Original Research Article

A STUDY ON EVALUATION OF RISK FACTORS AND OUTCOMES OF EMPYEMA THORACIS IN PEDIATRIC AGE GROUP.

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A B S T R A C T

Background: Empyema thoracis is a life-threatening complication of pneumonia in children, especially below 5 years of age. The treatment outcomes depend upon the nutritional state of the child and provision of medical care to administer appropriate antibiotics. This study was done with an aim to evaluate the risk factors and outcomes of children with empyema thoracis.
Materials and Methods: A total of 100 children who presented to the OPD with empyema thoracis, over a period of 18 months were included in the study.
Results: Majority of the children were below 5 years of age and most of them were males. Most of the participants belonged to lower socio-economic status. Anemia was the most commonly associated risk factor. ICD was removed within 1 week.
Conclusion: Early initiation of antibiotics along with ICD tube placement can allieave the immediate clinical or delayed complication.
Keywords: empyema thoracis, pediatric, pneumonia.

INTRODUCTION

Empyema thoracis is defined as collection of pus in the pleural space. It is condition with high mortality rate ranging between 6 -24%.[1,2] The incidence of empyema in children is reported to be on rise owing to the fact that the peak age at which pneumonia are highest is under 5 years.[3,4] Other predisposing risk factors in children are cerebral palsy, immunosuppression, congenital heart disease and prematurity. It is more common in children from poor socio-economic group. Common symptoms include fever with chills, dyspnea, chest pain, cough with copious amount of sputum production and toxic look of the child.[5-7]

Para-pneumonic effusions in the initial 48-72 hours are sterile, but if the pneumonia is left untreated, the pleural fluid increases and gets invaded by purulent bacteria leading to empyema. Empyema thoracis undergoes 3 stages of pathological response, i.e. exudative stage, fibro-purulent stage and organized stage.[8,9]

Radiological investigations of choice in empyema thoracis are X-ray chest, USG chest and CT scan.

Adequate antibiotic coverageand drainage of pus using tube, if required, are the mainstay of treatment. In case of multi-loculated empyema, video-assisted thoracoscopic surgery (VATS) or thoracoscopy with debridement are done.

The current study was done to evaluate the etiological factors, and outcomes of empyema thoracis in children below 12 years of age.

MATERIAL AND METHODS

This retrospective observational study was conducted by the Department of Pediatrics, KIMS, Narketpally, Telangana, India over a period of 18 months, i.e. from October 2022 to March 2024. All patients aged between 1 month to 12 years presenting to the OPD of pediatrics with clinical and radiological evidences of empyema thoracis that is confirmed by aspiration of pus on thoracocentisis and ICD was placed for drainage, were included in the study. A total of 100 patients were included in the study.

A detailed demographic history, birth history, family history was taken. Thorough clinical and systemic examination was done for all patients.

Routine investigations like complete blood picture, renal function tests, liver function tests, c- reactive protein, liver function tests, erythrocyte sedimentation rate, Mantoux test, blood sugar levels, blood culture, and pleural fluid analysis were done. Radiological investigations included x –ray chest, ultrasound of chest and in necessary conditions, CT-scan of chest.

After ET was confirmed, ICD was placed in the pleural cavity under aseptic precautions under local anesthesia. Depending upon the sides involved-unilateral or bilateral, one or two tubes were placed. A post-procedure X- ray was taken immediately to check the position of tube.

The Results: In stutueomtheclinical outcome was assessed after 24 hours. All patients were asked to follow-up with Chest X-rays after 3, 5 and 7 days.

RESULTS

A total of 100 patients with empyema thoracis were included in the study. Amongst the 100 patients, males comprised of 66% of the study participants and females constituted the rest 34%.66% were from low socio-economic status. 76% were under-nourished for their age.

Majority of the children belonged to < 5 years of age (65%). 35% had right sided ET, 45% had left sided ET, the rest 20% had bilateral ET.

Fever was the most common complaint (89%) followed by chest pain (78%) and cough (75%). 32% of the patients had respiratory distress.

Most common risk factor seen in present study was anemia, followed by positive sputum culture for micro-organisms. Gram positive cocci were the most commonly isolated organisms.

Most of the patients had tube in situ for < 1 week. Blockage of tube was the most common complication (10%). Majority of the patients had responded to ICD placement (86%). 14% of the patients required post –ICD decortication.

Table 1: Clinico-demographic details

		males	Females	Total (%)
Age	<5 years	46	19	65
	5-10 years	14	11	25
	>10 years	6	4	10
Socio-economic status	Low	48	18	66
	Other than lower class	18	16	34
Side involved	Right	23	12	35
	Left	30	15	45
	bilateral	13	7	20

Table 2: Risk factors

Risk factor	Total (%)
Anemia (hemoglobin <10 g/dL)	56%
Persistent positive CRP	35%
Gram stain - positive	22%
Positive pleural fluid growth	9%

Table 3: ICD placement and its related complications

		Total (%)
Duration of ICD placement	< 1 week	59%
	>1 week	41%
Complications	Misplacement	2%
	Pneumothorax	1%
	Blockage	10%
	Kinking	3%
Failure of ICD tube placement	Post ICD patient requiring decortication	14%

DISCUSSION

Empyema thoracis complicates upto 0.6% of all childhood pneumonias. In present study, 100 patients aging from1 month - 12 years with empyema thoracis, were included. Males comprised the majority of study population. Majority of the children belonged to lower socio-economic class. A large proportion of children were below 5 years of age. This is in concordance with studies done by Mandalet al,[10] and Arunagirinathan et al.[11]

In present study, anemia was the most commonly seen risk factor for development of ET. This could be attributable to the fact that most of the study participants belonged to lower socio-economic class and amongst them most of them were under-nourished. Similar finding was seen in study done by Menonet al.[12]

Persistently elevated C-reactive protein levels are defined as CRP> 6mg even after administration of antibiotics. In present study 35% had persistently elevated CRP levels. Embyia et al reported that

plasma CRP levels were not only sensitive markers of para-pneumonic effusions, they were also useful while monitoring the response to treatment.[13]

Majority of the patients had ICD in situ for less than 7 days. 14% of the patients required post-procedure decortication. In study done by Arunagirinathan et al,[11] 16% had needed post – ICD decortication.

The most common complication observed in present study is blockage of tube, followed by kinking of tube. One patient had developed pneumothorax post procedure. Mandalet al,[10] also had similar findings.

CONCLUSION

Empyema thoracis can be managed with ICD alone, provided, patient has no risk factors which delay healing; appropriate antibiotic has been started at the right time; correct technique and positioning of ICD. This could prevent ET related morbidity and complications in children.

Conflicts of Interest: Nil

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