Original article:

Study of clinical profile, etiological bacterial agents and outcome in pediatric patients of empyema

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Abstract:

Introduction: Our aim was to study clinical profile, etiological agents and outcome in Pediatric Patients of empyema.

Methodology: Patients of both sexes age d 0-12 years having empyema thoracis were included in the study. After history taking complete examination, routine and specific investigating wasdone. The pleural fluid was studied for gram straining, microscopy, cytology, pleural culture and antibiotic sensitive pattern.All patients were treated with intercostals drainage and antibiotic therapy. Complications were recorded.

Result: Maximum patients (52.33%) were seen in age group of 1-5 years. Most common symptom was fever and breathless (94.02%), staphylococcus aureus (45.45%) was the commonest organism isolated from plural fluid culture. Pyopneumothorax (34.49%) was the commonest complication seen in these patients and majority (98.50%) patients survived

Conclusion: In these studied patients of empyema thoracis commonest age group affected was 1-5 years. Staphylococcus aureus was the commonest organism isolated in pleural fluid culture from patient's ofempyema thoracis.

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]. Possible reason for this include delay in initiating treatment, prolonged oral treatment in the community with antibiotics, inadequate drug level in pleural space and delayed hospital presentation; or unusual causal organisam[4] . Empyema thoracis constitutes approximately 5-10% of cases seen by paediatrician in India[3,5]. Pleural effusion and empyema are known complications of bacterial pneumonia[6].

Thoracis empyema continues to have mortality rate of 5-7%[7, 8]. The prognosis in children with empyema is usually very good[7, 8]. The increasing incidence, associated morbidity, consumption of scarce hospital resources, and controversial optimal management of the disease makes empyema a complex issue. The present study was aimed at studying the clinical profile of empyema in pediatric age group; the various microbiological agents responsible for empyema and their antibiotic sensitivity pattern and the outcome of pediatric empyema patients[9].

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Material and methods:

The study was conducted during 2011-2012 in dept of pediatrics, tertiary care centre. 67 patients of both sexes aged 0-12 years having emyema thoracis (i.e. pleural tap showing pus cells under microscopy or on gross examination purulent exudates or materials) were included in this study children with empyema secondary to post surgical cause or post traumatic cause were excluded from the study.

After admission, details history was taken regarding complaints, predisposing factors, and immunization history and communications. General and systemic examination done Routine and specific investigation were done. These include hemoglobin estimation, total leucocyte count, differential count, ESR, HIV. Other investigation includes chest x-ray, USG and pleural tap pleural fluid was studied for gram staining, microscopy cytology biochemical analysis including protein estimation, pleural culture and antibiotic sensitivity pattern.Intercostals drainage with tube throacostomy was performed in all patients of empyema throacis (Romson's chest drainage catheter or any other appropriate catheter). All patients were treated with antibiotics as per culture and antibiotic sensitivity reports. Contrast and non contrast computed tomography was done when needed. The patient requiring long hospitalization stay and who did not respond to conventional antibiotics and tube thoracostomy or developing complication or those not showing radiological signs of lung expansion were referred to the pediatric surgeon for thoracoscopic decortications or VATS.

All patients were studied for complications during hospital study. The complication were recorded, reviewed and treated with treatment modalities like VATS and decortications surgery after full treatment, these patients were discharged.

Results:

The general characteristics feature of these patients of empyema throcis were shown in table 1.

Commonest age group affected was 1-5 years (52.23%) and male outnumbers female (Ration 1.09:1). Certain predisposing factors are studied like measles, bronchopneumonia, HIV etc. Bronch-oneumonia was found to be the commonest of these. (63-63%) majority of patients was of grade II (35.82%) (as per IAP classification) followed by grade Ill and Grade IV i.e. 25.37% and 5.97% respectively.

The results of study of empyema thoracis in the patients were shown in Table II. The commonest symptomin these patients was fever (94.02%) and breathlessness (94.02%) followed by cough (85.07%). Out of total 64 patients studies 44 patients (65.67%) were positive for pleural fluid culture and 23 patients (34.33%) were negative. On analysis of organisms detected in pleural fluid by culture commonest organism found was staphylococcus aureus (45.45%) followed by streptococcus pneumonia (22.74%) and pseudomonasacrogenous (18.18%). As shown in Fig.1. On admission, the commonest complication associated in these patients was pyopneumothorax (34.49%) as shown in fig 2.

