

A Study to Determine the First Line Treatment in Pleural Empyema

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Abstract

Introduction: Pleural empyema is a collection of pus in the area between the lungs and the inner surface of the chest wall that is caused by microorganisms, usually bacteria. Prompt evacuation of the infected fluid along with appropriate antibiotics is the mainstay treatment; however, Decortication may be performed with percutaneous chest tube placement.

Objective: The objective of the study is to determine the clinical outcomes of surgical decortication as first line treatment of choice in pleural empyema.

Material and Method: The study is an observational retrospective analysis of 100 patients who presented with empyema and were treated either with open drainage or surgical decortications as the first line of treatment at Dhiraj General Hospital, Gujarat.

Results: Out of 100 patients with empyema 27 underwent open drainage and 73 with surgical decortications. Surgical decortications showed a better treatment success rate in all study subjects (68/73 patients, 93%) compared with open drainage (20/27 patients, 74%, $p < .001$ for method comparison). After a propensity scored matching surgical decortications resulted in a better outcome versus open drainage, hence surgical decortication was the best predictor of treatment of success.

Conclusion: The first treatment of choice for pleural empyema is critical determinant of ultimate therapeutic success. After adjusting for confound variables, surgical decortication is the optimal first treatment of choice in advanced empyema.

Keywords: Pleural empyema; Decortication; Tuberculosis.

Introduction

Pleural empyema is defined as purulent fluids present within pleural space. In addition, empyema was defined as frank pus aspirated from the pleural space or positive Gram stain or culture identification of pathogens in pleural fluid¹ by microbiological and biochemical methods. Empyema due to tuberculosis is highly prevalent in our country. In 1962, the American Thoracic Society⁴ described the 3 phases of empyema

Exudative stage (stage 1)

Fibropurulent stage (stage 2)

Organizing stage (stage 3)

In the initial exudative stage, closed chest drainage, closed chest drainage and appropriate antibiotic administration can comprise effective treatment. Empyema due to tuberculosis (TB) is increasingly prevalent in TB-endemic countries.^{2,3} Antimicrobial therapy successfully resolves small uniloculated empyema. However in the later fibropurulent and organizing stages, antibiotics are not useful due to pleural peel and fluid loculation. If initial non-invasive treatment fails

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surgical intervention involving thoracotomy and decortications is an alternative choice. However surgical management has shown to be an effective management option especially in multiloculated empyema. In this study we reviewed our clinical experiences in treating pleural empyema in both nontuberculous and tuberculous cases.

Materials and Methods

A Retrospective study was carried out in Dhiraj Hospital Vadodara, Gujarat between the years 2016–18, the study population consisted of the patients aged more than 18 years with diagnosis of empyema. Data regarding clinical profile, initial and final diagnosis. The study was approved by HRRP committee of Sumandeep Vidyapeeth and the necessity of the written and informed consent was waived because this was a retrospective study and patients identities were not revealed.

Pleural fluid was investigated by microbiological and biochemical methods. Bacterial culture, gram staining, acid-fast bacilli smears and TB culture were performed on both pleural and sputum samples. In our studies tuberculous empyemas were analyzed together with nontuberculous bacterial empyemas. However all the patients were assessed for TB primarily.

Inclusion criteria were empyema as diagnosis and age above 18 years. Empyema was defined as septations or loculations identified in pleural space by CT Thorax. The surgical group was defined as patients who underwent decortications. The

drainage group was defined as patients who were treated with simple drainage. After the intervention was completed we evaluated the treatment outcomes with x-ray chest on POD 1 assessing restoration of lung expansion and evacuation of the infected pleural fluid along with general lab reports including CBC.

Result and Discussion

Out of 100 patients with empyema 27 underwent open drainage and 73 with surgical decortications. Surgical decortications showed a better treatment success rate in all study subjects (68/73 patients, 93%) compared with open drainage (20/27 patients, 74%, $p < .001$ for method comparison). After a propensity scored matching surgical decortications resulted in a better outcome versus open drainage, hence surgical decortication was the best predictor of treatment of success.

Surgical decortications involve the removal of all fibrous tissues from the pleura and the evacuation of all pus and debris from the pleural space. Thourani and colleagues⁵ reported that surgical decortications reduced the hospital stay compared with simple drainage through a catheter or chest tube. The total hospital charge for surgical decortications was not significantly higher compared with the cost of open drainage. Wozniak and colleagues⁶ reported that using simple drainage as a first treatment compared with surgical intervention was the most powerful prognostic factor for first treatment failure, and that first treatment failure is an important predictive factor of mortality in adult patients with empyema.

