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ORIGINAL ARTICLE

A STUDY ON TUBERCULOUS EMPYEMA THORACIS IN CHILDREN

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ABSTRACT: INTRODUCTION: Pleural decortication is surgical removal of the fibrous peel that covers the lungs in third stage empyema thoracis. Pleural biopsy, increased pleural fluid adenosine deaminase level are diagnostic of tuberculous pleuritis. Pleural decortication can be done in either intra pleural or extrapleural approach. We performed a study with the objective of comparing the clinical profiles and outcome of patients with tuberculous and non-tuberculous empyema thoracis who underwent open pleural decortication. **MATERIALS AND METHODS:** A study was conducted in the General Hospital during a period of 2 years. All the cases of empyema thoracis that underwent decortication were examined and pleural fluid analysis, pleural biopsy, physical examination, chest X-ray, CT-scan, Montoux test were done. Etiology of empyema was decided based on history, clinical examination and laboratory tests. **RESULTS:** In our study, non-tuberculous empyema was more frequent in infants and children below 6 years and tuberculous empyema was more frequent in 6-10 years. Among children with non-tuberculous empyema 28 children (42.42%) underwent intra pleural decortication and 38 children (57.57%) underwent extra pleural decortication. Among children with tuberculous empyema 2 children (25%) underwent extra pleural decortication and 6 children (75%) underwent intra pleural decortication. **DISCUSSION:** Non tuberculous empyemas required surgery (decortication) more often than tuberculous empyema and extrapleural approach of decortication was possible in slightly higher percentage of children with non tuberculous empyema compared to tuberculous empyema thoracis. Pulmonary tuberculosis probably had good response to antituberculous treatment for which they did not progress to organizing phase requiring surgery.

KEYWORDS: Tuberculous empyema, Decortication, Children.

INTRODUCTION: Empyema thoracis is an accumulation of pus in the pleural space. An empyema thoracis follows infection of the the pleural space and the structures surrounding the pleura, most commonly secondary to post-infectious pneumonia. Tuberculous empyema remains a common cause of empyema thoracis in a country like India. Tuberculous empyema differs from non-tuberculous empyema in the age profile, clinical presentation, management issues, and has a significantly poorer outcome.

Tuberculous empyema is a chronic, infection of the pleural space and a complication of pleuro-pulmonary TB.[1] Bacterial coinfection with tuberculous empyema has been reported in other studies. Tuberculous empyema is charactarized by spontaneous drainage phenomena (Bronchopleural-fistula [BPF]). The diagnosis of tuberculous empyema is suspected on computed tomography imaging by finding a thick calcified pleura and thickening surrounding loculated pleural fluid.[2]

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Chest computed tomography of tuberculous empyema shows enhanced parietal pleural peel. The extrapleural space seen as an intermediate attenuation in patients on CT shows the proliferation of vessels, inflammatory cells, and granulomas.[3]

The American thoracic society classified empyema into three phases:

1. The Exudative or acute phase.
2. Fibrin purulent or transitional phase.
3. The organizing phase or chronic phase.

Pleural biopsy for histology and culture is the mainstay of diagnosis with closed needle biopsy adequate in the majority of cases. Techniques such as PCR of biopsy specimens and the role of pleural fluid ADA are still being evaluated as a diagnostic aid.[4]

The demonstration that more than 50%, of the white blood cells in an exudative pleural effusion are small lymphocytes indicates that the patient probably has a Tuberculous pleural effusion. Pleural fluid from patients with exudative pleural effusions should be cultured for bacteria for aerobic, anaerobic bacteria, mycobacteria and fungi. The level of LDH in the pleural fluid is a good indicator of the degree of inflammation in the pleural space. Pleural fluid adenosine deaminase (ADA) level of >70 U/L is virtually diagnostic of tuberculous pleuritis while level <40 U/L virtually rules out this diagnosis.

All cases of simple empyema with thin pus and those cases of simple empyema with thick pus where size of empyema is small should be managed by aspiration.[5] Anti-TB drug treatment and intercostal drainage may be adequate in the management of Tuberculous empyema [6].However certain studies have proved that irrigation and aspiration alone have been of no apparent value in treating tuberculous empyema.[7] Drainage by surgical procedures, like decortication, decortication plus lobectomy are the preferred treatment to reduce the postoperative morbidity and for an early expansion of trapped lung. Decortication is surgical removal of fibrous peel that covers the lungs in third stage empyema. Pleural decortication can be done in either intra pleural or extrapleural approach.

Bacteriologic spectrum of empyema of nontuberculous etiology showed the prevalence of Staphylococcal aureus as the most common pathogen isolated. Other commonly identified organisms include Streptococcus pyogenes, Haemophilus influenzae, Mycoplasma pneumoniae, Pseudomonas aeruginosa, Escherichia coli and other streptococcus species.

Empyema of tuberculous etiology in adults is charecterised by hemoptysis, cavity in lungs, co-existing illness like diabetis, alcoholism, HIV etc. In chidren empyema of tuberculous etiology is usually characterised by lymphadenopathy, signs of malnutrition, precipitating viral illness like measles etc.

We performed a study with the objective of comparing the clinical profiles and outcome of patients with tuberculous and non tuberculous empyema, who underwent pleural decortication.

MATERIALS AND METHODS: A study was conducted in the General Hospital during a period of 2 years. All the cases of Empyema thoracis that underwent decortication were examined and pleural fluid analysis, pleural biopsy, physical examination, chest X-ray, CT-scan, Montoux test were done. Etiology of empyema was decided based on history, clinical examination and laboratory tests.

