ORIGINAL ARTICLE

EMPYEMA THORACIS: MANAGEMENT OUTCOME

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Background: Empyema thoracis results from postpneumonic effusion of bacterial origin or trauma. If untreated it may convert to fibro-purulent or an organising stage. **Methods:** This study was conducted at cardiothoracic unit of Ayub Teaching Hospital Abbottabad from Jan 2008 to Aug 2009. Patients with diagnosis of empyema thoracic were studied. Their clinical features and investigations were recorded on a proforma. Antibiotics alone, aspiration, chest intubation, rib resection or decortication were performed where required. **Results:** Out of 71 patients, males were 58 (81.69%) and females were 13 (18.3%). Majority of the patients (24, 33.8%), were below 20 years of age. Most of the patients (59, 83.09%), were from the poor socioeconomic class. Forty-one (57.76%) patients were smokers, 12 (16.9%) were diabetic, and 39 (54.92%) were hypertensive. Cough was the most common complain (62, 87.32%). Forty (56.33%) had more than 50% involvement of hemi thorax. In 44 (61.97%) cases, cause was tuberculosis. Fifty-one (71.83%) patients were treated with tube thoracostomy and 13 (18.3%) required decortication. **Conclusion:** Empyema thoracis commonly affects males. Apart from clinical assessment, x-ray chest is an important and simple investigation to detect empyema thoracic. Mostly tube drainage cures the diseases but in case of failure other options are also available.

Keywords: Empyema thoracic, Chest intubation, rib resection, decortication

INTRODUCTION

Despite the advances in antibiotic therapy during the last decades, thoracic empyema remains a common clinical entity with significant associated morbidity and mortality.[1] In our set up this significant morbidity and mortality is due to delay in initiation of proper treatment. Mainstay of treatment of pleural empyema is the treatment of ongoing infection and the prevention of recurrent infection and late restriction.[2] Treatment of thoracic empyema includes three basic principles: (a) drainage of complicated plural effusion, (b) full expansion of the underlying lung and (c) elimination of the pleuropulmonary infection with antimicrobial agents.[3] There are different types of treatments for different stages of the empyema thoracic. The decision of the type of treatment is usually empiric, sometimes guided by the failure of another treatment modality.[4]

Antimicrobial therapy along with thoracosentesis is usually adequate treatment in early empyema thoracic but chronic cases may requires aggressive intervention like rib resection or decortications. We share our experience of managing empyema thoracic.

PATIENTS AND METHODS

This study was conducted at cardiothoracic unit of Ayub teaching Hospital Abbottabad from Jan 2008 to Aug 2009. Consecutive diagnosed cases of empyema thoracic were included in the study. Diagnosis was suspected from clinical features and chest x-ray and was confirmed by aspiration of purulent exudates and culture of the aspirate. All necessary information from patients' histories, clinical examination, X-ray chest, ultrasound of chest and laboratory investigations (Blood CP and C/S) were recorded on proformas and analysed using SPSS-12. Treatment options included were Intravenous antibiotics alone, therapeutic aspirations, chest intubations, rib resection, and decortication. Selection of appropriate treatment modality was based on severity of disease, the site and nature of the collection and failure of a mode of treatment, like failure of chest intubation leaded to rib resection and some time failure of rib resection, to cure the disease, ended up with open decortications. Chest intubation was performed if pleural fluid had a purulent appearance. Chest tube was attached to an underwater seal system. Successful closed tube drainage was evidenced by improvement in clinical and radiological status within 24 to 48 hours. Continuous drainage was maintained until daily fluid output remained below 30 ml for three consecutive days and improvement in the chest radiograph was noted. Rib resection was performed in those patients who were too debilitated to undergo decortications or chest intubation did not show significant improvement of patients' clinical and radiological picture.

Decortication was performed in organised stage of empyema, failed chest thoracostomy or failed rib resection in otherwise fit patient for anaesthesia.

In decortication standard postero-lateral thoracotomy was performed .The lung was gradually freed in an extrapleural plane from the chest wall, the apex, the diaphragm, mediastinum and chest tube put in. Antibiotics were started empirically and later on changed according to culture and sensitivity. Patients were discharged home once their condition became

stable and were advised to come for follow up on monthly basis to assess their clinical and radiological improvement.

RESULTS

A total of 71 patients were admitted with diagnosis of empyema thoracic. Males were 58 (81.69%) and females were 13 (18.3%). Majority of the patients (24, 33%), were below 20 years of age (Table-1). Most of the patients (59, 83.09%) were from the poor socioeconomic class. Forty-one (57.76%) patients were tobacco smokers, none of them was female. Twelve (16.9%) patients had associated history of diabetes mellitus, 39 (54.92%) were hypertensive and 55 (77.46%) gave history of chronic chest infection. On presentation productive cough was the most common complain (62, 87.32%), followed by malaise (Figure-1). Chest x-ray finding on admission varied from 10% opacity to complete whitening of one hemithorax but 40 (56.33%) had more than 50% involvement of ane pleural space. Different microbes isolated on culture of aspirate were Mycobacterium tuberculi, Pneumococci, Staphylococci, Klebsiella and Pseudomonas auroginosa. Mycobacterium tuberculosis was the most common (44, 61.97%).