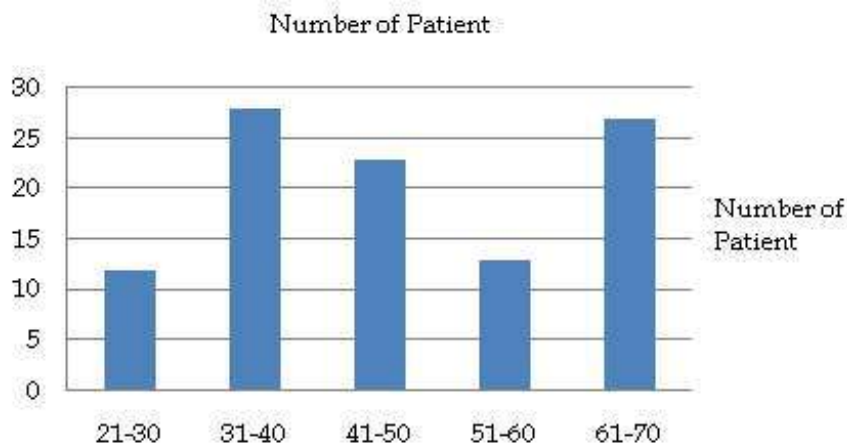


Fig. 1: Age incidence of the individual presenting with empyema.

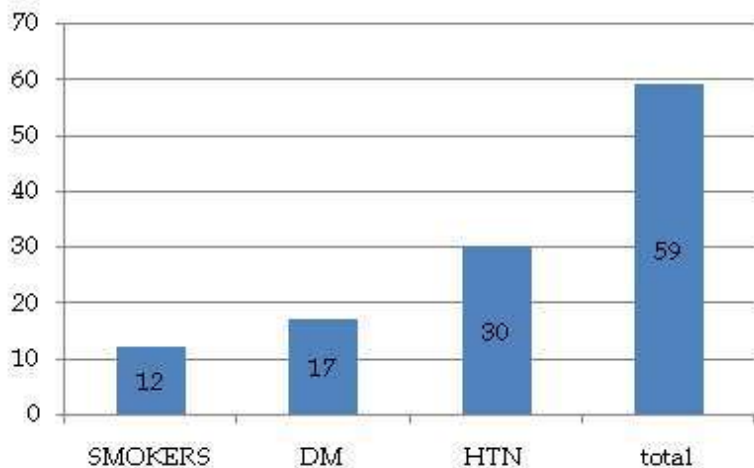


Fig. 2: Comorbidities in individuals presenting with empyema.

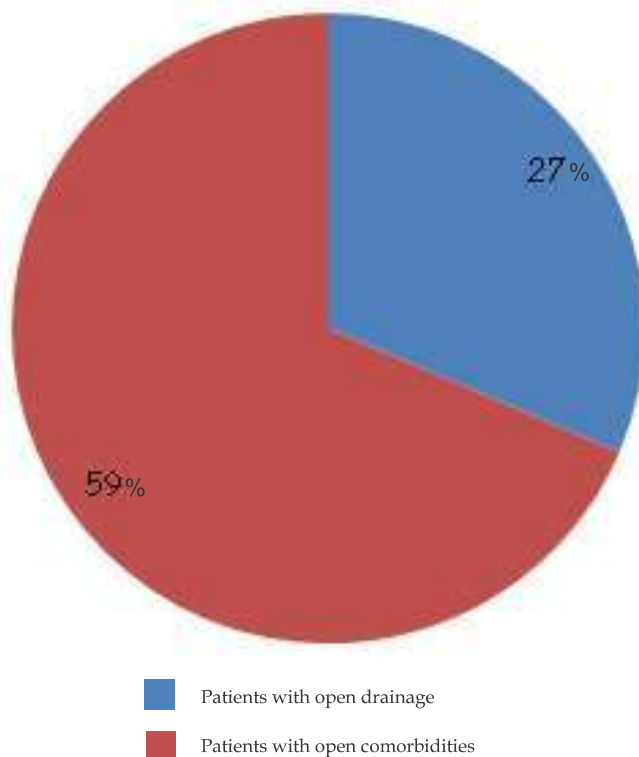


Fig. 3: 29% of the patient with empyema who have undergone decortication required open drainage.

Conclusion

The choices of the first interventional strategy for empyema is critical for treatment success. Even after adjusting for confounding variables surgical decortication is the optimal first line of treatment with patients with advanced empyema.

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