

Original Research Article

Efficacy of early thoracoscopic debridement for syn-pneumonic pleural effusions in pediatric age group

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ABSTRACT

Background: Pleural effusion can be treated by antibiotics alone but thoracoscopy assisted debridement has proved superior to antibiotics alone. There is need to study this aspect in more details related to the superiority of the treatment. The objective was to study efficacy of early thoracoscopic debridement for syn-pneumonic pleural effusions in pediatric age group.

Methods: A hospital based follow up study was carried out among 40 children of 1-7years of age. They were divided into two groups. One group with 15 children received only antibiotics while the other group with 25 children received thoracoscopic debridement. The results were compared in terms of hospital stay and clinical outcome.

Results: It was found that the hospital stay was significantly shorter in children who received thoracoscopic debridement compared to antibiotic group. The chest X-ray was normal in all cases who received thoracoscopic debridement compared to antibiotic group. Decortications were required in five children in antibiotic group compared to none who received thoracoscopic debridement. There was no morbidity and mortality in the children received thoracoscopic debridement. Clinical and symptomatic relief was much better in children received thoracoscopic debridement compared to antibiotic group where there was persistence of the symptoms.

Conclusions: Thoracoscopy done in 3days of syn-pneumonic effusions give better out come in terms of hospital stay, morbidity, radiological resolution, compared to thoracocentesis done cases.

Keywords: Debridement, Efficacy, Pleural effusions

INTRODUCTION

Pneumonia is the leading cause of hospital admission among children. Most of the cases of pneumonia in children will resolve with simple treatment but few cases may land in complications. Most common is empyema. It is nothing but accumulation of pus in the pleural cavity. This is stage one. If not treated, it may get loculated i.e. stage two and if it becomes fibrinous, it is stage three. If the effusions are small, drainage may not be required. Some children may develop abscess or necrosis.¹ Recently there have been many studies showings that the complicated pneumonia is very common among

children.² This increase has been attributed to occurrence of infection to non-vaccine serotypes of pneumococcus” since the introduction of the heptavalent pneumococcal conjugate vaccine (PCV7).³ *Streptococcus pneumoniae*, *Staphylococcus aureus* (including methicillin-resistant *S aureus*) and *Streptococcus pyogenes* are the common causative organisms implicated. Chest X-ray as well as ultrasound of the chest is required for diagnosis. It has been recommended that CT chest should not be used. Antibiotic treatment should be directed towards the treatment of the most common organisms responsible for pneumonia. If the child is not found to be responding to the antibiotic treatment, then invasive therapy should be

considered. The best option available currently is thoracoscopic or if the facilities are available then video assisted thoracoscopy should be preferred.⁴ Even author have choice of treatments available today like use of antibiotics only, use of fibrinolytic with antibiotics, thoracocentesis procedure or the procedure of the thoracoscopy or even open thoracoscopy. Video assisted thoracoscopy is the best option if facilities are present.⁵

Stage of the disease decides what type of management strategy to be adopted by the treating doctor. Baseline management is use of antibiotics and intercostals drainage, but decortications is required in some cases. Inter-costal drainage is enough in early stages of the disease when the fluid is thinner. Once the fluid becomes fibrino-purulent, debridement is required. Decortication is required in last stages of the disease.⁶ Hence, author carried out this study to study efficacy of early thoracoscopic debridement for syn-pneumonic pleural effusions in pediatric age group.

METHODS

This was hospital based follow up study conducted at Department of Pulmonary Medicine, Malla Reddy Medical College for Women, Quthbullapur, Medchal, Telangana, India. Present study was carried out over a period of six months from June 2018 to November 2018 with 40 patients aged 1-7years of pediatric age group.

The patients between the age of 1-7years, children with syn-pneumonic pleural effusion, decubitus on chest X ray lateral showing thickness greater than 1cm and ultrasound showing septations were included in the study and the patients of age less than one year and more than seven years, parents not giving consent to include their children in the study and seriously ill children were excluded. Institutional ethics committee permission was taken, and informed consent was taken from parents of

the children who were eligible to be included in the present study as per inclusion and exclusion criteria laid down for the present study.

Procedure

40 patients between 1year to 7years, according to the inclusion criteria were divided into 2 groups.

- Group 1 (antibiotic group): 15 children maintained with broad-spectrum IV antibiotics with pleural aspiration
- Group 2 (thoracoscopic debridement): 25 children maintained with antibiotics and early thoracoscopic debridement done under general anaesthesia.

Results were assessed by hospital stay, survival, and radiological clearance. There are no clear guidelines to show role of thoracoscopy in pediatric age group. Author used storz flexible bronchoscope 5mm diameter with 2.5mm working channel and the bronchoscopy was done under general anesthesia.

The data was entered in the Microsoft Excel Worksheet and analyzed using proportions and appropriate statistical tests as per requirement.

RESULTS

Table 1 shows comparison of hospital stay in the two groups. Children in the group 2 required 5-7days of hospital stay compared to 10-21days of hospital stay for children in group 1. The average stay was 5.9days for children in group 2 compared to 15.5days for children in group 1 and this difference was found to be statistically significant. Thus, the thoracoscopic group children were able to get the discharge from the hospital earlier than their counterparts in terms of duration of the hospital stay after the treatment.

Table 1: Comparison of hospital stay among the two groups.

