Management of empyema thoracis in Tikur Anbessa Hospital: A Three-years Experience.

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Background: **Empyema thoracis may be localized or it may involve the entire pleural cavity and may be classified as acute or chronic. The aim of this study was to analyze the causes and outcome of management of 127 patients treated at Tikur Anbessa Hospital (TAH) in Addis Ababa, Ethiopia between January 1998 and January 2001.**
Methods: **Data was collected retrospectively from medical records to analyze the causes, clinical presentation and outcome of management of treatment of thoracic empyema in terms of postoperative morbidity and mortality.**
Results: **The majority (67%) of the patients were males. The age ranged from 14 to 78 years with a mean of 32 years and a peak in the 21-30 years age group. Cough and chest pain were the commonest symptoms while decreased air entry and dullness to percussion were the most common signs. Tuberculosis was the major cause accounting for 75 cases (59.1%). Closed chest drainage alone was done in 108 (85%) of cases. The duration of Hospital stay ranged from 1 to 132 days with a mean of 43.2 days. There were 29 hospital deaths (23.8% mortality rate). Thirteen of the deaths occurred in patients who had HIV/AIDS.**
Conclusion: **Early and complete drainage is the fundamental step in the management of all empyema, considering the increased morbidity and complications associated with delayed drainage of empyema.**

Introduction

The presence of infected fluid or frank pus in the pleural space is called thoracic empyema. In the majority of cases it is the result of the spread of infection from a contagious structure and may complicate the cause of bacterial pneumonia, sub diaphragmatic abscess, lung abscess or esophageal perforation. Thoracic empyema is a disease entity that has been recognized throughout recorded medical history. Hippocrates 2400 years ago described its diagnosis and recommended open drainage with rib resection but lack of practical surgical methods made successful treatment rare. It is Gorham and Bill of the United States Army's empyema commission that placed the treatment of this entity on rational natural basis in 1981[1]. Their observations of the natural history of empyema resulted in logical use of open and closed drainage.

Empyema thoracic has been divided into three phases based on its natural history. These phases are useful in the planning of treatment. The earliest phase is called the exudative stage and it is characterized by thin pleural fluid. Untreated, this phase rapidly progresses into a fibro-purulent stage characterized by thicker, more turbid fluid and the appearance of

fibrin on the pleural surface. The lung begins to be trapped by a restrictive fibrin membrane that becomes organized with ingrowths of capillaries and fibroblasts during the phase known as the chronic phase. Organization may begin as early as 10 days after the onset of disease.

The time course of these events varies with different offending agents and the immune status of the patients. However, by the fourth to sixth week the process has usually entered the chronic phase. The purpose of this study was to describe our experience in the management of thoracic empyema in TAH Department of Surgery, Addis Ababa University based on 127 cases seen between January 1998 and January 2001.

Patients and Methods

This was a retrospective descriptive analysis of 127 patients with thoracic empyema admitted to Tikur Anbessa Hospital, Department of Surgery over a 3-year period beginning January 1998. The medical records of these patients were reviewed and data was collected on age, gender, clinical presentation, chest X-ray findings, primary diagnosis, management, complications, duration of hospital stay and outcome of the treatment. No initial attempt was made to classify the patients into fibro-purulent or chronic stages of empyema.

During the period under review, 120 patients (85%) were initially subjected to closed chest tube drainage. Tube thoracotomy was removed when it was no longer draining and adequate lung re-expansion had been achieved as judged by clinical and chest X-ray findings.

Results

Between January 1998 and January 2001. 127 patients were admitted with empyema thoracis at Tikur Anbessa Hospital. Addis Ababa, Ethiopia. Their age ranged from 14 to 78 years with a mean of 32 years and a peak in the 21-30 years age group (Table 1). The male to female ratio was 2 to 1. The commonest presenting clinical features were cough with sputum, chest pain, decreased air entry and dullness to percussion (Tables 2 & 3).

The commonest cause of empyema thoracis was pulmonary tuberculosis. The diagnosis was made by a combination of clinical features, chest X-ray and favorable response to anti-TB therapy. Based on these, the cause of empyema was considered to be tuberculosis in 59.1% of the patients.

Empyema following pneumonia contributed 22% and penetrating chest trauma accounted for 4.7%

Table 1. Aged istribut ion iny ear s.

Age	No of pat ie nt s	%
11 -20	26	20. 5
21 -30	42	33. 5
31 -40	35	27. 6
41 -50	9	7.1
51 -60	7	5.5
61 -70	6	4.7
> 71	2	1.6
T ota l	12 7	10 0

Table 2. Sy mpto ms of emp ye m a tho ra cis .

Sy mpto ms	No of Pt s	%
C oug h	12 5	98. 4
S putu m	11 4	89. 8
C he st P a in	11 7	92. 1
S hort ne ss of b reath	98	77. 2
F ev er	77	60. 6
H ae m opt ysis	6	4.7

Table 3. Signs of empyema thoracis.