Most of the patients (51, 71.83%) were treated with tube thoracostomy. Other modalities of treatment offered are outlined in Table-2. Tube thoracostomy was found successful in 43 (60.56%) and failed to cure in 8 (11.26%) patients. Rib resection cured empyema in 2 (2.81%) and failed in other 2 patients. In 3 patients pleura was thick enough on CT scan that the decision of decartication was directly taken without considering other modalities of treatments. Eight (11.26%) patients with failed outcome of tube drainage underwent decortication, and 2 failed rib resections were also subjected to thoracotomy decortication.

Figure-2 shows a preoperative X-ray chest of a patient with empeyma thoracic and Figure-3 shows post decortication X-ray with expanded lung of the same patient. Wound infection was the most frequent cause of morbidity (Table-3).

The most common cause of empyema in our study was pulmonary tuberculosis 44 (61.97%) and post pneumonic emyema was the second common cause of empyema (21, 29.57%). In 6 (8.45%) patients aetiology was trauma to chest. The cure rate was observed to be 59 (83.09%) while 5 (7.04%) patients expired. Seven patients were lost in follow up.

Table-1 Age of patients (n=71)

Age Group	Patients	Percentage
Up to 20 years	24	33.8
21–40 Years	20	28.16
41–60 Years	15	21.12
Above 60 years	12	16.9

Figure-1: Clinical Presentation

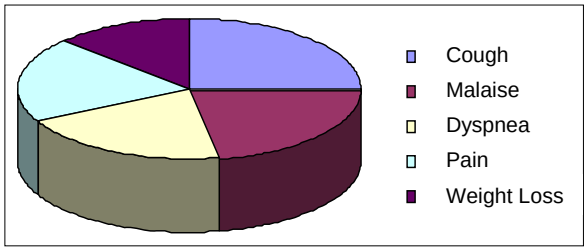

Table-2: Treatment Options (n=71)

Treatment option	Patients	Percentage
Aspiration	3	(4.22)
Tube thoracostomy	51	(71.83)
Rib resection	4	(5.63)
Decortication	13	(18.30)

Figure-2: Preoperative chest X-ray

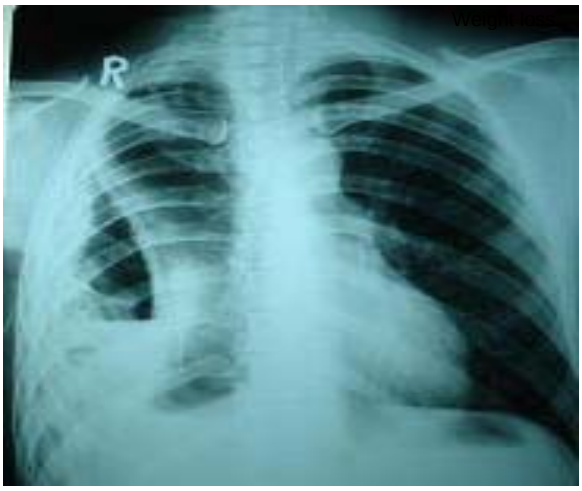

Figure-3: Postoperative Chest X-ray

Table-3: Complications

Complication	Patients	Percentage
Wound Infection	10	(14)
Air Leak	4	(5.6)
Pulmonary Embolism	1	(1.4)
Septicaemia	2	(2.8)

DISCUSSION

The optimal initial intervention for the treatment of Empyema thoracic remains controversial. As economic resources for patient health care continues to be restricted, we must amend our treatment strategies for Empyema thoracic to include the most cost-effective primary intervention.[5] But apart from cost of the treatment other important factors like condition of patient and nature of empyema also play a major role in evolving strategy of management. The mainstay of treatment of pleural empyema is the control of ongoing infection and the prevention of recurrent infection and late restriction. Incomplete drainage of the pleural space with persistent signs of infection should prompt surgical intervention.[6] The advent of video-assisted thoracic surgery (VATS) for the management of fibrinopurulent stage-II empyema has shown rewarding results in several reports.[7,8]