Groups	Total number	Hospital stay (in days)			T value	P-value
		Range	Mean	SD		
Group 1 (antibiotic group)	15	10-21	15.5	1.2	30.4027	0.0001
Group 2 (thoracoscopic debridement)	25	5-7	5.9	0.8		

Table 2: Comparison of clinical and symptomatic relief among the two groups.

Groups	Total number	Clinical and symptomatic relief
Group 1 (antibiotic group)	15	Persistent symptoms
Group 2 (thoracoscopic debridement)	25	Good

Table 2 shows comparison of clinical and symptomatic relief among the two groups. All children in the group 2 had good clinical and symptomatic relief compared to children in group 1. Children from group 1 have poor clinical and symptomatic relief and their symptoms

persisted. Thus, the thoracoscopic group children were able to get the clinical and symptomatic relief earlier than their counterparts in terms of clinical and symptomatic relief after the treatment. Table 3 shows comparison of chest X-ray after treatment among the two groups. All

children in the group 2 had good chest X ray compared to children in group 1. Children from group 1 had poor radiological clearance. Thus, the thoracoscopic group children were able to get the radiological clearance earlier than their counterparts in terms of radiological clearance after the treatment. Table 4 shows comparison of requirement of decortication among the two groups. Five children from group 1 required decortications and no child from group 2 required decortications. The difference between the two groups in terms of decortication required was statistically significant. Thus, the requirement of the decortication was not there for any

of the compared to their counterparts in terms of requirement of the decortication.

Table 3: Comparison of chest X-ray after treatment among the two groups.

Groups	Total number	Chest X-ray after treatment
Group 1 (antibiotic group)	15	Poor radiological clearance
Group 2 (thoracoscopic debridement)	25	Normal

Table 4: Comparison of requirement of decortication among the two groups.

Groups	Total number	Requirement of decortication	Chi square	P-value
Group 1 (antibiotic group)	15	5 subjects required decortication	6.27	0.004767
Group 2 (thoracoscopic debridement)	25	Not required in any case		

DISCUSSION

Thus, author found that children who underwent thoracoscopy for the treatment of empyema were better off in terms of symptomatic relief, shorter duration of hospital stay, radiological clearance and the requirement of decortication. Knudtson J et al, treated 22 children diagnosed with empyema using thoracoscopy. 49 months was the mean age. They did chest X-ray in 100% of the cases. They did ultrasound in 77% of the cases. CT scan was done in 59% of the cases. They found that there was no recurrence or mortality in 86% of the cases. They concluded that to manage childhood empyema, thoracoscopy should be done as it was safe procedure as well as effective. This conclusion was similar to the finding of the present study.⁷

Oak SN et al, noted that 116 of 133 children had empyema. They performed video assisted thoracoscopy in all these cases. They also treated other conditions like abscesses and carried out biopsy if required. Out of 116 cases, 16 cases were operated by open method. On an average after three days, the drain was removed. The author concluded that video assisted thoracoscopy was useful not only in empyema but also other thoracic diseases. This finding was similar to the finding of the present study.⁸

Pappalardo E et al, studied 23 children having empyema and they treated them using video assisted thoracoscopy. 58.9months was the mean age of the study subjects. 17 children were given parenteral antibiotics and remaining 6 were given oral antibiotics before surgery. X-ray chest was done in all cases. CT scan was done in three cases. All children underwent video assisted thoracoscopy. The average hospital stay after surgery was 10.3days which was more compared to the present study finding. The

authors concluded that thoracoscopy was safe and effective procedure. This is in accordance with the finding of the present study.⁹

Kang DW et al, performed 117 thoracoscopy procedures in children. Thoracic drainage was kept for on an average of nine days. Average length of hospitalization was 16.4days which was longer than the finding in the present study. In their study one patient died. But in the present study the mortality rate was zero. 28% of the cases developed persistent fistula while in the present study no one developed any complications. The authors concluded that good clinical outcome can be expected in children with thoracoscopy. This conclusion was in accordance with the conclusion of the present study.¹⁰

Alexiou C et al, noted that median time for admission was eight days. From admission to surgical profile was three days and from surgical profile to thoracotomy was one day. Limited muscle sparing thoracotomy was done in 44 patients. 36 patients underwent formal decortications. Five patients underwent debridement. Lobectomy was performed in one patient. The drain was removed from one to 16days. There was no mortality and this finding was similar to the finding of the present study. The authors concluded that use of thoracoscopy or fibrinolysis should be considered on the basis of their own merit, not on the assumption of probable adverse outcomes after thoracotomy.¹¹ Liu HP et al, studied 51 patients who underwent video assisted thoracoscopy and concluded that VATS was a safe and effective treatment for pediatric empyema. Thoracoscopic-assisted surgery facilitates visualization, evacuation, and debridement of the necrotizing lung tissue. Early surgical intervention can avoid lengthy hospitalization and prolonged intravenous antibiotic therapy, and it can accelerate clinical recovery.¹²

CONCLUSION

Thoracoscopy done in 3 days of syn-pneumonic effusions give better outcome in terms of hospital stay, morbidity, radiological resolution, compared to thoracentesis done cases. Hence early thoracoscopy in children with syn-pneumonic effusions should be done with proper antibiotic coverage for the benefit of the patients and to give them early relief.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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