Signs	No of Pts	%
Dullness	93	73.2
Reduced tactile fremitus	81	63.8
Decreased air entry	111	87.4
Mediastinal shift	70	55.1
Coarse crepitations	31	24.4

Table 4. Chest X-ray findings.

Finding	No of Patients	%
Empyema	49	38.6
Effusion	44	34.6
Hydropneumothorax	17	17.4
Pyopneumothorax	14	11.0
Total	125	100

Table 5. Causes of empyema thoracis.

Cause	No	%
Pulmonary TB	75	59.1
Pneumonia	28	22
Chest trauma	6	4.7
Malignancies	5	3.9
Lung abscess	4	3.1
Broncho-pleural fistula	3	2.4
Iatrogenic	2	1.6
Post-pneumonectomy	2	1.6

Table 6. Treatment of empyema thoracis.

Treatment	No of pts	%
Tube thoracostomy alone	108	85.0
Decortications	9	7.1
Open chest drainage	3	2.4
Rib resection	3	2.4
Pleuropneumonectomy	2	1.6
None	2	1.6
Total	127	100

Table 7. Causes of Mortality in empyema thoracis

Diagnosis	No of pts	%
HIV/AIDS	13	10.2
Tuberculosis	5	3.9
Malignancies	4	3.1
Mediastinitis	2	1.6
DM and DKA	2	1.6
CHF, HPT, Br Asthma	1	0.8
Gas-forming infection	1	0.8
Pneumonia	1	0.8

Table 8. Hospital stay in days at TAA

Days	No of pts	%
< 10	17	13.4
11-20	10	7.9
21-30	23	18.1
31-40	20	15.7
41-50	10	7.9
51-60	19	15
>61	28	22

of the cases. Four (3.1%) of cases were due to ruptured lung abscess and 2 (1.6%) were iatrogenic including one that followed thoracocentesis for pleural effusion. In 1.6% of the cases the cause was not established (Table 5).

A total of 120 patients had an initial closed tube thoracostomy; 85% of who were cured of the disease and did not require any further surgical treatment. These patients were in retrospect considered to have had acute or sub-acute empyema thoracic. Nine (7.1%) underwent decortications because of failure to respond favourably to the initial tube thoracostomy. Three (2.4%) had rib resection and drainage. Open drainage (chest window) was done in 3 cases of empyema thoracic with loculations. Two patients whose lungs failed to re-expand fully underwent pleuropneumonectomy. Only five patients had a single antibiotic treatment compared to the 117 (92.1%) who had a combination of antibiotics.

Discussion

Most patients in our series were young. This corresponds with previous studies done by Lema et al[4]. Tuberculosis was the commonest cause, contribution 59.1% of the patients. This finding did not differ significantly with the 60% reported by Lema et al[3]. Pneumonia was the second most common cause. Prior to the introduction of sulfonamide drugs in the 1930's and the development of antibiotics in the 1940's pleural empyema was a relatively common complication of patients who survived an attack of pneumonia in reducing the incidence of post pneumonic empyema[5].

Early insertion of a chest tube during the acute and subacute phase of empyema thoracis or early fibro purulent phase is frequently curative[2]. A total of 85% of cases in this study had such and were cured.

In the late fibro purulent stage and in the chronic stage, the lung and chest wall become relatively fixed by a fibrous membrane making simple evacuation of the infected empyema material ineffective and therefore more aggressive surgical procedures are necessary. Often chest drainage by rib resection (chest window) is indicated when multiple loculations are present. Only 2.4% of the patients in this survey were treated with chest window and the results were good.

In other studies, large numbers of patients with thoracic empyema were treated by chest window method[2], which is in sharp contrast with our situation. This was most probably because our patients arrived to the hospital at the early sub-acute stage when closed drainage was still possible.

Formal decortications of the lung and parietal pleura are indicated in patients with a major portion of the lung entrapped. Postero-lateral thoracotomy through the 5th or 6th space provides exposure to all aspects of the pleural cavity and is the incision of choice[6]. The thick fibrous membrane is removed from the lung, diaphragm, mediastinum and pleural surface of the chest wall. Nine of our patients treated with decortications. Thoracoplasty[7,8,9] sometimes needed to obliterate the pleural cavity was not done in any of the patients under review.

It is worth noting therefore that in our series of 127 patients, all but 4 had an initial tube thoracostomy. Many of them recovered and in retrospect may be considered to have had acute or sub acute empyema thoracis. Those who were not cured by tube thoracostomy had most likely entered the chronic stage of empyema thoracis. The three cases with loculated empyema thoracis underwent open chest drainage (window). Those considered to have had un-expandable lung underwent decortications.

Conclusions

- In this study, the commonest cause of empyema thoracic was pulmonary tuberculosis followed by pneumonia.
- The principles of empyema management are the drainage of the pus, re-expansion of the lung, control of pleural space, and augmentation of host immune response by Antibiotic, nutrition and immune manipulations[11].
- Early and complete drainage is the fundamental step in the management of all empyema,considering the increased morbidity and complications associated with delayed drainage of empyema.
- Finally it is prudent to remember the adage *"The sun should never set on a parpnuemonic effusion"*[10].

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