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Original Article

Pediatric Thoracic Surgery at Bangladesh Shishu Hospital & Institute: An Eighteen-Month Clinical Experience

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Abstract

Background: Pediatric thoracic surgery presents with distinctive difficulties due to its diverse range of congenital and acquired conditions, and predominantly affected by infectious diseases, like empyema thoracic in developing countries. The scenario is far more challenging in resource-constrained settings like Bangladesh, where the outcome is often influenced by late presentation and limited logistics.

Objective: This study aims to evaluate the surgical experience and outcomes of pediatric thoracic procedures in a tertiary pediatric hospital in Bangladesh.

Methods & Methods: This retrospective observational study was conducted at the Department of Pediatric Thoracic Surgery, Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh from October 2024 to March 2026. A total of 91 patients aged 0-12 years undergoing thoracic surgery were included. Dataregarding demographics, clinical presentation, diagnosis, surgical intervention, postoperative complications, and 3-month follow-up outcomes were analyzed.

Results: The mean age was 3.8 ± 2.6 years, with a male predominance (63.7%). The most common presenting symptoms were fever (63.7%), respiratory distress (57.1%), and cough (51.6%). Infectious conditions accounted for the majority (71.5%), followed by congenital anomalies (18%).The most common procedures were open decortication (37.5%) and chest drain insertion (31.9%) and, with limited use of VATS (2.2%). Right-sided involvement was more frequent 60.4% vs 39.6% left-sided. Postoperative complications occurred in 7.69% of patients, most commonly surgical empyema or recurrent pleural effusion, occurring 3.3% cases surgical site infection, pyothorax, anastomotic leak following EA/TEF (Esophageal atresia with tracheoesophageal fistula) repair, and post-decortication re-intervention requiring chest tube reinsertion, each occurring in 1 patient (1.1%).The overall mortality rate was 3.3%.At 3-month follow-up, 91.2% of patients had complete recovery, while 5.5% had mild residual symptoms.

Conclusion: Although Bangladesh Shishu Hospital & Institute has shown encouraging results in pediatric thoracic surgery, regular healthcare is hindered by poor infrastructure and delayed diagnosis and referral.

Key words: Pediatric Thoracic Surgery, Oesophageal Atresia, Empyema Thoracis

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Introduction

Pediatric thoracic surgery constitutes both congenital and acquired conditions affecting the lungs, pleura, mediastinum, and esophagus. Congenital anomalies such as esophageal atresia and congenital pulmonary airway malformations, as well as acquired conditions like empyema thoracis, lung abscess, pneumothorax, pleural effusion, and mediastinal tumors both acquired and congenital are frequently encountered, most of which requiring early diagnosis and surgical intervention. Substantialdifferent epidemiological dynamics is still prominent between developed and developing countries.1Infectious diseases remain one of the leading causes of thoracic surgery in the low- and middle-income countries, due to their delayed diagnosis and late advanced stage presentation. Due to delayed presentation, poor early management, and unavailability to specialized care, empyema thoracis a common complication preceding pneumonia remain a healthcare burden.[1,2] Many recent studies have shownhow management varies and timely intervention difficulties in developing countries.[3]

With technological advancements, there is increased use of minimally invasive interventions such as video-assisted thoracoscopic surgery (VATS) and intrapleural fibrinolytic therapy. Yet developing countries with resource limited settings often necessitate open surgical procedures such as decortication.[4,5]

Recent study data have shown that early intervention with chest drainage combined with fibrinolytic therapy can minimize hospital stay and need for surgery, but surgical intervention remains essential in advanced disease.[6] Additionally, long-term follow-up data show that delayed or severe empyema can result in persistent respiratory morbidity.[7]

The surgical burden is also greatly increased by congenital thoracic abnormalities, like variants of esophageal atresia(EA). Although survival rates in disorders like EA with tracheoesophageal fistula (TEF) have improved due to advancements in newborn care and surgical techniques, results in developing nations are still influenced by delayed diagnosis and a lack of neonatal intensive care facilities.[8]

This study aims to evaluate the demographic profile, clinical presentation, disease spectrum, surgical interventions, postoperative outcomes, and short-term follow-up of pediatric thoracic surgical cases at a tertiary pediatric center in Bangladesh.

Materials and Methods:

Study Design and Setting: This retrospective observational study was conducted at Bangladesh Shishu Hospital & Institute, Dhaka, Bangladesh, from October 2024 to March 2026.

Study Population: A total of 91 pediatric patients (0–12 years) undergoing thoracic surgical procedures were included.

Data Collection: Datawas collected from hospital records and operative registers. Variables analyzed included:Demographics, Clinical presentation, Diagnosis, Surgical procedure, Postoperative complications, Mortality, 3-month follow-up outcomes

Follow-Up: Patients were followed for 3 months postoperatively through outpatient visits or telecommunication.

