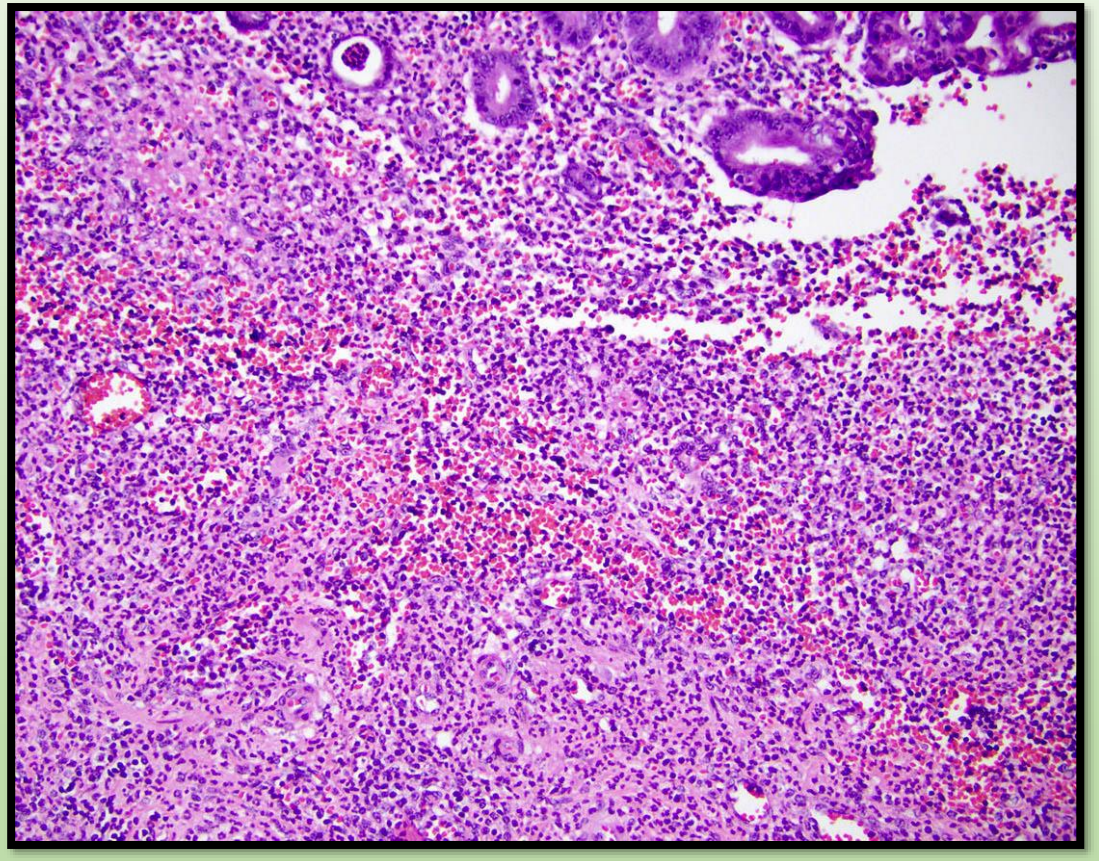
LOW POWER HIGHER POWER





HIGH POWER MICROSCOPY





Discussion points:

1. What is the final pathologic diagnosis?
2. What are the cardinal signs of acute inflammation in this patient?
3. How does the body respond to the bacterial infection in the appendix?
4. What are the potential complications of untreated acute appendicitis?

FINAL PATHOLOGIC DIAGNOSIS AS PERORTED:

Appendix, laparoscopic appendectomy:

- Acute suppurative appendicitis

What are the cardinal signs of acute inflammation in this patient?

The cardinal signs of acute inflammation in this patient include:

- **Rubor (redness) due to increased blood flow**
- **Tumor (swelling) due to increased vascular permeability and fluid leakage**
- **Calor (heat) due to increased blood flow and metabolic activity**
- **Dolor (pain) due to the release of chemical mediators (e.g., bradykinin, prostaglandins) that stimulate pain receptors**
- **Functio laesa (loss of function) due to pain and swelling, leading to limited movement and guarding of the abdomen.**

How does the body respond to the bacterial infection in the appendix?

