

Empyema Thoracis- Our Ten Years Experience

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Abstract

Empyema still remains one of the serious problems and challenge for a thoracic surgeon, despite the wide spread use of antibiotics and other surgical modalities its treatment is controversial with or without bronchopleural fistulae. Our experience in 200 patients of empyema with or without bronchopleural fistula was retrospectively reviewed. The causes of empyema were as follows. Parapneumonic (n=140), post tubercular empyema (n=20), following trauma (n=16), Post surgical (n=10), subdiaphragmatic pathology (n=2), oesophageal rupture (N=5) and underdetermined + 17. Broncho- pleural fisyla was found to be present in 20 % of these patients. Therapeutic thoracentesis was carried out successfully in 22 patients and closed tube thoracostomy in 178 patients and success was obtained in 89 patients (50 %) decortication alone in 60 patients (30 %). Thoracoplasty with muscle with muscle flap interposition in n=13, open drainage with rib resection (Eloesser flap) in ten patients, six patients refused any surgical intervention.

Key Words

Empyema, Pleural, Thoracotomy, Eloesser Flap

Introduction

The word empyema, which means suppuration, originated from Greek and Latin. The practice of thoracic surgery began with drainage of pus from the chest by Hippocrates, who wrote extensively on this subject, describing symptoms and natural history (1). Empyema thoracis has a higher frequency and is more devastating in elderly and immune compromised population. The most common cause of empyema thoracis is parapneumonic, whereas thoracis, surgical procedure, traumatic oesophageal perforation, cystic fibrosis, foreign body, chest wall infection, and subdiaphragmatic abscesses are less common (2). Current modalities used in the treatment of empyema thoracis includes use of appropriate antibiotics, thoracentesis, inter costal tube drainage, open drainage, decortications, excision with exteriorization (or empyemaectomy), sterilization of the thoracic cavity and use of fibrinolytic agents, thoracoplasty and muscle flap, closure. Each of these modalities has a role and an appropriate time and place in the treatment of acute and chronic thoracic empyema (3). Despite various treatment options available empyema thoracis remains associated with mortality ranging from 1 % - 19 % (2). Furthermore, with the emergence of drug resistant

myobacteria, ageing population, drug abuse and acquired immunodeficiency syndrome-related pulmonary complications, the incidence of empyema thoracis is going to rise, comparable to pre antibiotic era. In this study we retrospectively reviewed treatment and modalities on patients diagnosed with empyema thoracis at our institution, with whom I was associated from time to time.

Material and Methods

In a one year study patients (130 males and 70 females) with proven empyema were reviewed retrospectively. The age ranged from 16 to 84 years (median 58 years). The empyema in 13 patients occurred as a late complication of intra pleural procedures performed for the diagnostic purpose. The causes of empyema are summarized in *table I*. A retrospectively review was performed on charts of these patients with reference to clinical findings, surgical intervention and follow up. Treatment modalities were divided into five groups.

Group I: Therapeutic thoracentesis and antibiotic only 22 patients 11 %

Group II: Closed tube thoracostomy in 89 patients (45.9 %).

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Group III : Decortication in 60 patients 30 %

Group IV : Thoracoplasty with muscle flap interposition in 13 patients (6 ½ %)

Group V : Open drainage , elloesser flap etc. in 10 patients (5 %)

Results

6 Patients with empyema who were on intercostals tube drainage failed to turn up for major surgical intervention . All these patients received antibiotics and 80 patients had received antitubercular therapy. Therapeutic thoracentesis was carried out in those patients who presented early and in this group majority of patients were in younger age group. Aspiration was done repeatedly in these patients along with use of antibiotics . 70 % (140 of 200) patients were having para, pneumonic empyema , 10 % with pulmonary tuberculosis and 8 % were following post-trauma chest . Two patients had empyema following rupture of liver abscess into pleura . 5 % were following surgical procedure on drugs , 3 patients had oesophageal rupture and in seven patient no definite cause could be found (*Table 1*). Staphylococcus was responsible for 30 % empyema cases followed by streptococcus 25 % , enterococcus 12 % , bacterioids 10 % , pseudomonas 8 % 8 % , echerichia coli 5 % , 10 % showed no growth , rest 10 % had various other organisms (*Table 2*). Empyema was complicated by bronchopleural fistula in 40 patients . This group required prolonged treatment with or without surgical procedure. Depending upon the treatment modalities patients were divided into 5 groups . Group I therapeutic thoracentesis and antibiotic cured 22 patients (11 %) , in group II, 44.5 treated with intercostals tube thoracostomy ,decortication was done in 60 patioents in group III, complicated procedure like thoracoplasty and muscle flap interposition to obliterate the pleural space were performed on 13 patients in group IV and in group V open drainage Enoesser flap etc. in rest of the patients i.e. 5 5 (10) overall mortality was 12 % (N-24).One patient developed amyloidosis of kidney and finally died due to chronic renal failure. (*Table-3*)