The associated complication after start of treatment were improperposition (11.94%), thickened pleura (35.82%), accidental removal (17.91), bronchopleural fistula (20.89%), pneumothorax (4.47%) and subcutaneous emphysema (7.46%). Majority patients 64 (95.53%) responded to antibiotics and intercostals drainage. 2 patients required docortication and 1 required VATS (Video assisted thoracoscoic surgery). In outcome, majority of the patients i.e. (98.50%) survived, and only 1 patient died due to septic shock.

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Discussion:

The age of presentation and male preponderance was similar many studies e.g. Barnwell et al (2003)[10]. Out of many predisposing factors studied, bronchopneumonia found to be commonest as in other studies done by Eastham et al (2004)[11] and Mangete et all (1993)[12]. Fever and breathlesness was the commonest symptom found similar to many other studies like Fang Liang Huang et all (2002)[13].

In the present study, pleural fluidsamples were positive for GM positive organism in 44.78% cases and positive for GM negative organisms by staining in 20.89% while 34.34% were negative. The sterile samples might be due to previous antibiotics patients has received or lack of better facility for culturing fastidious organism like anaerobes, mycobacteria and viruses. Staphylococcas aureus was the commonest organism detected onpleuralfluid culture. In many studies, like Rodriguezet al (2006)[14] and Baranewal et al (2003), similar organism was detected. In study done by Fang Liang Huang et al (2002), commonest organism isolated was streptococcuspneumoniae. This is similar to many patients of empyema thoracis of western countries might be due to absence of this serotype in the pneumococcal vaccines available there. Most of our patients responded successfully to amoxicillin-clavulinic acid and cefotaxime therapy as in other studies[15]. The choice of antibiotics was governed by the sensitivity pattern prevalent in that particular region of he world and availability of the drugs. Associated complications on admission were studied and pyopneumothrax was the commonest associated with emyema throacis, followed by pneumothorax. In treated patients of emphyema thoracis, thickenedpleura were the commonest complication followed by bronchopleural fistula. This bronchopleural fistula gets corrected in many of patients without any specific treatment if it is of minor nature[16]. Intercostal drainage and antibiotic therapy is the mainstay treatment of empyema thoracis. Complicated patients need other treatment modalities like VATS and Docortication surgery[17].Majority of patients have responded to antibiotics and intercostals drainage and 2 patients required decortication and 1 requiring VATS. These treatment outputs were similar to other studies done by Satpathy et al (2005)[18] and Byingtone et al (2002)[19].

In the present study, majority of at patients survived and only 1 patient died due to septic shock. This outcome is parallel like many studies e.g. Avansion et al (2005)[20] were 100% is the survival. Proper line of management survives majority of these patents. Many of these patients have lost follow up, so we could not do that.

TABLE .1 SHOWING GENERAL CHARACTERISTICS OF PATIENTS OF EMPYEMA THORECIS

CHARACTERISTICS	NO.OF PATIENTS	PERCENTAGE %
AGE DISTRIBUTION		
0-1 YR	07	10.44%
1-5 YR	35	52.23%
6-12 YR	25	37.33%
SEX DISTRIBUTION		
Male	35	52.23%
Female	32	47.77%
PREDISPOSING FACTORS		
Measles	01	3.03%
Chickenpox	02	6.0%
Bronchopneumonia	21	63.63%
HIV	02	6.06%
Impetigo & Other Skin Lesions	07	21.22%
NUTRITIONAL STATUS		
No Malnutrition	13	19.40%
PEM I	09	13.43%
PEM II	24	35.82%
PEM III	17	25.38%
PEM IV	04	05.97%

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TABLE 2 SHOWING OUTPUTS OF PATIENTS OF EMPYEMA THORACIS

FINDINGS	NO.OF PATIENTS	PERCENTAGE %
SYMPTOMATALOGY		
Fever	63	94.02%
Cough	57	85.07%
Breathlessness	63	94.02%
Chest Pain	47	71.14%
Refusal of Feeds	48	71.64%
ORGANISMS DETECTED IN PLEURAL FLUID		
Staphylococcus Aureus	20	45.45%
Stretococcus Pneumoniae	10	22.74%
Peudomonas Aeroginosa	08	18.18%
Klebsiella Pneumoniae	05	11.36%
Escherischia Coli	01	02.27%
ASSOCIATED COMPLICATIONS		
Pyopneumothorax	10	34.49%
Pneumothorax	08	27.59%
Pericarditis	04	13.79%
Lung Abscess	02	06.89%
Subcutaneous Emphysema	02	06.89%
Osteomyeltis	03	10.35%
RESPONSE TO VARIOUS MODALITIES OF TREATMENT		
Antibiotics + Drainage	64	95.53%
Decortication	02	02.98%
VATS	01	01.49%