- The body responds to the bacterial infection through the activation of the innate immune system, including:
- Recognition of pathogen-associated molecular patterns (PAMPs) by pattern recognition receptors (PRRs)
- Activation of neutrophils and macrophages, which phagocytose bacteria
- Release of pro-inflammatory cytokines (e.g., TNF-α, IL-1β, IL-6) that amplify the inflammatory response
- Increased production of acute phase proteins (e.g., C-reactive protein) that help to eliminate pathogens.

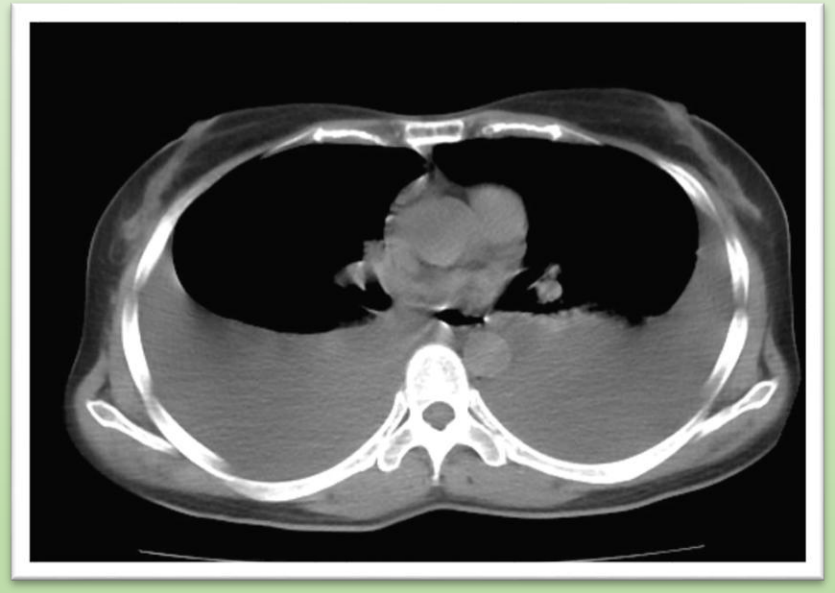
What are the potential complications of untreated acute appendicitis?

- Perforation of the appendix, leading to peritonitis (infection of the peritoneal cavity)
- Abscess formation
- Sepsis or septic shock due to the spread of infection into the bloodstream
- Adhesions or bowel obstruction due to chronic inflammation and scarring

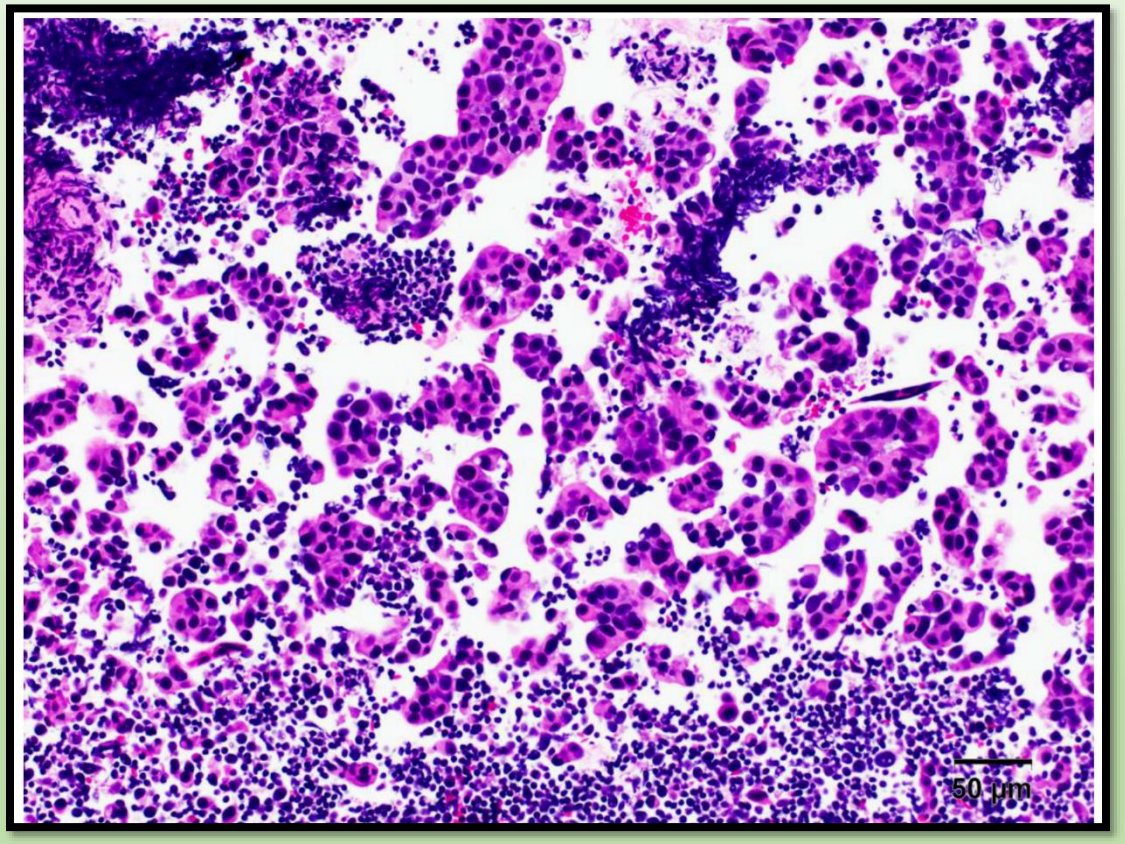
CASE 2:

A 50-year-old female with a history of breast cancer presents with shortness of breath and chest pain. Imaging studies reveal a large pleural effusion. Thoracentesis is performed, and the pleural fluid analysis shows a high protein level and low glucose level. CT scan and fluid cytology is shown.

CT SCAN



CYTOLOGY



What are the characteristics of an exudative pleural effusion?

Exudative pleural effusions are characterized by:

- **High protein level (>3 g/dL)**
- **High lactate dehydrogenase (LDH) level**
- **Presence of inflammatory cells or malignant cells**
- **Often associated with underlying diseases such as malignancy, infection, or inflammation.**

How does metastatic breast carcinoma lead to pleural effusion?

Metastatic breast carcinoma can lead to pleural effusion by:

- **Direct invasion of the pleura by cancer cells**
- **Obstruction of lymphatic drainage, leading to fluid accumulation**
- **Increased vascular permeability due to inflammatory mediators released by cancer cells**

What are the potential treatment options for this patient?

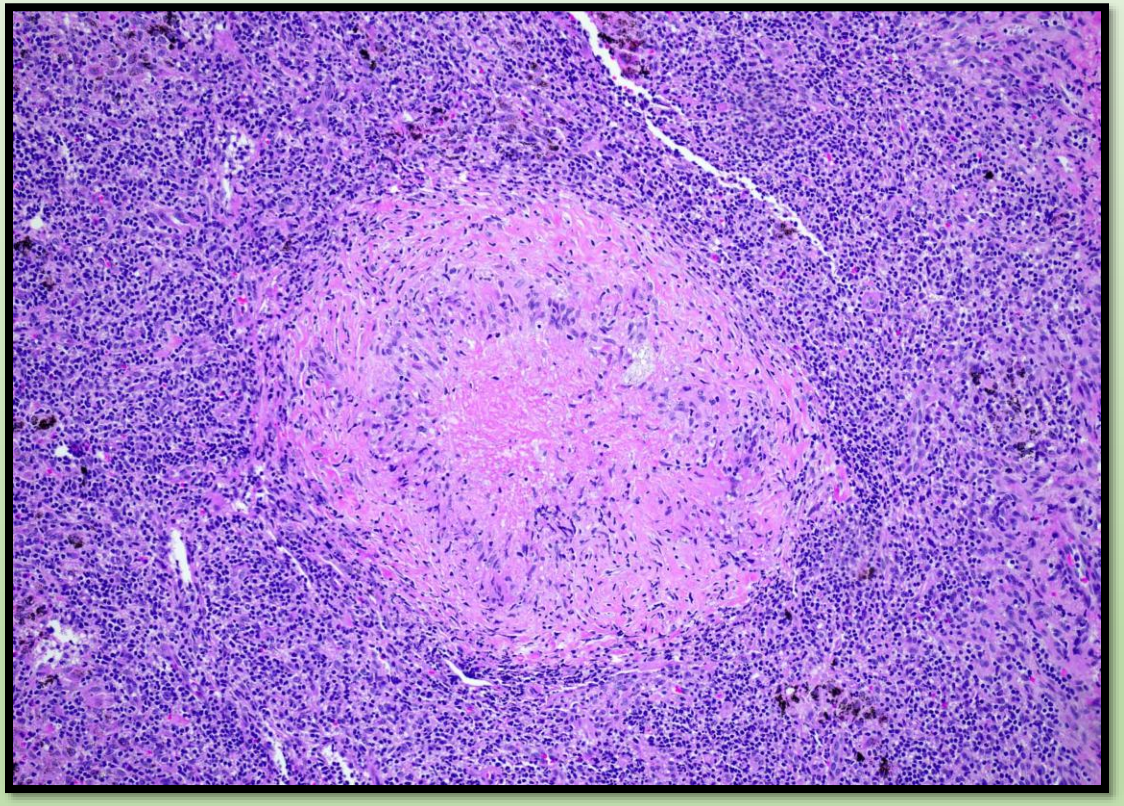
Potential treatment options include:

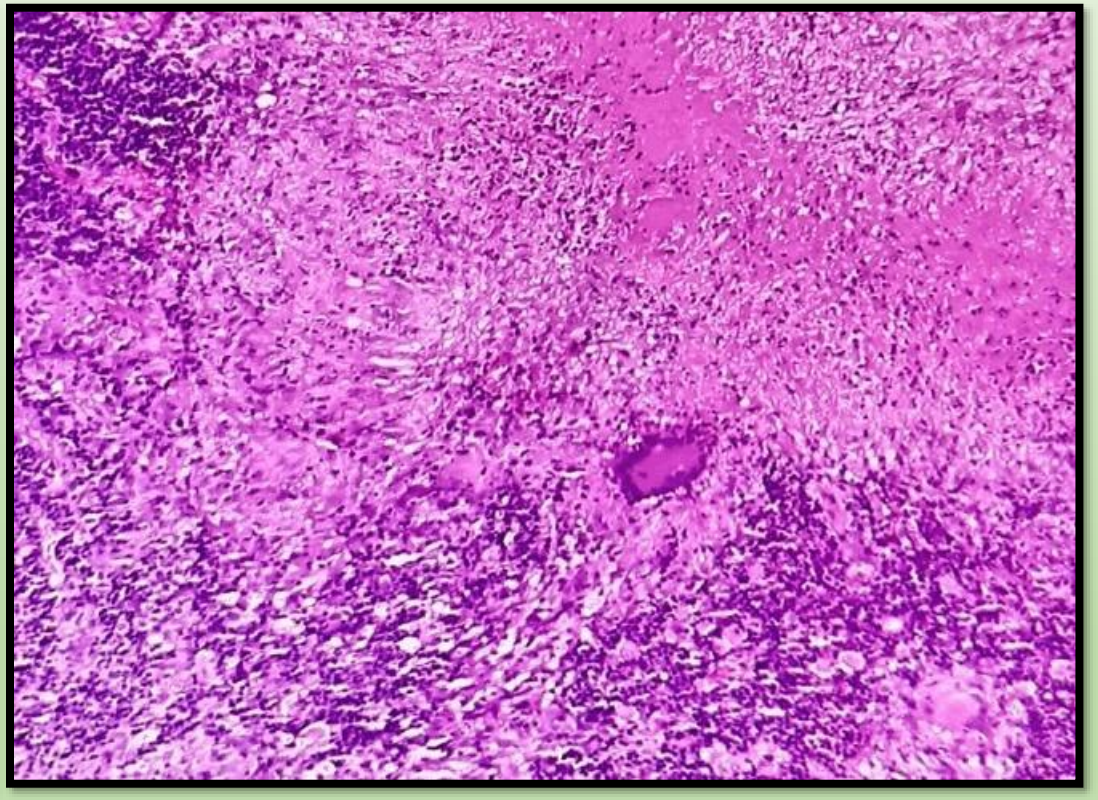
- **Thoracentesis to drain the pleural fluid and relieve symptoms**
- **Systemic chemotherapy or hormone therapy to treat the underlying breast cancer**
- **Pleurodesis to prevent recurrence of the pleural effusion**
- **Palliative care to manage symptoms and improve quality of life (Stage 4 breast cancer, high mortality)**

Case 3:

A 30-year-old male presents with a persistent cough, fever, and weight loss. Chest X-ray shows bilateral hilar lymphadenopathy. A biopsy of the lymph node is shown?

