



THORACOTOMIES IN CHILDREN -AN INSTITUTIONAL EXPERIENCE

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ABSTRACT

Thoracotomies in children have been less extensively studied, as the incidence of diseases necessitating thoracotomies is low in the pediatric age group. This study reviews childhood thoracic diseases, thoracotomy approaches, indications, and complications. Surgical procedures and complications of a total of 482 children below 12 years of age who underwent thoracotomy for various reasons in the Department of Pediatric cardiothoracic Surgery, Institute of child health, between 2012 and 2017, were reviewed in this study. The physiology and anatomy of the respiratory system and especially the respiratory control mechanism in pediatric patients vary from those of the adults, hence the need for modifying postoperative management of these patients.

KEYWORDS : Thoracotomy , Pediatric , Surgery , Management.

INTRODUCTION:

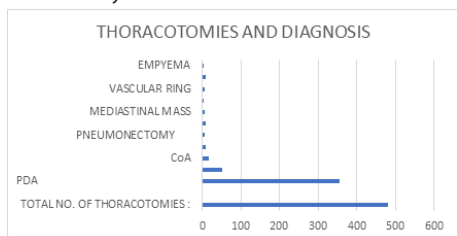
A retrospective study of the details of Thoracotomies done in children aged <12 years during the period 2012-2017 at a tertiary care centre is aimed. The most common indication for thoracotomy in our pediatric cardiothoracic surgical unit is for patent Ductus Arteriosus ligation. Other indications include chronic pericarditis/effusion; lung resections – lobectomies & pneumonectomies; closed mitral commissurotomy for mitral stenosis; mediastinal mass excision; repair of vascular rings / slings; Impacted foreign body removal; thoracic empyema's. In addition to considerations associated with the underlying indication, the different proportions of the anatomical structures in children require special modifications in both diagnostics and surgical technique compared to corresponding procedures in adults.

MATERIALS & METHODS:

All the children who underwent a thoracotomy procedure for the management of their disease between 2012 - 2017 were included in the study. The indications, procedure, complications and outcome are being reviewed.

RESULTS & DISCUSSION:

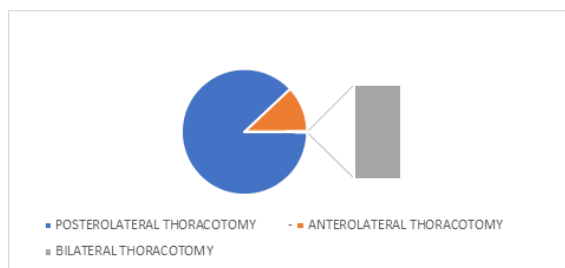
The most common encountered indications for surgery were ligation of patent ductus arteriosus 356(74%); pericardiectomy 52(10.8%); coarctation of aorta repair 18(3.7%). Other surgeries include those done for lung resections - lobectomies & pneumonectomies; closed mitral commissurotomy for mitral stenosis; mediastinal mass excision; repair of vascular rings / slings; Impacted foreign body removal; thoracic empyemas. Out of the 481 patients, 423(87%) underwent Posterolateral thoracotomy and 57(11.8%) patients underwent Anterolateral thoracotomy incision and one child underwent a bilateral thoracotomy.



TOTAL NO. OF THORACOTOMIES :		481
PDA		356
PERICARDECTOMY		52
CoA		18
LOBECTOMY		
	(RIGHT)	4

	(LEFT)	5
PNEUMONECTOMY	(RIGHT)	1
	(LEFT)	5
RIB EXCISION	(RIGHT)	4
	(LEFT)	4
MEDIASTINAL MASS	(RIGHT)	3
	(LEFT)	4
CLOSED MITRAL COMMISSUROTOMY		5
VASCULAR RING	(RIGHT)	1
	(LEFT)	5
FOREIGN BODY	(RIGHT)	6
	(LEFT)	4
EMPYEMA	(RIGHT)	1
	(LEFT)	3

NO OF CASES – TYPE OF THORACOTOMY:
 POSTEROLATERAL THORACOTOMY - 423
 ANTEROLATERAL THORACOTOMY - 57
 BILATERAL THORACOTOMY - 1



The youngest child operated was a 5 days old for ligation of Patent Ductus Arteriosus and the oldest was a 12 year child for foreign body removal.

The youngest and the oldest child operated for a Patent Ductus Arteriosus are 5 days and 8 years old respectively.

Pericardiectomy was done through a anterolateral thoracotomy approach in 52 cases of which following diagnosis were made 18 – Acute Inflammatory Pathology; 15 – Non specific inflammatory Pathology ; 10 – Tuberculoma; 9 – Chronic Inflammatory Pathology were diagnosed.