Statistical Analysis: Continuous variables were expressed as mean ± standard deviation (SD) for normally distributed data and median with interquartile range (IQR) for non-normally distributed data. Categorical variables were expressed as frequencies and percentages.

Results:

A total of 91 pediatric patients were included in the study.

Table 1 summarizes the demographic characteristics showing that the mean age of the patients was 3.8 ± 2.6 years. The age distribution showed that the majority of patients were older children, with 32 patients (35.2%) aged between 1–5 years and another 32 patients (35.2%) aged more than 5 years. Infants accounted for 18 patients (19.8%), while neonates comprised 9 patients (9.9%).There was a clear male predominance, with 58 patients (63.7%), compared to 33 female patients (36.3%), resulting in a male-to-female ratio of approximately 1.8:1.

Table 1: Demographic Characteristics (n = 91)

Variable	Number of Patients (n)	Percentage (%)
Age Group		
Neonates (0–28 days)	9	9.9
Infants (1–12 months)	18	19.8
Children (1–5 years)	32	35.2
>5 years	32	35.2
Mean age	3.8± 2.6 years	
Sex		
Male	58	63.7
Female	33	36.3

Table 2 shows the most common presenting symptom was fever, observed in 58 patients (63.7%), followed by respiratory distress in 52 patients (57.1%) and cough in 47 patients (51.6%).Less frequent symptoms included chest pain in 21 patients (23.1%) and recurrent respiratory infections in 12 patients (13.2%). Feeding difficulty, primarily seen in neonates with esophageal atresia, was present in 9 patients (9.9%).Other less common

presentations were cyanosis in 6 patients (6.6%) and a history of foreign body aspiration in 2 patients (2.2%).

Table 2: Symptoms at Presentation (n = 91)

Symptom	Number of Patients (n)	Percentage (%)
Fever	58	63.7
Respiratory distress	52	57.1
Cough	47	51.6
Chest pain	21	23.1
Feeding difficulty (neonates, EA)	9	9.9
Cyanosis	6	6.6
Recurrent respiratory infection	12	13.2
Foreign body aspiration history	2	2.2

Table 3 details the distribution of surgical procedures performed, demonstrating the predominance of open surgical interventions over minimally invasive techniques. The most frequently performed procedures were open decortication (37.5%) and chest drain insertion (31.9%). Minimally invasive surgery (VATS) was performed in only 2.2% of cases. Other procedures included lobectomy for congenital lung disease, repair of esophageal atresia with or without tracheoesophageal fistula, wedge resection, pneumonectomy, and thoracotomy for foreign body removal.

Table 3: distribution of surgical procedures performed (n = 91)

Procedure	Number of Patients (n)	Percentage (%)
Open decortication	34	37.5
Chest drain	29	31.9
VATS	2	2.2
Lobectomy	6	6.6
EA ± TEF repair	10	11.0
Others	10	10.8

Table 4 represents postoperative complications with majority, 84 patients (93.3%), had an uneventful postoperative course without any complications. Among those who developed complications, the most frequent was surgical empyema or recurrent pleural effusion, occurring in 3 patients (3.3%). Other complications were infrequent and included surgical site infection, pyothorax, anastomotic leak following OA/TOF repair, and post-decortication re-intervention requiring chest tube reinsertion, each occurring in 1 patient (1.1%).

Table 4: Postoperative Complications (n = 91)

Complication	Number of Cases (n)	Percentage (%)
Surgical site infection	1	1.1
Pyeothorax	1	1.1
Anastomotic leak (EA/TEF)	1	1.1
Surgical empyema/effusion	3	3.3
Post-decortication re-intervention (re-insertion of a chest tube)	1	1.1
No complications	84	93.3

Table 5 shows, at 3-month follow-up, the majority of patients showed favorable outcomes. Complete recovery, defined as being asymptomatic, was achieved in 83 patients (91.2%).A small proportion, 5 patients (5.5%), had mild residual symptoms, such as persistent cough or exertional dyspnea. There were 3 deaths (3.3%) recorded during the study period.