MICROSCOPIC EXAMINATION:

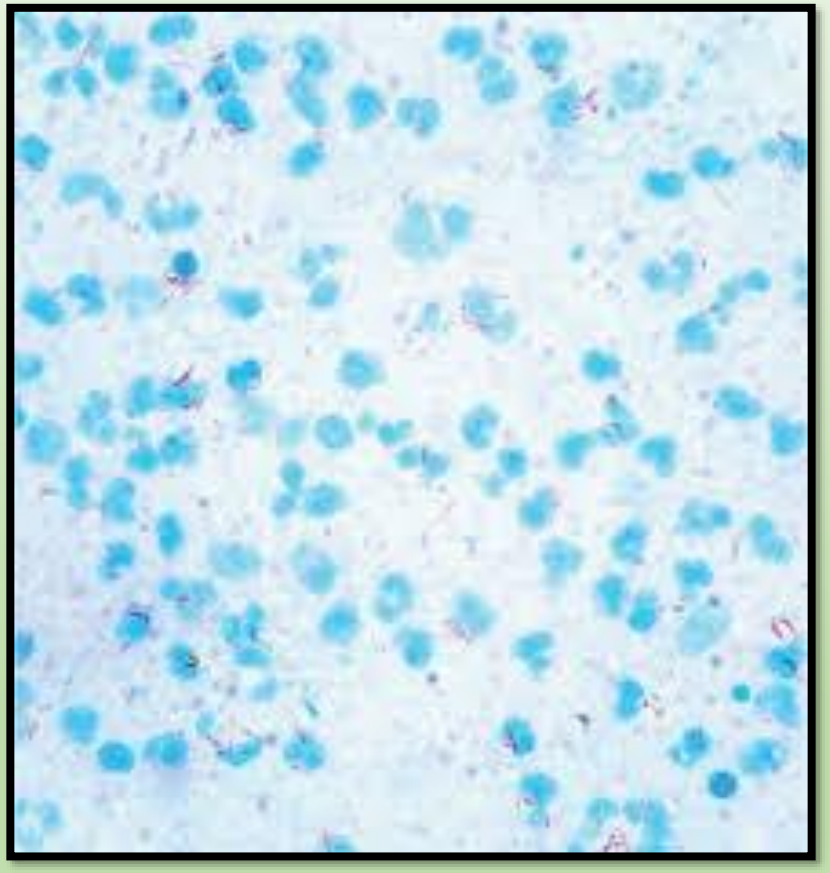




What is the likely diagnosis, and what are the characteristic features of granulomatous inflammation?

- **Likely diagnosis: Tuberculosis (TB) to be confirmed by ZN stain (TB stain), PCR, Culture**
- **Characteristic features of granulomatous inflammation include:**
  - **Aggregates of epithelioid histiocytes (modified macrophages)**
  - **Multinucleated giant cells (e.g., Langhans giant cells)**
  - **Lymphocytic infiltration**
  - **Central necrosis (Caseous necrosis: a form of necrosis with a "cheese-like" appearance) in TB**

Ziehl- Neelsen stain (TB stain):



How does the body attempt to contain the infection in granulomatous inflammation?

The body attempts to contain the infection by:

- **Forming granulomas, which are organized aggregates of immune cells that wall off the infection**
- **Activating macrophages and T cells to control the growth of the pathogen**
- **Producing cytokines (e.g., IFN-γ) that enhance the ability of macrophages to kill the pathogen**

What are the potential complications of granulomatous inflammation?

Potential complications include:

- **Tissue damage and fibrosis due to chronic inflammation**
- **Organ dysfunction (e.g., lung damage in TB)**
- **Dissemination of the infection to other parts of the body (Miliary tuberculosis)**
- **Reactivation of latent infection in immunocompromised individuals**

GOOD LUCK