

A Profile of Theatre Procedures in Paediatric Thoracic Practice

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Background: The paediatric subset of patients is a peculiar group with specific physiologic and anatomic features that differentiates them from adolescents, adults and the elderly. This study was thus undertaken to provide a census of thoracic theatre cases seen and to describe the distribution of the cases across the paediatric age groups.

Patients and Methods: This is a retrospective study involving all children who had thoracic procedures done by the Thoracic Division between the periods January 2007 and December 2012.

Results: There were a total of 85 patients, with a male:female ratio of 3:2. The mean age in years was 3.8 ± 4.2 ; for the female was 4.2 ± 5.2 and male was 3.5 ± 3.4 . Domestic trauma accounted for 74.1% of all the cases. The highest incidence occurred in the 4-6yr group. The commonest procedure was oesophagoscopy which accounted for 35.2%. Foreign body extraction was done for 20.1% of the patients with 31.9% being by bronchoscopy and 44.7% by oesophagoscopy. Failure of extraction by bronchoscopy was seen in 7/15 that subsequently underwent thoracotomy and successful removal. Failure of extraction by oesophagoscopy was only encountered in one patient who subsequently had thoracotomy and oesophagotomy.

Conclusion: Domestic accidents are shown to be the main reason for presentation in this study; and are especially common in the 4-6yr group, which highlights the need for constant supervision of this subset of patients. Early presentation leads to a milder clinical course.

Key Words: thoracic surgery, paediatric

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INTRODUCTION

The paediatric subset of patients is a peculiar group with specific physiologic and anatomic features that differentiates them from adolescents, adults and the elderly.^{1,2} Paediatric Cardiothoracic Surgery is a subspecialty in Cardiothoracic Surgery, and the discipline is broadly subdivided into paediatric Cardiac Surgery, Paediatric Pulmonary Surgery and Paediatric General Thoracic Surgery. Pulmonary and General Thoracic both make up the Thoracic branch. It involves surgery for all diseases involving the chest wall and intrathoracic structures excluding the heart, pericardium and great vessels. The specialty is under served in Nigeria, even when they form the bulk of paediatric cardiothoracic practice.^{1,2}

This study was undertaken to provide a census of cases seen and to describe the distribution of the cases across the paediatric age groups. Infection involving the pleural space-empyema thoracis, pulmonary system-bronchiectasis, lung abscess form the main cases seen in many practice.^{3,4} Congenital indications include diaphragmatic hernias, mediastinal masses and pulmonary cysts and.4 Neonates have a preponderance of congenital diseases while acquired causes rise with increasing age.⁴

PATIENTS AND METHODS

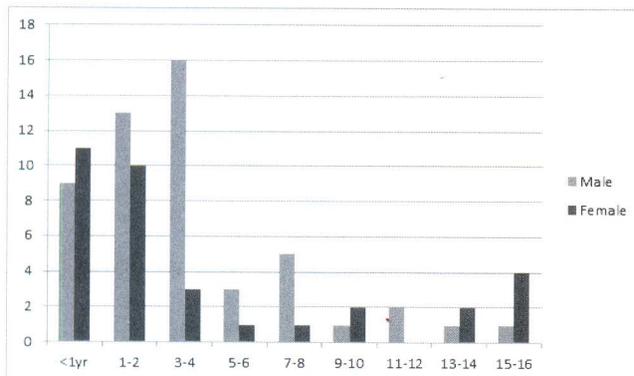
This is a retrospective study involving all children who had thoracic procedures done by the Cardiothoracic Division between the periods January 2007 and December 2012. A procedure was defined as surgical intervention done within the Theatre and or endoscopy suite. Thoracic procedures included all surgeries on the chest wall, internal thoracic organs excluding the heart and great vessels. It also excluded tube thoracostomies, thoracocentesis and other bedside and minor procedures including pleural biopsies, central venous catheterization and vascular surgeries. Children were defined as all patients who were 16years or younger at the time of first presentation for thoracic surgical care.

Data was collated from clinic and theatre records from the period and was analysed using Microsoft Excel 2007. All cases whose records were incomplete were excluded from the study. The results are presented in tables and graphs.

RESULTS

There were a total of 85 patients, with a male: female ratio of 3:2. The mean age in years was 3.8 ± 4.2 ; for

Figure 1
Shows the bar chart distribution of the patients according to age and gender



the female was 4.2 ± 5.2 and male was 3.5 ± 3.4 . Domestic trauma accounted for 74.1% of all the cases. The highest incidence occurred in the 4-6yr group. The commonest procedure was oesophagoscopy which accounted for 35.2%. Foreign body extraction was done for 20.1% of the patients with 31.9% being by bronchoscopy and 44.7% by oesophagoscopy. Failure of extraction by bronchoscopy was seen in 7/15 that subsequently underwent bronchotomy and successful removal. Failure of extraction by oesophagoscopy was only encountered in one patient who subsequently had thoracotomy and oesophagotomy.

