

Role of thoracoscopy in the management of various foregut duplication cyst

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Abstract

Aim: To highlight the role of thoracoscopy in the management of various foregut duplication cyst. **Introduction:** Foregut duplications are rare pathology including esophageal and bronchogenic cysts. The diagnosis is most often made from an incidental finding on chest radiograph, respiratory distress or failure to thrive. Treatment consists of complete resection by thoracotomy or thoracoscopy. We present our experience with the management of 4 cases that were managed thoracoscopically. **Materials and Methods:** From March 2008 to August 2011, 4 patients underwent thoracoscopy for resection of foregut duplication cyst. All the cysts were on the right side and were performed with three or four ports. The masses were removed after decompressing the cyst and enlarging one of the port sites. Chest tubes were placed in all patients. **Results:** All the 4 cases underwent successful thoracoscopic resection. Two cases were esophageal duplication cyst out of which one was a neuro enteric cyst, extending from the apex to the esophageal hiatus and one had common wall with the esophagus. Two cases were bronchogenic cyst. Histopathology demonstrated gastric mucosa in the neuro enteric duplication cyst. There were no complication or recurrence till date in any of these cases.

Conclusion: Thoracoscopic resection is a safe and an effective method for treating foregut duplication cyst. Outcomes have been good with no morbidity or mortality even in cases extending through the whole length of thorax, which would otherwise need an extended thoracotomy. Thoracoscopic resection should be considered the first line of management for these benign masses.

INTRODUCTION

Foregut duplications are rare entities that include both esophageal and bronchogenic cysts. The diagnosis of foregut duplication cyst is made, most often, from an incidental finding on chest radiograph, or due to respiratory compromise due to mass effect or infection. The treatment consists of complete resection. Open resection by thoracotomy has been the only definitive treatment for these lesions in the past, but in view of their benign histology, a less-invasive approach is desirable. Growing experience and improved instrumentation for small patients have

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broadened the repertoire of procedures that can be accomplished by pediatric minimal access surgery (MAS). Recurrences are associated with incomplete resection. Four cases of foregut duplication cysts are presented that were resected thoracoscopically.

MATERIALS AND METHODS

A retrospective review of pediatric thoracoscopic resections for chest masses was performed. Four patients of duplication cyst were identified. All patients were referred with symptoms of compression due to the duplication cyst. Preoperatively CT scan was done in all patients and 2 patients were diagnosed to have esophageal duplication cyst (Fig. 1) and 2 patients were diagnosed to have intra-thoracic cyst. Variables examined included gender, age, operative positioning, operative time, number of ports, cyst location, insufflation pressure, concomitant morbidities, pathologic findings, chest tube placement, time of chest tube removal, length of hospital stay, complications and outcome.

SURGICAL PROCEDURE

The patient is placed in lateral decubitus position on the operating room table with the affected side facing upward. Since these cysts are located posteriorly, resection is facilitated by rotating the patient into a near prone position.

Usually the first port is placed inferior to the tip of the scapula. CO₂ pneumo-insufflation is done with pressure of 5–8 mm and flow of 1 litre is used. Single lung ventilation

was not used in any of the cases. The 5-mm, 30° surgical endoscope is placed via the subscapular port, and the mass is visualized after hypoventilation (Fig. 2). Optimal placement of the subsequent two or three ports depends on the location of the mass. In general, the ports should be placed in order to allow triangulation of the instruments and thoracoscope such that the apex of the triangle lies on the mass. Subsequent ports are placed under direct vision.

Once the ports are in place, the mass should be identified and dissected free from surrounding structures using hook electrocautery or endoscopic Metzenbaum scissors with electrocautery. We used Fan retractors as single lung ventilation was difficult. To facilitate removal from the chest cavity, the cyst should be punctured under control and suctioned free of fluid and debris (Fig. 3). Once evacuated, the cyst can easily be removed via a port site. When the cyst is particularly large or tense, early decompression can improve mobility and exposure of the posterior aspect.