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Figure 1: showing orgainisms detected in pleural fluid culture

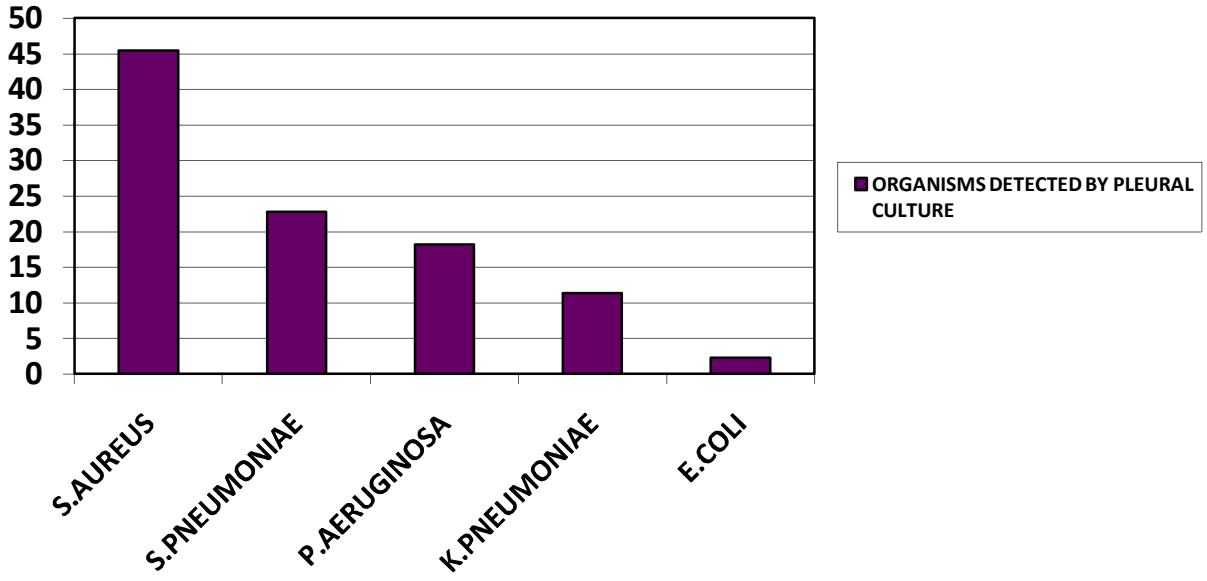
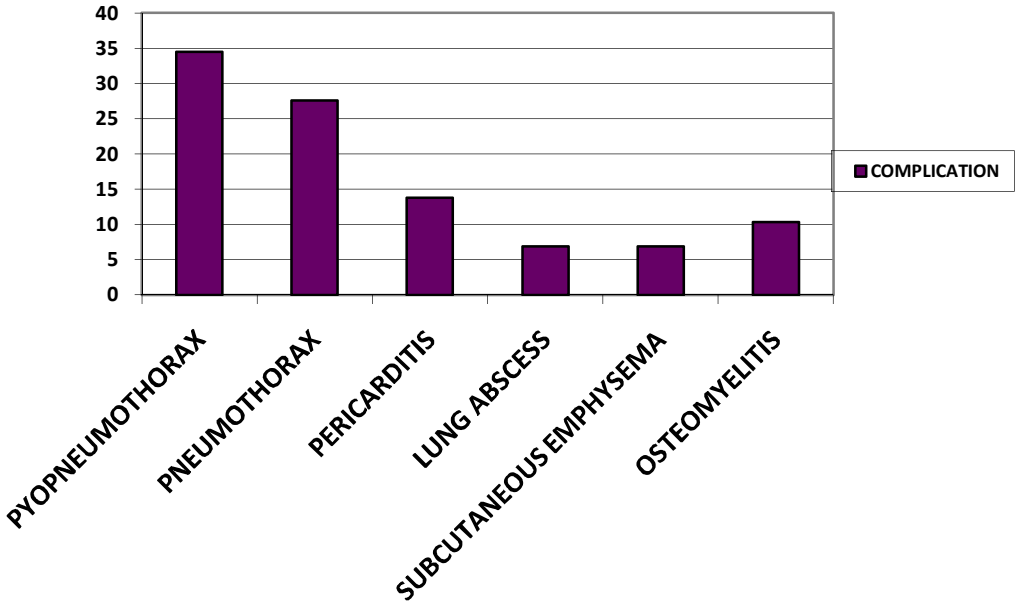


Figure 2: showing complications associated with empyema thoracis



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