



OUTCOME OF CHILDREN WITH EMPYEMA THORACIS

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ABSTRACT Introduction: Empyema thoracis is a common condition in children and causes significant mortality and morbidity and pose a therapeutic challenge to clinicians. Aim and objective: A study was undertaken to analyze the demography of empyema cases and evaluate the efficacy of management like chest tube drainage, antibiotics and VATS and compare the outcome. Material and Methods: A cross-sectional retrospective study of empyema cases admitted to SKN Medical College Pune wef. June 2013 to Dec 2016 was carried out. Neonates and other secondary causes of empyema were excluded from the study. Routine investigations, chest X-ray, USG, pleural fluid analysis, CT & MRI scan of chest were done. Cases were managed with IV fluids, antibiotics, blood transfusion, ICD and VATS where required. Result: Fifty cases of empyema were recorded. The children were in the age group from 9 months to 10 years. The mean age of the total study group was 3 years. Majority of the children i.e. 76% (n=29) were below 5 years of age. Male to female ratio was 1.7:1. Majority of cases 41 (82%) were weighing below 3rd percentile of expected norms. Common presentation were cough (100%), fever (92%), dyspnea (88%), and chest pain (26%). Majority of the cases received antibiotics before admission to this hospital. Pleural fluid cultures isolate only in 13 (26%) and commonest organism was staphylococcus aureus. Right sided empyema detected in 26 (52%), left sided 19 (38%) and bilateral 5 (10%). All were anemic and in 21 (42%) Hb% were below 7 gm%. Seven (14%) cases managed with antibiotics alone, CTD- 14 (28%) and VATS- 29 (58%). Average duration of hospital stay 16.3 days, cases without tube 9 days, with CTD- 16 days and VATS- 19.6 days. Average duration of ICD in CTD alone was 9.5 days and in VATS was 8.5 days. All cases recovered and no deaths reported and of thickened pleura were detected in majority of cases. Conclusion: Empyema always pose therapeutic challenge but if diagnosed early and treated appropriately is always rewarding. VAT surgery is safe and beneficial.

KEYWORDS :

Introduction:

The incidence of empyema is increasing worldwide causing significant childhood morbidity with an estimated 0.6% of childhood pneumonia progressing to empyema.^{1, 2, 3} Empyema thoracis constitutes approximately 5-10% of cases seen by pediatrician in India.^{4,5} Acute respiratory infections are the most common illness of childhood accounting 50% of all illness in under-fives, largely involving upper respiratory. However 5% involve lower respiratory.⁶ 40% of bacterial pneumonia are said to be complicated by parapneumonic effusions, 10% of whom evolve into empyema. Possible reason for this include delay in initiating treatment, prolonged oral treatment in community with antibiotics, inadequate drug level in pleural space and delayed presentation.⁷ It is a significant cause of pediatric hospital admissions and morbidity of developing countries where hospital resources are scarce.^{8, 9, 10} Effusion occur in at least 40% with bacterial pneumonia with up to 60% of effusions resulting in formation of empyema in all age groups.^{11,12} The American Thoracic Society describes empyema in three stages namely, exudative, fibrinopurulent and organized.¹² Therapy depends upon the stage of presentation. Staphylococcus aureus is the most common cause in developing nations.^{13,14,15} however pleural fluid is sterile due to widespread early use of antibiotics.^{16,17} the aim of therapy is rapid recovery with long term normal pulmonary outcome. Medical therapy includes antibiotics with chest tube drainage. Surgical intervention in the form of VATS (Video Assisted Thoracoscopic Surgery) has been reported.

Aim and objective:

To study clinical profile and outcome of children with empyema.

Material and methods:

This was a cross-sectional retrospective study of all the empyema cases admitted to Paediatric ward and PICU of SKN Medical College, Pune during June 2013 to December 2016. Neonates and other secondary cases of empyema were excluded. In all cases, investigations like hemogram, total leucocyte count, differential count, ESR, chest radiography, pleural fluid analysis, culture and blood culture were done. USG chest and CT scan thorax were done in cases with clinical and radiological suspicion of multiloculation or non-improvement following therapy. In all cases except multiloculated empyema, chest tube insertion was done with intravenous antibiotics and other supportive treatment like intravenous fluids, antipyretics were used. VATS (video-assisted thoracoscopic surgery) was done in cases with multiloculations, bronchopleural fistula or in cases with non-improvement after previous treatment with chest tube insertion.