Majority of our patients (33.8%) were below the age of 20 years. Almost similar observations (44%) were made by Nadeem *et al*[9] in their study. Poverty and low immunity in younger age group may be the contributing factor to develop empyema thoracic. Misthos *et al*[10] in their study reported fever as the most common presenting symptom (88%) followed by cough (73%). We observed cough as the frequent symptom (87%) followed by malaise. Forty (56.33%) had opacity on more than 50% of a pleural space on x-ray chest which emphasizes the role of x-ray chest in patients presenting with cough, fever, malaise and dyspnea. Molnar[11] in his review article mentioned tuberculous empyema as a less frequent cause of empyema while we found tuberculosis as a most common cause (61.97%) of empyema thoracic. Socioeconomic differences in East and West around the globe seem to be the major factor for this discrepancy. Bilal *et al*[12] also found Tuberculosis as the most common cause (50%) of empyema thoracic in this part of the world. Mandal *et al*[13] in their study reported 62% success rate for closed thoracostomy, interestingly; our cure rate (61.56%) with tube drainage was almost the same. Results of Video Assisted Thoracoscopic Surgery (VATS) are different in different hands. Angelillo-Mackinlay *et al*[14] compared VATS and open thoracostomy for empyema thoracic and reported same success rate in both procedures except reduced hospital stay, increase cosmetic outcome and conversion rate of 10% in VATS. Lardinois *et al*[15] reported 44% conversion rate for VATS with slight difference in mortality between open thoracotomy and VATS. Although in near future VATS may be recognised as a gold standard for empyema thoracic but it still requires under supervision training and expertise to reduce conversion rate and to improve mortality rate. We proceeded with open decortication as we were not trained in VATS. Amongst the 5 deaths only one was secondary to thoracotomy.

CONCLUSION

Empyema thoracic commonly affects males. Apart from clinical assessment x-ray chest is an important and simple investigation to detect empyema thoracic. Timely intervention cures the diseases in most patients with tube drainage but in case of its failure other options are also available.

REFERENCES

1. Light RW. A new classification of parapneumonic effusions and empyema. Chest 1995;108:299–301.
2. Rzyman W, Skokowski J, Romanowicz G, Lass P, Dziadziuszko R. Decortications in chronic pleural empyema-effect on lung function. Eur J Cardiothorac Surg 2002;21:502–7.
3. Huang HC, Chang HY, Chen CW, Lee CH, Hsiue TR. Predicting factors for outcome of tube thoracostomy in complicated parapneumonic effusion or empyema. Chest 1999;115:751–6.
4. Berger HA, Morganroth ML. Immediate drainage is not required for all patients with complicated parapneumonic effusions. Chest 1990;97:731–5.
5. Thourani VH, Brady KM, Mansour KA, Mille JI, Lee RB. Evaluation of treatment modalities for thoracic empyema: a cost-effectiveness analysis. Ann Thorac Surg 1998;66:1121–7.
6. Ris HB, Pezzetta E, Krueger T, Lardinois D. Surgical treatment of pleural infections: the surgeon's point of view. Eur Respir Mon 2004; 29:181–8.
7. Waller DA, Rengarajan A. Thoracoscopic decortication: a role for video-assisted surgery in chronic postpneumonic pleural empyema. Ann Thorac Surg 2001; 71:1813–6.
8. Roberts J R. Minimally invasive surgery in the treatment of empyema: intraoperative decision making. Ann Thorac Surg 2003;76:225–30.
9. Nadeem A, Bilal A, Shah S A. Presentation and management of Empyema Thoracis at Lady Reading Hospital Peshawar. J Ayub Med Coll Abbottabad 2004;16(1):14–7.
10. Misthos P, Sepsas E, Konstantinou M, Athanassiadi K, Skottis I, Lioulias A. Early use of intrapleural fibrinolytics in the management of postpneumonic empyema. A prospective study. Eur J Cardiothorac Surg 2005;28:599–603.
11. Molnar T F. Current surgical treatment of thoracic empyema in adults. Eur J Cardiothorac Surg 2007;32:422–30.
12. Bilal A, Nabi M S, Salim M, Zaman M, Muslim M. Collapse therapy in 21st century an experience of 50 cases. Ann King Edward Med Coll 2005;11(1):24–6.
13. Mandal AK, Thadepalli H, Mandal AK, Chetipally U. Outcome of primary emypema thoracis: therapeutic and microbiologic aspects. Ann Thorac Surg 1998;66:1782–6.
14. Angelillo-Mackinlay TA, Lyons GA, Chimondeguy DJ, Piedras MA, Angaramo G, Emery J. VATS debridement versus thoracotomy in the treatment of loculated postpneumonia empyema. Ann Thorac Surg 1996;61:1626–30.
15. Lardinois D, Gock M, Pezzetta E, Buchli C, Rousson V, Furrer M, Ris HB. Delayed referral and gram-negative organisms increase the conversion thoracotomy rate in patients undergoing videoassisted thoracoscopic surgery for empyema. Ann Thorac Surg 2005;79:1851–6.

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