Discussion

The survey showed a preponderance of domestic trauma cases across all age groups.⁶ The highest incidence occurred within the 4year group and this highlighted the fact that there were problems in supervising and caring for this very active, inquisitive age group who quickly investigate their environment by ingestion, inhalation and other high risk behavior when left on their own. There was a high incidence of inhaled and ingested foreign bodies, and these appear to be mainly toy parts or pieces of plastic or metals lying around the home or school environment.^{6,7} Endoscopic retrieval was the main stay of treatment except for the neglected cases who had impaction and open retrieval became inevitable.⁷ The main stay of treatment direction should be prevention by way of health education directed at parents, guardians, teachers, nannies and other care givers to this vulnerable group of children.⁶ The peak for female patients were <1year and >15years whereas the male peak was at the preschool years and this was due to the increased incidence of domestic accidents amongst male.^{8,9,10}

Ingestion of corrosive was especially high in this study

and it commonly occurred in households where local soap was being manufactured commercially.^{8,9} Ingestion occurred speciously from either the unsuspecting children or from other children or adults who did not know that the water being given to the child was in fact caustic soda solution. It is important to note that home accidents like this are entirely preventable by small measures as keeping such materials in a special work place away from the home environment and also within specially marked containers, not as was seen in all cases in same containers used to store drinking water in the household.⁸ Serial Oesophageal bougies sufficed in the majority of cases and only in the few with multiple and long segment strictures not amenable to dilation were oesophagectomy and colon replacement done. The procedure was well tolerated in the patients and the only mortality occurred from a patient who developed post operative bleeding gastric ulcer and later died from multiple organ failure.⁹

Infection was an important cause for both neglected cases of suppurative pulmonary and pleural based diseases. Early presentation and appropriate treatment would have prevented the thoracic surgeries. It is pertinent that the number was small and showed the usefulness of thoracocentesis and tube thoracostomies in preventing major surgical procedures.¹⁰ Congenital causes were seen mainly in the early neonatal period and consisted chiefly of tracheo-oesophageal stricture (oesophageal atresia) and lung cyst.¹¹ There was a remarkable absence of mediastinal tumors within the period under review as none was referred to the division. The only thymectomy was done for a case of gunshot wound to the chest which bullet lodged in the thymus gland.

The majority of procedures were oesophageal surgeries accounting for 58.1% of all procedures. This differs from works in the west which show a preponderance of cardiac and pulmonary procedures.¹² The major indication was household accidents including inadvertent ingestion of foreign bodies, corrosive agents and the small minority of congenital atresia. Oesophagoscopy was combined with retrieval, dilation and or oesophagotomy as indicated. This highlights the dangers these infants encounter in their quest to explore their surroundings unsupervised;¹³

however only 5.7% of the patients required oesophagectomy and colon replacement which is our preferred means for reconstruction of the oesophagus. The problem of inhalational foreign bodies was also seen, as about 18.8% had bronchoscopy for removal of inhaled foreign bodies.¹³

Thoracotomy was done in 27.1% of the patients and this was evenly distributed among the various age groups and included surgeries for congenital causes, to trauma and varied from Lobectomy, to oesophagectomy and surgeries on the diaphragm. Intensive care use was 100% for all thoracotomies even

though many may have benefited more from HDU (High Dependency Unit) rather than ICU.^{14,15}

CONCLUSION

Domestic accidents are shown to be the main reason for presentation in this study and are especially common in the 4-6yr group, which highlights the need for constant supervision of this subset of patients. Early presentation leads to a milder clinical course.

Table I

Shows the distribution of the indications for surgery according to the age brackets

	Indication	Frequency	Percentage
Infants	Tracheo-oesophageal fistula	13	15.3
	Oesophageal foreign body	5	5.9
	Congenital diaphragmatic hernia	1	1.2
	Pulmonary Cyst	1	1.2
Pre-School	Corrosive Oesophageal stricture	18	21.2
	Oesophageal foreign body	9	10.6
	Bronchial foreign body	8	9.4
	Corrosive oesophagitis	2	2.4
	Penetrating chest injury	2	2.4
	Empyema Thoracis	1	1.2
	Oesophageal perforation	2	2.4
Secondary School	Oesophageal foreign body	5	5.9
	Corrosive oesophageal stricture	2	2.4
	Penetrating chest injury	1	1.2
	Corrosive oesophagitis	1	1.2
	Empyema thoracis	1	1.2
Total		85	100

Table 2:

Shows the distribution of procedures done according to the age brackets

	Infants	Preschool	Primary	Secondary	%
Oesophageal exclusion	17	12	1	1	17.0
Oesophagoscopy	5	27	3	7	23.1
Oesophageal dilatation	-	18	1	2	11.5
Bronchoscopy	1	8	7		8.8
Oesophagectomy + Colon replacement	-	6	-	1	3.8
Decortication	-	-	-	1	0.5
Exploratory Sternotomy	1				0.5
Congenital diaphragmatic Repair	1	-	-	-	0.5
Pulmonary cyst	1	-	-	-	0.5
Total	26	71	12	12	100

Table 3

Shows the breakdown of the foreign body extraction according to the means of retrieval.

	Infants	Preschool	Primary	Secondary	Total	%
Bronchoscopy	-	8	7	-	15	31.9
Bronchotomy	-	3	4	-	7	14.9
Oesophagoscopy	4	8	4	5	21	44.7
Oesophagotomy	1	1	-	2	4	8.5
Total	5	20	15	7	47	100

Table 4

Shows the breakdown of thoracotomies according to the procedures

	Infants	Preschool	Primary	Secondary	Total	%
Bronchotomy	-	3	4	-	7	30.4
Decortication	-	-	-	1	1	4.3
Oesophagectomy	-	6	-	1	7	30.4
Oesophagotomy	1	1	-	2	4	17.4
Others	5	-	-	-	5	21.7
Total	5	10	4	4	23	100

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