

Management of Paediatric Empyema Thoracis: Study At Tertiary Care Hospital, Guntur.

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Abstract

Introduction: Empyema thoracis can produce significant morbidity in children if inadequately treated^[1,2]. Correct evaluation of the stage of the disease, the clinical condition of the child and proper assessment of the response to conservative treatment is crucial in deciding the mode of further surgical intervention.

Material & Methods: The present hospital based observational study was conducted in the Department of Cardiovascular and Thoracic Surgery, Government General Hospital, Guntur Medical College, Guntur. Study period was from August 2017 to May 2022. chest x-ray and axial non contrast computerized tomography (CT) were done in all the patients. All the patients underwent thoracoscopic decortication.

Results: Analysed our experience with thoracoscopic decortication in the management of empyema thoracis in children.

Total number of patients with paediatric empyema thoracis during the study period were 56. Out of whom, 36 were males and 20 females with mean age being 5.6±5.08 years. Surgical procedure was done under general anaesthesia and Minimally invasive thoracoscopic decortication. All patients had lung expansion on discharge chest x-ray. The mean number of days of hospital stay was 4.8±0.8 days with no hospital mortality.

Conclusions: Decortication appears to be a useful definitive treatment for children with empyema thoracis in developing countries^[5,6]

Keywords: empyema thoracis, decortication, thoracoscopy.

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I. Introduction:

Empyema thoracis is a common surgical complication of pneumonia. It is an important cause of paediatric hospital admissions and paediatric morbidity. Various modes of treatment are described for the management of this condition.^[1,7] **Management of Pediatric empyema remains controversial.** Thoracic empyema continues to have a high mortality rate (10-16%)¹. It occurs when bacteria invade and propagate in the normally sterile pleural space, and progresses in three phases. The exudative phase is caused by increased permeability of the inflamed pleura. The fibrinopurulent phase is characterized by accelerated fibrin deposition, giving rise to loculations and pus formation.^[5,8] The organizational phase begins one week after infection and is characterized by multiloculated empyema and pleural peel, with subsequent lung entrapment. The predominant organisms involved are polymicrobial & monomicrobial. Various treatments have been employed, including antibiotics, thoracocentesis, tube thoracostomy, intrapleural fibrinolytics, open-window thoracostomy, video-

assisted thoracoscopic surgery, and open decortication. The current mode of therapy in our institution is thoracoscopic decortication and prognosis is excellent.

II. Methodology:

All the cases of empyema thoracis admitted in the Department of cardiovascular & thoracic surgery, from August 2017 to may 2022. Were included in this prospective study. Consecutive sampling technique was used to select 36 cases (n=20 male, n=16 female). Children of age 12 years and below having empyema thoracis were included. Diagnosis was established on the basis of history, examination and investigations including x-ray chest Ultrasound chest Computed Tomography (CT) chest, with any of the two findings taken as significant (lung collapse with pleural effusion, multiloculated fluid collections, shift of mediastinal structures). Patients with associated lung disease like tuberculosis, lung abscess and malignancy etc. and patients with previous chest surgery were excluded. The demographic characteristics of study population were noted. Parents were informed about the objectives and informed written consent taken. Fibropurulent fluid or fibrous peel of infected material along with parietal pleura was separated through posterolateral approach followed by insertion of chest tube.

Functional outcome was measured after the intervention and was labeled positive if lung re-expansion found to be 50% from the base line.

Pleural fluid analysis
Gram staining aerobic and anaerobic and culture and sensitivity
pH and glucose determination
protein content
cell count
cytology
Acid fast bacillus
AFB culture

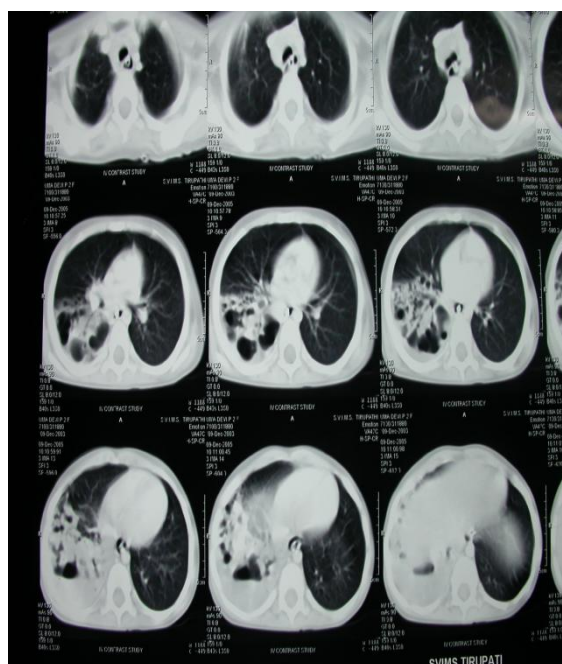


Figure 1: Chest x-ray with exudative, fibropurulent, organising stages

Data was analyzed using the computer software SPSS version 11. Descriptive statistics were used to calculate mean and standard deviation for the variable like hospital stay. Frequency was calculated for lung re-expansion.