Table 5: 3-Month Follow-Up Outcomes (n = 91)

Outcome	Number of Patients (n)	Percentage (%)
Complete recovery (asymptomatic)	83	91.2
Mild residual symptoms (cough/exertional dyspnea)	5	5.5
Death	3	3.3

Table 6 Summary of diagnosis and surgical techniques:

Condition		Side	Procedure	Number of Cases (n)
Pleural Effusion/Pneumothorax/ Empyema Thoracis (29)		Right	Chest Drain(29)	19
		Left		10
Encysted pleural Effusion (11)		Right(8)	VATS	2
			Open decortication (35)	6
		Left(2)		2
		Bilateral(1)		1
Empyema Thoracis(26)		Right		18
		Left		8
Lung Abscess with Empyema Thoracis(5)		Right	Decortication with wedge resection(5)	4
		Left		1
Collapse consolidation (Destroyed Lung)(1)		Left	Pneumonectomy(1)	1
Esophageal atresia (9)	without fistula		Gastrostomy + Oesophagostomy	1
	With TOF		Primary repair	8
Congenital Lobar Emphysema (6)		Right(5)	Upper lobectomy	1
			Middle lobectomy	4
		Left	Middle lobectomy	1
Congenital Cystic Adenomatoid Malformation (CCAM) (1)		Left	Segmental wedge resection	1
Foreign Body (lt. Bronchus)(1)		Left	Thoracotomy + bronchotomy & removal	1
Anterior thoracic meningocele(1)		Right	Excision & repair	1
Mediastinalteratoma (1)		Right	Excision	1

Discussion:

This study shows, over 70% of pediatric thoracic surgery cases were mainly due to infectious thoracic diseases. This is in line with recent research from developing countries, where empyema thoraciscontinuesto be a major clinical issue.[3,5]

The high number of open decortication reflects delayed referral, late presentation and advanced disease stage. Previous literature indicates that early-stage empyema can often be managed with chest drainage and fibrinolytic therapy, thereby reducing the need for surgery.6 However, in late-stage disease, open decortication remains the definitive treatment.[4]

The limited use of VATS in this study highlights challenges in resource availability and late referral. Similar trends have been reported in recent multicenter surveys, where variability in practice and limited access to minimally invasive techniques were noted.[3]

The clinical profile, dominated by fever and respiratory distress, aligns with previous studies describing the typical presentation of pediatric empyema.5The postoperative complication rate in this study was relatively low and comparable to published reports. Infectious complications and pulmonary issues remain the most common postoperative concerns.4The mortality rate of 3.3% is consistent with other recent previous studies, where mortality is primarily associated with severe infection and sepsis.[6]

At 3-month follow-up, most patients showed favorable outcomes. However, previous longitudinal studies suggest that children with severe empyema may experience persistent respiratory impairment, emphasizing the importance of early and effective management.[7]

Overall, the findings of this study reflect the ongoing challenges in managing pediatric thoracic diseases in resource-limited settings while also displaying acceptable outcomes with current practices.

Conclusion

In these settings,infectious diseasesare major contributors of pediatric thoracic surgery, particularly empyema thoracis, due to delayed presentation, and inadequate logistics open surgical procedures are still frequently performed. Although Bangladesh Shishu Hospital & Institute has shown encouraging and satisfactory results in pediatric thoracic surgery, to further improve patient outcomes, it is crucial to strengthen early diagnosis, enhance referral systems, and increase access to less invasive procedures.

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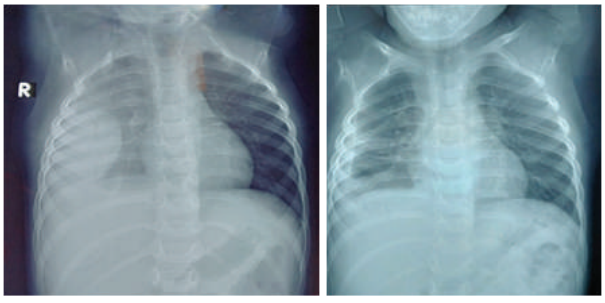

Figure 1 (a) CXR before Decortication (b) after Decortication

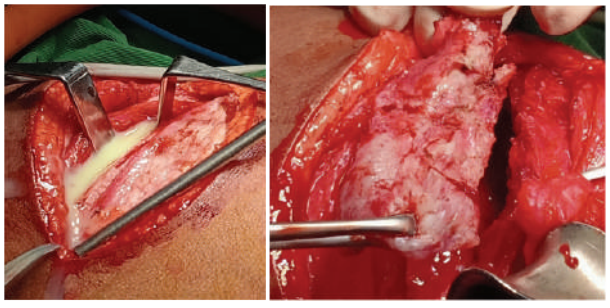

Figure 2: A:Pus in the pleural cavity Figure
B : thickened paraital pleura requiring pleurectomy

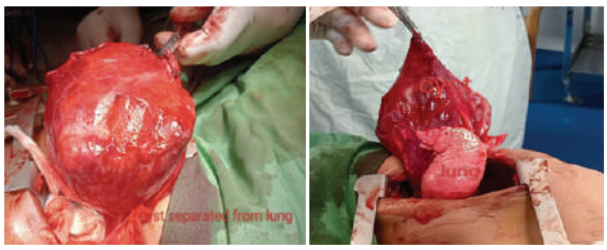

Figure 3: Mediastinal Teratoma (Cystic)