After resection, the operative field should be inspected for haemostasis, irrigated and suctioned as needed, and tube thoracostomy placed under direct vision via a port site. The remaining ports are closed in layers with absorbable sutures. Patients receive a chest X-ray postoperatively, after removal of the chest tube. Oral intake is allowed postoperatively usually the next day and pain control is with oral pain relievers and parenteral analgesics as needed. Histopathology reports were reviewed in the post-operative period to confirm the diagnosis.

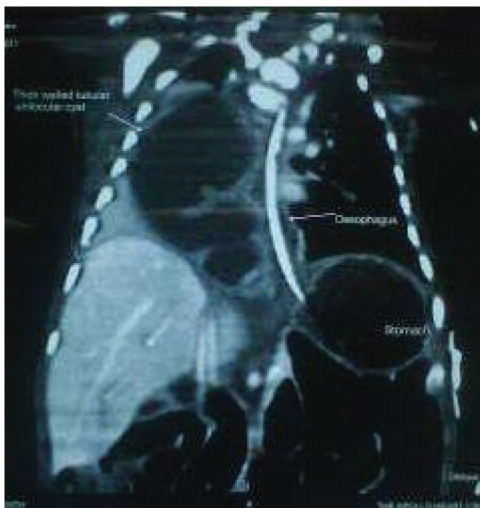


Figure 1: CT scan of 1 month old baby showing esophageal duplication cyst, extending from the apex of lung to diaphragm with spinal extension (Neuroenteric cyst)

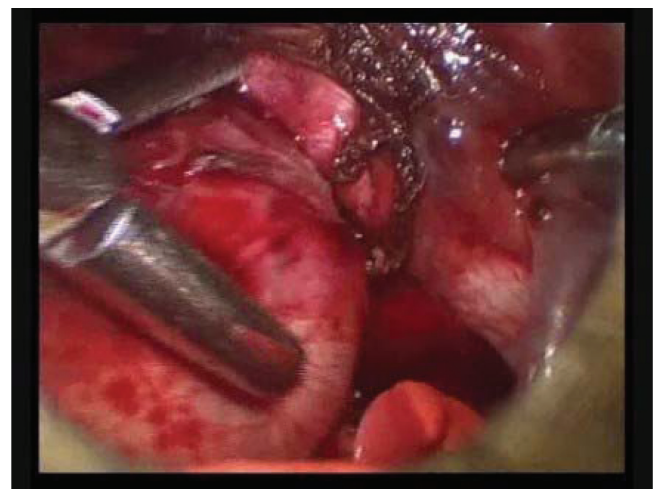


Figure 2: Visualization of the duplication cyst is facilitated by hypoventilation, prone lateral position and adequate retraction by fan retractor

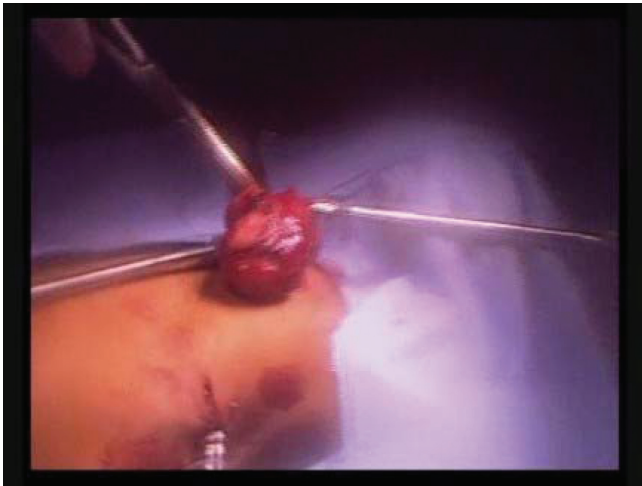


Figure 3: A large cyst removed from the port site after decompression and evacuation of mucinous fluid