All patients were discharged after clinical recovery and completion of intravenous antibiotic course. At each follow up, patients were assessed clinically and chest radiography was done whenever required. Data was analyzed and results were obtained.

Results:

Total 50 cases were included in the study. The children were in the age group from 9 months to 10 years. The mean age of the total study group was 3 years. Majority of the children i.e. 76% (n=29) were below 5 years of age. 24% (n=12) were in group of more than 5 years and 18% (n=9) were in less than 1 year group. Male preponderance was noted with 64% (n=32) males and 36% (n=18) females. Male to female ratio was 1.7:1. Majority of cases 82% (n=41) were malnourished according to IAP classification of malnutrition. All patients included in the study group were anemic. In 42% (n=21), cases had a Hemoglobin of less than 7gm%. Common symptoms of presentation were cough 100% (n=50), fever 92% (n=46), Dyspnea 88% (n=44) and chest pain in 26% (n=13) cases. Right sided empyema was seen in 52% (n=26). Left sided empyema was seen 38% (n=19) cases. Bilateral in 10% (n=5). Pleural fluid cultures were positive in 26% (n=13) cases. Staphylococcus aureus was the most common organism isolated from the pleural fluid. 7 cases (14%) were managed on antibiotics alone. Chest tube insertion was done in 14 cases (28%) and VATS was done for 29 cases (58%). Average duration of the chest tube drainage alone was 9.6 days. Average duration of ICD in CTD alone was 9.5 days and in VATS surgery was 8.5 days. Average duration of the hospital stay was 16.3 days. Cases without chest tube had a stay of 9 days, with chest tube drainage was 16 days and with VATS was 19.6 days. There were no deaths noted. Majority of the patients had complications of thickened pleura and bronchopleural fistula.

Discussion:

Among the 50 patients, majority i.e. 76% cases were younger than 5 years of age. This is similar to a study by Saleem AF et al,¹⁸ Kumar et al¹⁹ and Dass R¹⁵ et al. The mean age of presentation was 3 years in our study and a study by Kumar et al¹⁹ as compared the mean age was 4.74 ± 3.53 years in a study by Dass R.¹⁵

Male preponderance was consistent with similar other studies^{14,15,19,20,21} In our study 82% of the children were malnourished as per IAP classification. This is similar to 80% of children being malnourished in a study by Narendra Laishram.²² A higher incidence of empyema has been reported in undernourished children.^{23,24}

All the patients of study group were anemic. This is similar to a study by Ghosh S et al.²⁴

Cough, fever and breathlessness were the most common manifestations found at admission similar to many other studies.^{15, 19,20,21,25}

In our study and many other studies right pleura is more commonly affected than left pleura.^{26,27} In our study right sided pleura was mainly involved due to right main stem bronchus is more vertical and in direct line with trachea than in the left.

Pleural fluid cultures were positive for 26% cases which was also seen in other similar studies.^{15, 22, 23, 26} Most common organism isolated was staphylococcus aureus which is comparable to previous studies from other developing countries.^{15,20,21,22,26,28,29}

Majority of the children i.e. 58% required surgical intervention (n=29) in form of VATS. This was also seen in a study by Saleem AF.¹⁸

Fourteen cases (28%) responded to a combination of antibiotics and ICD. This was seen in a study by Ramireddy et al.²⁶

The median duration of chest tube drainage was 9.6 days and was similar to that reported in the literature.^{15,30,31,32}

The median duration of hospital stay was comparable to other studies on conservative management.^{15,31,33} Previous studies suggest a success rate of 61-100% with chest tube drainage and antibiotics.^{34,35,36} The stay was prolonged in surgically treated patients as seen in our study and a study by Saleem AF.¹⁸

In the treated patients of empyema thoracis, thickened pleura was the commonest complication. There was no case fatality in this study. This outcome is similar to other studies done where 100% is the survival.³⁷

Conclusion:

From the study we conclude that, incidence of empyema thoracis in pediatrics is more common in under 5 children with male preponderance and malnourished children. Right sided empyema is more common. Staphylococcus aureus is the most prevalent etiological agent. The successful management of empyema thoracis lies in intravenous antibiotics and intercostal tube drainage and surgical intervention when needed.

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