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Case Report

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Empyema

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Epidemiology

Most of the Empyema results from pneumonia.

Pleural infection may result from lung surgery, trauma, esophageal perforation, or transdiaphragmatic spread of an Intraabdominal infection.

Most of the patients hospitalized with pneumonia have an ipsilateral pleural effusion.

Parapneumonic effusion and Empyema are relatively common complications of pneumonia.

Since the advent of antibiotics, their overall incidence has declined dramatically.

However epidemiologic studies suggest that rates are again slowly rising.

Empyema may be more common in men than women.

Parapneumonic effusion /Empyema develops in 2 to 12 percent of children with pneumonia and up to 28 percent of children requiring hospitalization.

Most common among young children. Boys and girls are equally affected.

The mortality rate is low but may be higher in infants.

Most deaths are due to acute pneumonia or Sepsis rather than pleural disease.

History

Empyema is most often used to refer to a collection of pus in the space around the lung(pleural cavity).

Hippocrates first described the serious nature of thoracic Empyema.

Gotthard Biilau used a closed method of drainage of infected pleural fluid.

The incidence of streptococcal Empyema decreased with the introduction of antibiotics.

Microbiology

Pyogenic bacteria such as streptococcus pneumonia, oral streptococcus and anaerobes and Staphylococcus aureus is the most common

cause of Parapneumonic effusion and Parapneumonic Empyema.

S. pneumonia (pneumococcus) is the most common bacterial cause of community-acquired Parapneumonic effusion and Empyema.

Mycobacterium effusion and Empyema are less frequent than bacterial Empyema.

Viruses do not cause Empyema.

Parapneumonic effusion and Empyema in children occur primarily in association with underlying bacterial pneumonia.

The predominant causative organism has changed over time with the advent of antibiotic therapy, the development of antibiotic resistance and the development of widespread use of polysaccharide and conjugate vaccines for Haemophilus influenza type B and Streptococcus pneumonia.

Pathogenesis

Classically, the development of Empyema occurs in three clinical stages.

The Exudative stage, fibrin purulent stage, and the organizing stage.

When initially presented with an infectious organism, the pleura responds with edema formation and exudation of proteins and neutrophils into the pleural space.

Early in the Exudative stage, bacterial growth may be minimal and the exudate may be sterile.

Staphylococcal pneumonia is almost always associated with pleural effusion.

Most patients with uncomplicated Parapneumonic effusion respond to antibiotics alone.

Untreated Exudative effusions may develop into fibrin purulent effusion or complex Parapneumonic effusion.

The fibrinopurulent stage represents the deposition of fibrin on the visceral and parietal pleural membrane and the formation of loculation.

A complex Parapneumonic effusion develops into a pleural Empyema when the concentration of leukocytes becomes sufficient to form Frank pus.

The fibrin strand results in loculation of the pleural space which prevents drainage of the pleural fluid using a single needle or tube.

This stage of pleural effusion requires catheter drainage and often surgical drainage.

The third and final phase is the organizing phase.

This is characterized by the influx of fibroblast and formation of the thick, fibrous pleural peel along with continued maturation of dense septations.

Both the visceral and parietal pleura may become severely thickened with significant fluid remaining in the pleural space.

During this stage of disease, simple drainage of fluid may be possible but the thick peel prevents reexpansion of the underlying lung.

Failure of the trapped lung to re-expand will not allow for improved aeration of the lung or any improvement in breathing.

Clinical Features

The clinical findings of Parapneumonic effusion and Empyema are Nonspecific.

Risk factors such as aspiration, persistent or new fever and lack of clinical response despite appropriate antibiotics should raise the suspicion of Parapneumonic effusion and Empyema.

Common clinical features on history include cough, fever, Pleuritic chest pain, Dyspnea and sputum production.

Duration of the symptom as long as two weeks.

Physical examination may identify the presence of pleural fluid with dullness on percussion, decreased breath sound and decreased fremitus.

Egophony is present at the upper edge of the effusion.

Decreased vocal fremitus is found in pleural effusion.

Diagnosis

The presence of leukocytes, Radiographic evidence of pleural effusion and the presence of purulent fluid on thoracentesis are classic findings of Empyema.

Signs or symptoms of infection, history of Malignancy, or associated medical disease such as cardiac failure or kidney or liver disease can help determine the cause of the effusion.

Ultrasound can detect loculation and can determine an appropriate site for thoracentesis.

A Computed axial tomographic scan can determine the size and the location of the effusion and provides information regarding associated underlying parenchyma and pleural abnormalities.

Inspection of lung fluid interface may suggest entrapped lung and may reveal an underlying parenchymal process such as an abscess or tumor.

The appearance of the effusion and fluid lung interface can indicate the need for operative intervention.

Thoracentesis is useful in determining the cause of the effusion.

