

CHILDHOOD AND ADULT EMPYEMA THORACIS



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INTRODUCTION

Empyema has been known since the time of Hippocrates and requires drainage for the treatment [1]. In 1876, Hewitt performed the first empyema drainage with a drain and closed water drainage system [2]. Eastlander and Shede applied the first thoracoplasty, while Kuster and Fowler applied decortication in empyema [1,2].

Empyema is an inflammation of the pleural space and a thick, sticky fluid collects in the pleural space. When it is not treated, it causes 10% mortality [3]. Surgery and medical treatment are used together in the treatment. The aim is to eliminate the infection and to provide adequate expansion of the lung.

ETIOLOGY

Lobar pneumonia, lung abscess, bronchiectasis, previous thorax, cardiac and esophageal surgery, septic pulmonary embolism, trauma, mediastinitis, abdominal infections, spontaneous pneumothorax, recurrent thoracentesis, malignancy, diabetes mellitus, immunosuppression therapy, long-term steroid therapy, neurological diseases, aspiration, esophageal perforation and sepsis are the causes of empyema [4,5]. In addition to these, congenital lung diseases are among the causes in pediatric patients [6]. The most

common cause of empyema is complication of parapneumonic effusions. Parapneumonic effusion develops in 40-50% of patients with bacterial pneumonia and 10-15% of them become complicated and a small portion of them, 5%, turns into empyema. Gram positive aerobic bacteria are the most common causes of empyema. Gram negative bacteria are observed in those with hospital origin [1,7]. Although the frequency of bacterial pneumonia is decreasing, its complications, parapneumonic effusion and empyema, increase in children [1]. It develops due to inadequate treatment of pneumonia, especially in children.

PATHOPHYSIOLOGY

In the pleura, due to the disruption of the permeability of the cells with the mesothelium, the protein rich exudate character begins to accumulate. Fluid is removed by pleural lymphatics with increased capillary permeability. However, fluid accumulation is seen due to insufficient lymphatic drainage over time. Empyema develops whereas the infection of this fluid with microorganisms [8].

Three clinical stages are seen in empyema. These are the exudative stage, fibrinopurulent stage, and organizational stage.

1- Exudative Stage: It is the first 48-72 hour period. The number of cells in the pleural fluid is low, LDH is low, glucose level is normal,

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With minithoracotomy, fibrous septations are broken down in debridement and the thoracic cavity is ensured to be one piece. Fibrinous and pyogenic material is evacuated from the thoracic cavity. The goal is to ensure adequate lung expansion [10,11].

VATS (Video-assisted thoracoscopic surgery) is a reliable method in the treatment of complicated parapneumonic empyema. The purulent fluid is aspirated, the loculations are separated, the fluid is aspirated, the fibrinous pleura is debrided, and the lung is expanded. It is recommended to see a thoracic computed tomography before surgery. The fibrin tissue covering the lung is removed utmost. This can be done from a single port and the existing port location can be used to place a thoracic drain [19]. Luh et al. have achieved 86% success in decortication with VATS [20]. VATS has technical advantages over thoracotomy. It shortens the duration of hospital stay with the advantages of less pain, less blood loss, and less thoracic drain stay [19,20]. VATS should be the firstly preferred in the surgical treatment step (Figure3).

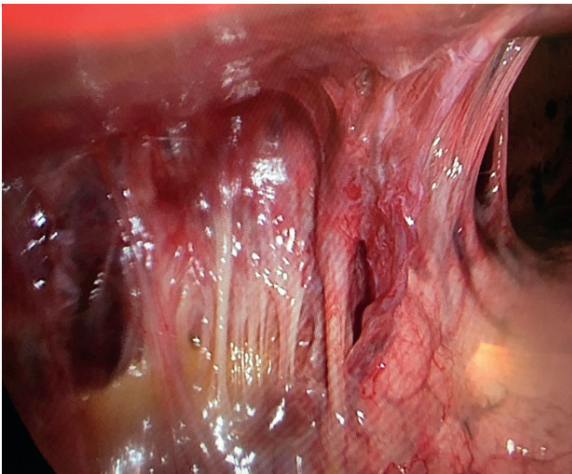


Figure 3: VATS decortication – Pleural adhesions

Decortication with thoracotomy is the treatment option in cases where VATS decortication fails and the disease continues. Although 6 months have passed, pleural thickening continues and decortication is required if there is a limitation in pulmonary functions. Decortication

is not recommended before three weeks have passed. Thus, bleeding and air leaks appear as serious complications in decortication of organized empyema. [21]. In decortication, fibrous tissues are removed from the parietal and visceral pleura in the trapped lung. The lung is released and expanded. Thus, respiratory functions are improved.

Chronic empyema can be followed up and treated with open drainage in patients with poor general condition that cannot be decorticated. Open drainage is not recommended in children, as it causes skeletal deformities in the late period [22]. At present times, VAC (vacuum assisted closure) dressing is used instead of open drainage.

If the lung condition is appalling and not expanded, the chest wall is collapsed to prevent re-infection of the intrapleural space. Remarkably, thoracoplasty can be applied. Another reason for performing thoracoplasty is to close the bronchopleural fistula, which has occurred as a complication of empyema, with vascularized living tissue [23].

Empyema is substantial cause of morbidity and mortality. Restrictive pulmonary disease can be observed as a result of inadequate treatment of empyema. Therefore, respiratory failure may occur. According to the stage of empyema, appropriate treatment options should be applied at the appropriate time. VATS is an effective option that can be applied safely among surgical methods. It is also significant to give adequate time to the appropriate antibiotic in the treatment of empyema.

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