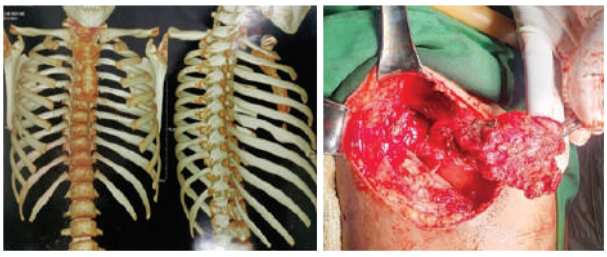

Figure 8: (a) CT scan of Rib lesion (b) Excision of Rib lesion

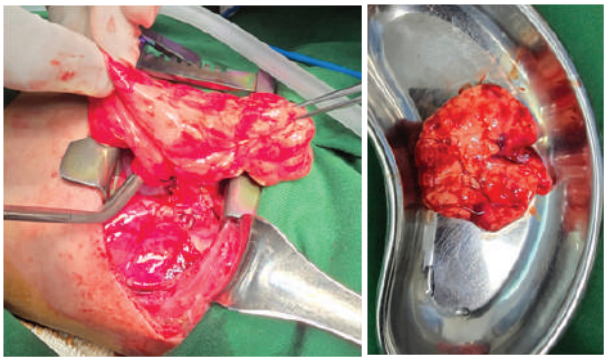

Figure 4 Lobectomy for congenital lobar emphysema

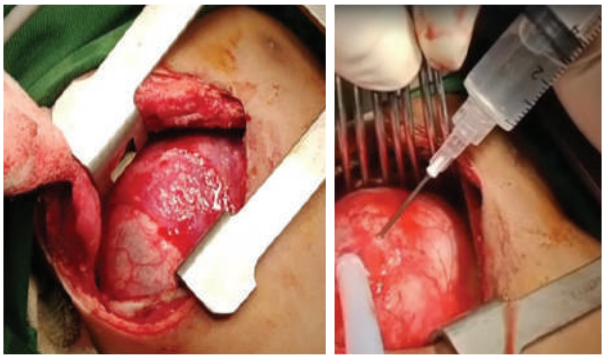

Figure 9: Anterior Meningocele clear fluid(CSF) on aspiraton

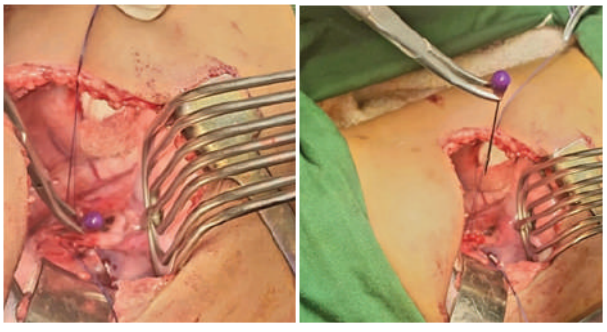

Figure 5: Foreign Body removal

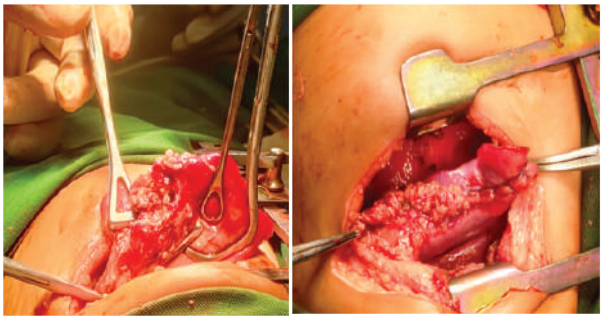

Figure 7: (a)Lung abscess (b)Decortication with wedge resection

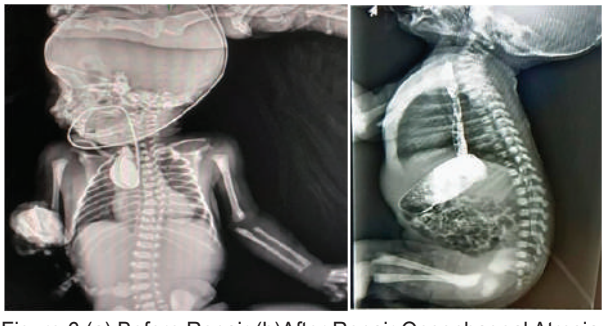

Figure 6 (a) Before Repair (b)After Repair Oesophageal Atresia