Pleural fluid evaluation should include a cytologic evaluation, pH level, gram stain and culture, cell count and total protein, glucose and LDH level.

Effusion is classified as Exudative or transudative based on protein and LDH level.

Exudative effusions will have a pleural fluid protein/serum protein level higher than 0.5 and a pleural fluid LDH/serum LDH level higher than 0.6.

The presence of an increased white blood cell count in the pleural fluid, particularly with a preponderance of neutrophils may indicate pleural infection.

Low pleural fluid glucose and a pH less than 7.20 are indicators of active pleural infection and the need for pleural drainage.

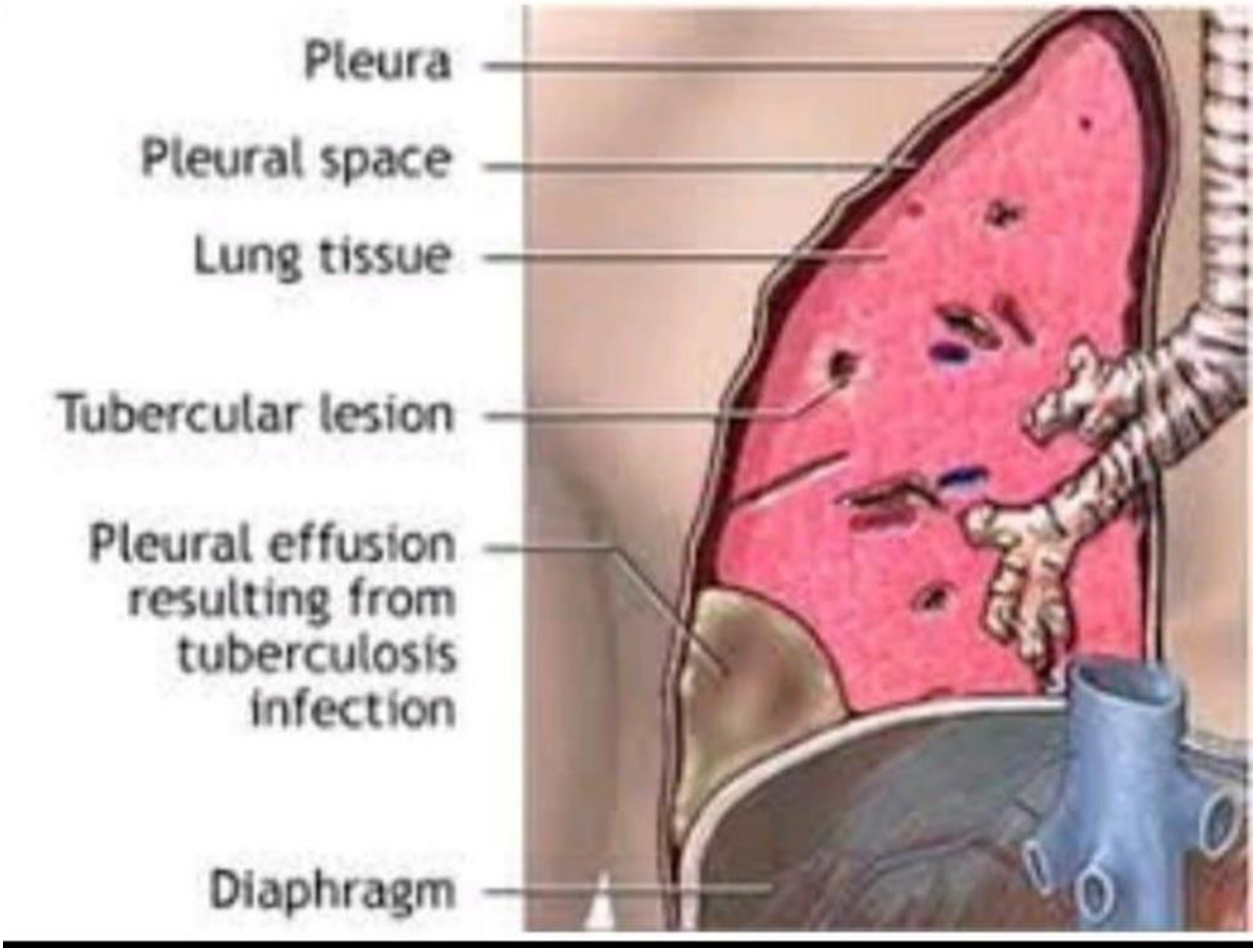

Figure 1

References

1. "Epidemiology, clinical presentation and diagnostic evaluation of parapneumonic effusion and empyema in adults" Charlie Strange, md.

2. "Epidemiology, clinical presentation and Evaluation of parapneumonic effusion and Empyema in children..." Ibrahim a janahi, md, khoulood fakhoury, md Sabiston and spencer surgery of the chest... Edition ninth.

3. Sabiston and Spencer surgery of chest.