III. Results:

Of 36 patients 11 (47.8%) aged 1 - 5 years and 25 (41.3%) were 6 - 12 years of age. All presented with complaints of cough, fever and breathlessness of duration ranging from 2-12 weeks. 18 (50%) children had history of pneumonia and treatment prior to development of empyema was right-sided in 25 (76.1%) and left-sided in 11 (23.9%). All were treated with tube thoracostomy, systemic antibiotics and other supportive

measures for a duration ranging from 1-2 weeks. . Most commonly isolated bacteria were Pseudomonas (n = 12) and Staphylococcus aureus (n = 7), polymicrobial infection (11), monomicrobial infection was evident in (6).

<i>Characteristic</i>	<i>Number</i>
Total no. of patients	36
Sex distribution	
Male	20
Female	16
Mean age (years)	11.6±11.08
cough	2-12 weeks
fever	2 weeks
breathlessness	2-12 weeks
pneumonia	18

Table 1: Demographic and clinical characteristics

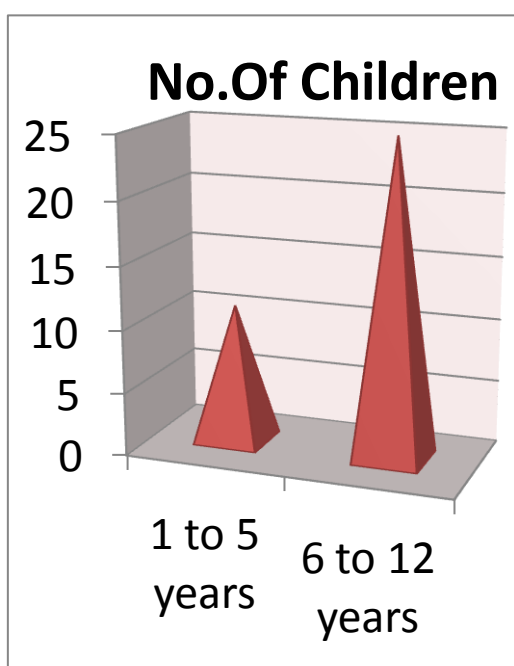


Figure 2: Distribution of children as per age

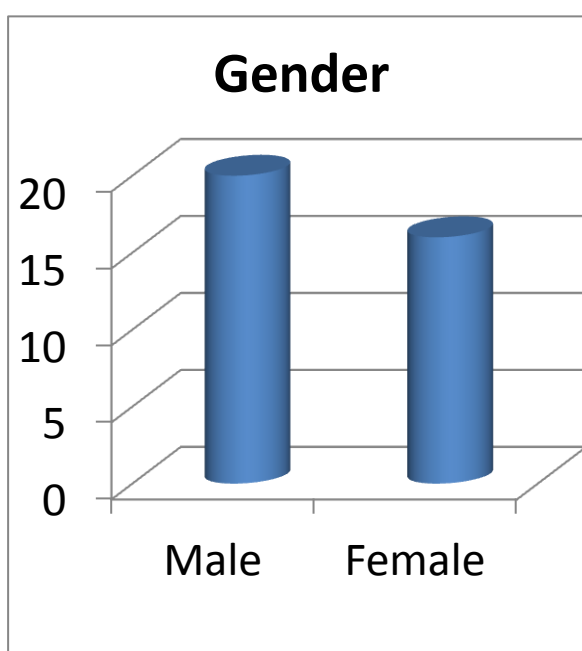


Figure 3: Gender distribution

Table 2: Characteristics of pneumonia

<i>Characteristic</i>	<i>Number</i>
Site	
right sided	25
left sided	11
Type of bacteria	
Pseudomonas	12
Staphylococcus aureus	7
Polymicrobial	11
Non microbial	6
Chest x-ray findings	
lung collapse with pleural effusion,	22
multiloculated fluid collections,	11
shift of mediastinal structures	3
Discharge chest x-ray	
Lung reexpansion	36



Figure 4: 11 year old male with empyema thoracis right sided



Figure 5: After tube thoracostomy



Figure 6: After thoroscopic decortication



Figure 7: A 6 years old male with left multiloculated empyema thoracis underwent thoracoscopic decortication. Histopathological examination revealed suppurative pleurisy.

Outcome:

No post-operative complications were observed among the patients. With regards to hospital stay, the mean number of days of hospital stay was 10.8 ± 0.8 days with no hospital mortality.