Lung resection was done 15 cases which includes pneumonectomies (6), and lobectomies (9) for bronchiectasis.

Thoracotomy for removal of Impacted foreign body removal was undertaken in 10 cases successfully including one case of metallic ball bearing managed by bilateral thoracotomy; other FB retrieved include Betel Nut (1), Acrylic Bead (2), Watch Battery (1), Ground Nut (2), Iron Nail (1), Safety Pin (1), LED bulb (1).

The indications for Rib resection include Osteoma (4), osteomyelitis (2), and chondroma (1).

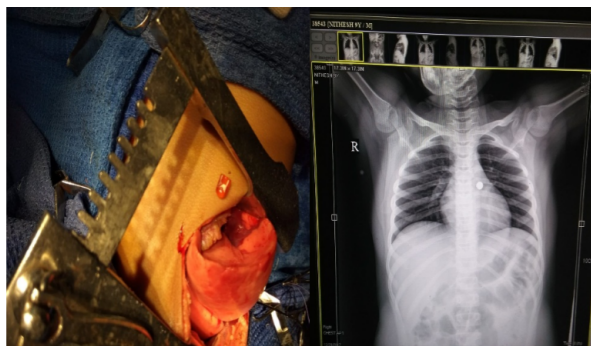
The diagnosis of mediastinal mass for which a thoracotomy has been done include -Thymic Cyst (2), Small Round Cell Tumour (1), Benign Cystic Teratoma (2), Lipoma (1), Thymic Lipoma (1).

The following Complications were seen in patients: atelectasis, wound infection, haemorrhage, chylothorax, and postoperative extended air leakage. The mean hospital stay was 15 days and mortality was 11 (2.28%)

**BILATERAL THORACOTOMY
A CASE OF MIGRATING FOREIGN BODY (FB) -METALLIC BALL BEARING**

FB noted in the Left bronchus and a left thoracotomy was done, but the FB migrated to right bronchus (bronchoscopy). Hence a right thoracotomy was done but the FB migrated to carina. An unsuccessful attempt was made to retrieve the FB using rigid bronchoscope with the patient in supine position. The patient was placed in the prone position for control of both bronchus and bronchoscopy done showed FB in the right main bronchus. The left bronchus was occluded using one hand and a right bronchotomy was done and the foreign body retrieved.

This case of migrating foreign body – Metallic ball bearing was successfully removed using bilateral thoracotomy with the patient in prone position for gaining control of the foreign body.



CONCLUSION:

In order to achieve optimal exposure and minimal damage to ribs, cartilages, muscles, intercostal nerves and the vasculature, several modification of thoracotomies have been described. The intercostal approach is common to all of the thoracotomies. The three different variants are Anterior ; Posterolateral ; Lateral thoracotomies.

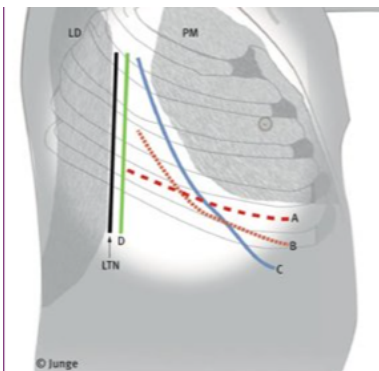


Fig. 2.2.1: Schematic diagram of skin incisions for different muscle sparing lateral approaches. A: conventional lateral thoracotomy; B: anterolateral thoracotomy; C: anteroaxillary thoracotomy; D: vertical thoracotomy. LD, latissimus dorsi muscle; PM, pectoralis major muscle; LTN, long thoracic

An area of distinction between thoracic surgical procedures in children compared to those performed in adults relates to differences in surgical technique required by the special physiological and anatomical characteristics of children. On one hand, the smaller size of children's anatomical structures restricts access while, on the otherhand, special attention must be paid to structures that are important for the child's continued normal somatic growth. The surgical technique of thoracotomy in children differs from that used in adults in several important steps. A muscle sparing approach spares the latissimus dorsi and thoracodorsal muscles, both of which are important structures for the growth of the chest wall. Whereas osteotomy of the ribs is necessary in adults, it can be avoided in children, since the intercostal spaces are easily spread.

Thoracotomies have been an important approach for cardiac and thoracic surgeries and in our institute majority have been performed for surgical closure of a PDA.

It is also an invaluable method of retrieving an impacted foreign body via bronchotomy. Thoracotomy with the patient in prone position is a useful method for retrieving of mobile foreign body via bilateral approach.

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