Discussion

The cause of empyema in any series are a reflection of nature of the patient population being treated at that centre. In example , the fact that 70 % of our empyemas were attributable to paraneumonic infection and indicative of high incidence of infected patients were treated in our hospitals. Five percent of our emyemas were post surgical procedure . Bronchopleural fistulae was associated in 20 % of empyema patients . If we attribute post surgical

Table-1. Causes of Empyema Thoracis

Cause	No. of patients	% age
Parapneumonic	140	70 %
Post-traumatic	16	8 %
Tuberculosis related	20	10 %
Subdiaphragmatic pathology	2	1 %
Oesophageal - related	5	2.5 %
Post-surgical	10	5 %
Undetermined	7	3.5 %

Table.2 Common Culture Isolates

Common culture	No. of patients	%age
Staphylococcus	60	30 %
Post-Streptococcus	50	25 %
Enterococcus	24	12 %
Bacterioids	20	10 %
Pseudomonas	16	08 %
Escherichia colli	10	5 %
No growth	10	5 %
Various other growth	10	5 %

Table.3 Various Surgical Modalities Adopted in the Study

Surgical Modality	No. of patients	%age
Therapeutic thoracentesis	22	11 %
Closed tube thoracotomy	89	44.5 %
Decortication	60	30 %
Thoracoplasty & muscle flap	13	6.5 %
Open drainage (Eloesser flap etc.)	10	5 %
Patient refused surgical intervention	6	3 %

empyema as iatrogenic empyema. The cause of which could be post - intercostals tube thoracostomy, as a result of diagnostic thoracentesis. Similar low but significant incidence of iatrogenic empyema have been noted by others and the need for sterile technique in performing these procedures must be emphasized (4, 5, 6, 7). Serious associated diseases were present in the majority 80 % of our patients . The influence of associated systematic illness upon empyema mortality has been documented (8). The results of microbiological cultures of empyema contents in this series differ little from other reports, with staphylococcus , streptococcus and pseudomonas being the most frequently isolated organism (5). Anaerobic organism (bacterioids) were present in 10 % of the cultured and the result of treatment could be determined. Even with appropriate therapeutic attempt , the mortality of patients with empyema is 15-20% and even high is immune compromised patients. Twenty four of the 200 patients described in this report died. 10 of these deaths were directly caused by empyema (5 % empyema mortality) and in the remaining empyema was a

contributing factor. Various reported empyema-related death rates range from 8 % to 33 % (5, 7, 8). 8 of these patients had fatal sepsis, as a result of pyothorax and one bled uncontrollably from the empyema cavity.

A significant finding of this retrospective analysis is that closed chest tube thoracostomy was successful in 44.5 % of the patients in which it was used as the initial method of treatment. This success rate is substantially lower than 74 % to 64 % chest tube success rate reported by others (7). Chest tube drainage was more successful in cases who had parapneumonic empyemas. That post operation empyema is a more difficult problem is a new observation. Cohn & Blaisdell (9) emphasized the aggressive use of open drainage (rib resection or Eloesser flap) for post-pulmonary resection empyema and encouraged open drainage of post-pneumonectomy empyemas, as has also been advocated by Krish and associated (10). Decortication was highly successful when used as the initial method of empyema treatment with cure or control of the empyema (30 %), in 10 patients, rib resection and open drainage was successful after they failed to respond to decortication alone. 13 patients required multiple procedures while thoracoplasty and muscle flap interposition to obliterate the pleural dead space. 23 patients of 40 with bronchopleural fistulae required three multiple procedures where as rest responded to simple decortication and or simple drainage. Our analysis of 200 patients with empyema thoracis with or without broncho pleural fistulae treated at our institutions reaffirms the principle of aggressive empyema drainage that has long been advocated by thoracic surgeons. It demands careful selection of patients with empyema who may respond to conservative management. However, it does not support a conservative approach to this serious clinical problem. Closed tube thoracostomy drainage is often inadequate and early decortication in organized form of empyema is recommended, rib section and open drainage is safer in moribund patients. Procedures like thoracotomy and muscle flap transposition grafts are rarely required in complicated cases of empyema thoracis and bronchopleural fistulae (11-12). Video-assisted thoracoscopic surgery (VATS) is the procedure of choice, as it is equally effective but less invasive than drainage by thoracotomy in both adults and children, although in up to 20 % of the patients. VATS is inadequate and conversion to open thoracotomy drainage is necessary (13). VATS debridement and decortication is safe and effective treatment in the management of stage II and

stage III empyema thoracis (14). Patients with symptom durations of less than 4 weeks show better early results with VATS than those with symptom durations greater than 4 weeks. Thus, symptom duration can be considered a reliable preoperative factor in deciding the surgical management of empyema or cases involving loculated pleural effusion (15).

Conclusion

Empyema with broncho pleural fistula is very difficult to treat especially when complicated by pulmonary tuberculosis or post resectional. Early surgical intervention along with appropriate antibiotics and complete obliteration of dead space, is the corner stone of success.

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