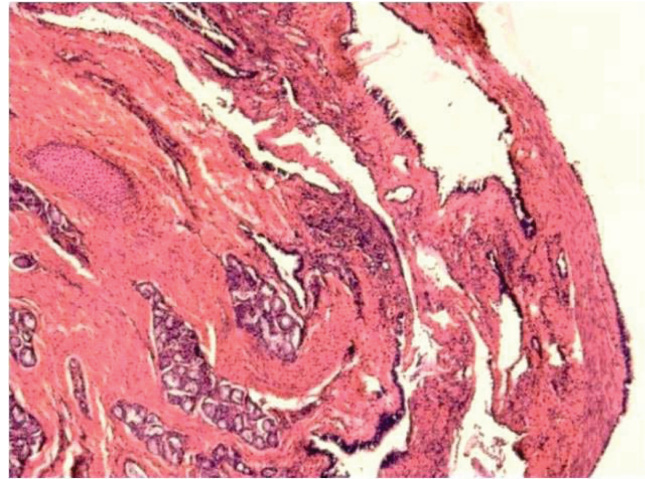


Figure 4: Histopathological evidence of bronchogenic cyst

RESULTS

Four children (M:F = 2:2) were referred to our service from March 2008 to August 2011 for management of mediastinal cystic lesions. They were 1 month to 4 years of age and weighed between 3.2 and 30 kg. Clinical details are given in Table 1. Operating time ranged from 85 to 160 min. Bleeding was minimal in all procedures and no patient required transfusion. A definitive cure was achieved in all the four patients with no complications.

The patients were admitted to the hospital before the day of surgery, and the postoperative hospital stay was between 4 and 7 days. All patients were mobilized early and went home within 7 days after operation. The cosmetic results of the surgery were excellent. Histologic diagnoses were bronchogenic cyst in 2 cases (Fig. 4) and mediastinal esophageal duplication cyst in 2 cases.

DISCUSSION

Ventral budding of the lung primordia from the foregut occurs at 3 to 4 weeks of gestation. Aberrations in this process during this or subsequent stages of development may result in duplications of the esophagus or bronchi. Simple esophageal or bronchial duplication cysts are found most commonly in the mediastinum.^{1,2} Histologically, they may be differentiated by the presence of cartilage in the wall of a bronchial cyst and the presence of two well-defined muscle layers in an esophageal duplication.³ The common embryologic origin of these structures is resected by the fact that the lining epithelium of both lesions may be ciliated respiratory epithelium.

These cysts are histologically benign, and some controversy exists regarding the need to excise asymptomatic cysts in adult patients. Complete excision is the preferred treatment in children because of the high risk of obstructive respiratory problems, and also because these cysts do not regress spontaneously and occupy space destined for growing respiratory tissue.⁴ Malignant transformation, although rare, has been described in children and adults.⁴ All of our patients had symptoms directly related to the presence of the duplications, which is consistent with previous reports that show that the prevalence of symptoms is greatest among young infants with these lesions.^{5,6} In cases where the resection is incomplete electrocoagulation or laser destruction of the residual wall can be used to destroy the patent pathological cells, thereby significantly reducing the recurrence risk.⁷

In conclusion, thoracoscopic resection is a safe and effective method of treating foregut duplications. Outcomes have been good with little short-term morbidity and no mortality. Morbidity and cosmesis are improved by avoiding thoracotomy. Thoracoscopic resection should be considered the first-line therapy for these benign masses with no inferior age limit.

DISCLOSURE STATEMENT

No competing financial interests exist.

ACKNOWLEDGEMENTS

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Table 1: Clinical characteristics of four pediatric patients with foregut duplications treated by minimal access surgery

Patient	Age	Symptoms	Diagnosis	Operation	Notes
1.	4 years	Vomiting, Cough	Right esophageal Duplication cyst	Thoracoscopic subtotal excision with cautery to base	Cyst sharing a common wall with esophagus
2.	6 months	Increasing size on radiology	Right bronchogenic cyst	Thoracoscopic resection	Antenatally diagnosed and followed up
3.	4 months	Respiratory distress	Right bronchogenic cyst	Thoracoscopic resection	
4.	1 month	Vomiting, respiratory distress	Right esophageal duplication cyst (neuroenteric)	Thoracoscopic resection	Cyst extending from apex to diaphragm with spinal extension

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