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Pleural fluid adenosine deaminase (ADA) level of >70 U/L was diagnostic of tuberculous pleuritis while level <40 U/L virtually ruled out this diagnosis. The pleural fluid pH, Cytology, White Cell Count and Differential Count, Lactic Acid Dehydrogenase, Amylase and glucose were analysed and were helpful in the diagnosis of Etiology of empyema.

RESULTS:

	Non-tuberculous empyema(n =66)	**Tuberculous empyema(n = 8)**
Intra pleural	28(42.42%)	2(25%)
Extrapleural	38(57.57%)	6(75%)

Table 1: Number of children treated by decortication

	Non-tuberculous empyema(n =66)	**Tuberculous empyema(n = 8)**
5 years	43	1
6-10 years	20	5
10 years	3	2
Total	66	8

Table 2: Age of children treated by decortication

	Number of patients	**Percentage of total**
Culture positive	13	19.69%
Gram stain positive & Culture negative	4	6.06%
Sterile	49	74.25%
Total	66	8

Table 3: Pleural fluid analysis in Non- tuberculous empyema

	Non-tuberculous empyema(n =66)	**Tuberculous empyema(n = 8)**
Fever	66(100%)	6(75%)
Dyspnea	62(93.93%)	7(87.5%)
Cough	57(86.36%)	6(75%)

Table 4: Comparison of clinical characteristics

Tuberculous empyema was more frequent in 6-10 years, compared to non-tuberculous empyema, which was more frequent in infants and children below 6 years. Among the 66 cases of the non-tuberculous empyema group, pleural fluid culture was positive in 13 cases (19.69%) only. Gram stain was positive but culture was negative in 4 cases (6.06%) and in the remaining 49 patients (74.25%) the pus was sterile, possibly because of prior antimicrobial drug treatment before the surgical treatment. Of the patients of tuberculous empyema 3 cases had chest X-ray evidence of active pulmonary tuberculosis in the form of focal consolidation and hilar lymphadenopathy.

Among children with non-tuberculous empyema 38 children (57.57%) underwent extrapleural decortication and 28 children (42.42%) underwent intra pleural decortication. Among children with tuberculous empyema 3 children (37.5%) underwent extrapleural decortication and 5 children (62.5%) underwent intra pleural decortication.

DISCUSSION: In our study Non-tuberculous empyema was more frequent in infants and children below 6 years and tuberculous empyema was more frequent in 6-10 years. History of fever, cough and respiratory distress was the main presentation. Pleural decortication was done in either intra pleural or extra pleural approach. Extra pleural approach of decortication was possible in slightly higher percentage of children with nontuberculous empyema. Pleural fluid smear for AFB was positive in 37.5% of tuberculous empyema, sputum/gastric aspirate smear was positive in 12.5% and sputum/gastric aspirate and pleural fluid smear for AFB were positive in 25 %. Mean duration of intercostal tube drainage prior to decortication was slightly higher in children with tuberculous empyema. Mean duration of postoperative ICD was higher in children with nontuberculous empyema.

Follow up of all children showed good outcome and there was no mortality. Comorbid conditions like febrile seizures were common with children with nontuberculous empyema, while children with tuberculous empyema had cervical, axillary and mesenteric lymphadenopathy. Pulmonary tuberculosis had good response to ATT and required a short hospital stay; this could be the reason for less number of cases going for decortication. The other modalities of treatment are intrapleural instillation of fibrinolytic agents, thoracoscopic decortication (VATS), but these methods are not of much use in third stage empyema.

Complications related to decortication were mainly severe postoperative pain, haemorrhage and prolonged alveolar air leaks which can be significantly brought down if decortication is done early as soon as third stage empyema is confirmed. Fibrinolytic therapy and thoracoscopic decortication should be considered in early stages of empyema.

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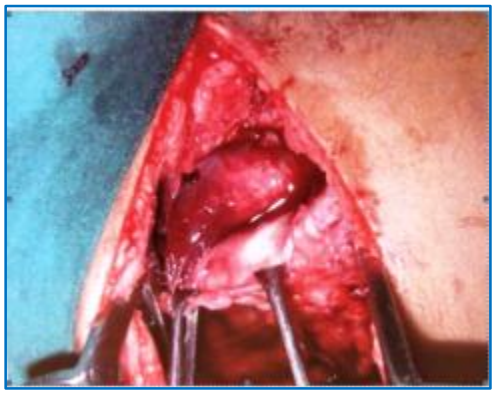

Fig. 1: Extra pleural decortication

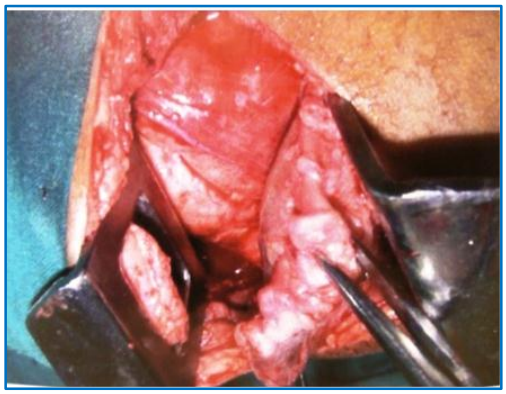

Fig. 2: Underlying healthy lung parenchyma

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