IV. Discussion:

Bacterial pneumonia is the most common cause of thoracic empyema in the paediatric age group. Pleural effusion during the course of nonspecific bacterial pneumonia progresses to empyema for several reasons including malnutrition, immunodeficiency, irregular antibiotic treatment, delay in diagnosis of pneumonia, contamination during thoracentesis, the tendency for antibiotic treatment in the acute phase in paediatric clinics, and disappearance of the signs and symptoms of pneumonia. There are many treatment options but unfortunately results with these treatment regimens have been highly variable.^[9,10] As a result, the optimum therapeutic strategy for empyema has yet to be elucidated. Moreover, the availability of non-operative alternatives frequently results in delayed surgical consultation, and ultimately, increased patient morbidity and mortality. Determination of the stage of the empyema has been reported to be crucial in choosing an appropriate therapeutic option. Duration of symptoms has been suggested as one of the means of estimating the stage of the empyema.

The presence of a thick rind with trapped lung are indications for operation and decortication.^[8,11,14] The inability to evacuate fibrinous debris via chest tube is also an indication for decortication. Decortication should be performed as soon as possible if drainage is not effective. It may be an initial treatment instead of wasting time by performing tube thoracostomy. When the patient's status is suitable for surgery, we recommend this approach because of the decrease in mortality and morbidity, reduction of hospital stay, and discharge of the patient without an open wound. Postoperative complications such as atelectasis and delayed expansion are mainly from parenchymal disease.

V. Conclusion:

Early decortication gives better results in terms of lung re-expansion and hospital stay. There was no mortality amongst above treated children. Majority of children with empyema thoracis are manageable with tube thoracostomy, antibiotics, physiotherapy and other supportive treatment. Few of them who fail to above measures need more aggressive management

References:

- [1]. Anstadt MP, Guill CK, Ferguson ER, Gordon HS, Soltero ER, Beall AC Jr, et al. Surgical versus nonsurgical treatment of empyema thoracis: an outcomes analysis. *Am J Med Sci* 2003; 326:9–14.
- [2]. Tareen S, Aman R, Hussain S, Masoom A, Zaman M, Massod MK. Bacteriology of acute thoracic empyema in a tertiary care hospital. *Int J Pathol* 2007; 5:72–6. **le II: Lu**
- [3]. Muzaffar MS, Rashid A, Majeed FA. Role of video assisted thoracoscopy in management of empyema thoracis. *Pak Armed Forces. Med J* 2004; 54:25–31.
- [4]. Shankar KR, Kenny SE, Okoye BO, Carty HM, Lloyd DA, Losty PD. Evolving experience in the management of empyema thoracis. *Acta Paediatr* 2000; 89:417–20.
- [5]. Meier AH, Smith B, Raghavan A, Moss RL, Harrison M, Skarsgard E. Rational treatment of empyema in children. *Arch Surg* 2000; 135:907–12.
- [6]. King S, Thomson A. Radiological perspectives in empyema. *Br Med Bull* 2002; 61:203–14.

- [7]. Khan MY, Javaid A, Ziaullah, Shah MK. Pleural biopsy in empyema thoracis patients: is it a useful diagnostic tool. *J Postgrad Med Inst* 2004; 18:210-3.
- [8]. Cekirdekci A, Köksel O, Göncü T, Burma O, Rahman A, Uyar IS, et al. Management of parapneumonic empyema in children. *Asian Cardiovasc Thorac Ann* 2000; 8:137-40.
- [9]. Cham CW, Haq SM, Rahamim J. Empyema thoracis: a problem with late referral. *Thorax* 1993; 48:925-7.
- [10]. Light RW. Management of parapneumonic effusions. *Chest* 1991; 100:892-3.
- [11]. Solak H, Yüksek T, Solak N. Methods of treatment of childhood empyema in a Turkish University Hospital. *Chest* 1987; 92:517-9.
- [12]. Lewis KY, Bukstein DA. Parapneumonic empyema in children: diagnosis and management. *Am Fam Physician* 1992; 46:1443-55.
- [13]. Robinson LA, Moulton AL, Fleming WH, Alonso A, Galbraith A. Intrapleural fibrinolytic treatment of multiloculated thoracic empyemas. *Ann Thorac Surg* 1994; 57:803-14.
- [14]. LeMense GP, Strange C, Sahn SA. Empyema thoracis: Therapeutic management and outcome. *Chest* 1995; 107:1532-7.
- [15]. Tillett WS, Sherry S, Read CT. The use of streptokinase-streptodornase in the treatment of chronic empyema. *J Thorac Surg* 1951; 21:325-41.
- [16]. Jerges-Sanchez C, Ramirez-Rivera A, Elizalde JJ, Delgado R, Cicero R, Ibarra-Perez C, et al. Intrapleural fibrinolysis with streptokinase as an adjunctive treatment in hemothorax and empyema. A multicenter trial. *Chest* 1996; 109:1514-9.
- [17]. Temes RT, Follis F, Kessler RM, Pett SB Jr, Wernly JA. Intrapleural fibrinolytics in management of empyema thoracis. *Chest* 1996; 110:102-6.
- [18]. Brohi AR, Akhtar J, Ahmed S, Aziz A. Empyema thoracis in children: Results of tube thoracostomy and decortication. *J Coll Physicians Surg Pak* 2001; 11:324-7.

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