



## A STUDY OF EMPYEMA THORACIS IN CHILDREN

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**ABSTRACT** This study comprises of 27 children with empyema thoracis. Boys were more commonly affected with younger age i.e median age of 3years 2months.Fever and cough was noted in all children. The commonest organism isolated was Staph aureus. Depending up on clinicoradiological features, all children received CTD with antibiotics, Primary VATS or secondary VATS .There was a radiological clearance in 6 cases and pleural thickening in 6 cases at 6 weeks post discharge follow up.

**KEYWORDS** :Chest tube drainage , empyema thoracis, VATS, child, pus

Empyema is accumulation of pus in pleural space. It is most often associated with pneumonia caused by Streptococcus pneumonia, although Staphylococcus aureus is most common in developing nations and Asia. Group A Streptococcus, Gram negative organism, tuberculosis and fungi are less common causes. It occurs in 5-10% of children with bacterial pneumonia and in up to 86% of children with necrotizing pneumonia.<sup>[1]</sup>In addition to antibiotics, the pus has to be drained from the pleural space either by chest tube thoracostomy (CTD) or by thoracotomy ; the former is the usual first step. The surgical procedures like VATS and thoracoscopic surgery employed in case of septations and loculations. Other modes of treatment involves use of thrombolytics such as Urokinase or Streptokinases to facilitate the drainage of pus even in presence of septations/loculations.

The present study is done to know the outcome of empyema thoracis in children our setting with various modality of treatment.

#### Methods

The study was conducted prospectively in Paediatrics department at our institution between 1Jan 2017 to 31 Dec 2017. The study included all children of age more than 30 days old and less 14 years with clinical ,radiological and laboratorial diagnosis of empyema thoracis. Post surgical and post trauma cases with empyema were excluded .The Institutional ethical committee had approved the study.

A detailed history with emphasis on recent skin infection or exanthema were recorded on proporma. All children with empyema thoracis undergone investigations like complete hemogram, ESR, blood as well pus culture, Pleural fluid Gram stain, AFB stain, PH, LDH , cell count, Protein and sugar and periodic Chest X rays. Selected cases undergone USG chest and CT thorax. At admission, all children received empirically parental Vancomycin and Ceftriaxone antibiotics with supportive therapy. Antibiotics were changed based on clinical progress and radiological features and culture reports subsequently. The duration of antibiotics were minimum of 4 weeks and wherever possible extended to 6 weeks. The decision to use Primary VATS and secondary VATS was based on radiological evidence of septae/loculations in former and Non improvement on clinical signs, persistent of fever and or prolonged drainage (30ml>/day for 2 days)in later after few days of Chest tube drainage in case of later.

All patients were discharged after confirming good lung expansion and absence of fever. The patients were followed up at 6 weeks of post discharge for lung expansion and chest wall deformity.

#### Results

The study period recorded 27 children with empyema thoracis with median age of 3 years 2months.Among them 18 were and 9 were girls. 20 children (74%) belonged to low socioeconomic group with 21 children (77%) were malnourished. Out of which 7 were severe malnourished. Fever and cough noted in all patients and hurried breathing in 20 children(74%).Right side of chest involved in 19 children and left side empyema in 8 children. The patients presented to hospital with a mean duration of 11 days since the onset of symptoms. The pleural fluid/pus analysis revealed no growth on culture in 15 children(55%),Gram positive cocci in 7 children(25%) and positive

pus culture in 5 children(18.5%). Pus culture showed Staphylococcus Aureus in 4 cases and 1 case of Streptococcus pneumonia. They were sensitive to Vancomycin in former and Ceftriaxone in later respectively. Measle was diagnosed earlier to symptoms in one child, pyoderma in two children and ear discharge in one case.

**Table 1 -Treatment of empyema thoracis**

Modality of treatment	No of cases (%)
CTD +Antibiotics	10 (37)
PRIM VATS	9(33.3)
CTD+Antibiotics+ secondary VATS	6(22.2)
CTD+Antibiotics+Thoracotomy with decortication	2(7.4)
Total	27(100)

CTD- Chest tube drainage , VATS – video assisted thoracotomy, PRIM- primary .

Chest tube drainage with antibiotic salone were used in 10 cases(37%) followed by primary VATS in 9 cases(33.3%). 2 cases undergone in addition, thoracotomy and decortications(7.4%).The duration of chest tube was less than 7 days in majority 13(48.1%) and mere 3 cases(11%) required tube for more than 30 days. We had lost 7 cases during follow up however 20 cases were regular to follow up till 6 weeks post discharge. At six week follow up, complete radiological resolution was found in 6 cases(30%), pleural thickening in 6 cases (30%) and overcrowding of ribs in 8 cases(40%).

**Table 2-Duration of treatment**

Duration of CTD(D)	No of Days (%)
< 7	13(48.14)
8-29	11(40.3)
>30	3(11.1)
Hospital stay in days (D)	
<14	11(40.3)
14-30	10(37.7)
>30	6(22.2)

#### Discussion

Our study showed emyema thoracis was more common in younger children and malnourished children. The results were similar to the study carried out by Kumar A et al<sup>[2]</sup> and Srinivas<sup>[3]</sup>. Boys were more commonly suffered than girl children. All patients at presentation had fever and cough which was similar to other studies.<sup>[2,3]</sup>We could isolate causative organism from pus culture in only 5 cases .The reason for poor culture yield was due to prior antibiotics use in such children. Staphylococcus aureus is common organism causing empyema in our study which reflects epidemiology of empyema in developing nations and Asian countries. Our study revealed nearly one third of cases improved with CTD and Antibiotics alone followed by Primary VATS and secondary VATS. Similar results were showed by Narayanappa D et al from their study<sup>[4]</sup> The finding are similar to other studies.<sup>[2,3]</sup>the duaration of chest tube drainage was between 8-29 days in 11

children(40.3%) ,more than 30 days for 3 children (11.1%) as compared to 5 (20%) and 3(12%) by Kumar A et al.<sup>[2]</sup>.

Our study sample size was too small to suggest Primary VATS and secondary VATS or CTD with antibiotics alone were better for the management. There are various suggestions on using VATS alone , Use of thrombolytics like Urokinase vs VATS<sup>[5]</sup> and VATs followed by failure of treatment or development of organized empyema.<sup>[6,7]</sup>

VATS is expensive, requires an operation theatre setting and expertise with advantage of reducing hospital stay , better lung expansion. Thrombolytics like Urokinase, Streptokinase usage is less expensive, allows gradual debridement and healing but exact dosages were not yet defined, their utility depends upon the viscosity of fibropurulent exudates and small risk of anaphylaxis.

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