

# Thoracoscopic excision of asymptomatic antenatally diagnosed mediastinal bronchogenic cysts: A case report

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## Abstract

Bronchogenic Cysts (BCs) are benign congenital malformations commonly located in the mediastinum. In recent years the development of antenatal diagnosis has changed the BCs management allowing an earlier minimally invasive approach. We report a case of an asymptomatic 8-months-old girl with antenatal diagnosis of subcarinal posterior mediastinal BC. Thoracoscopic excision of the cyst was successfully performed. The management of antenatally diagnosed BCs is discussed. Thoracoscopic treatment of BCs is safe and effective with the advantage of a reduced morbidity compared to thoracotomy.

## Introduction

Bronchogenic Cysts (BCs) are benign congenital malformations of the mediastinum that are often asymptomatic and discov-

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Consent for publication: The patient's guardians gave their written consent to use the patient's personal data for the publication of this case report and any accompanying images.

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ered incidentally. In 15-20% of cases they are located within the pulmonary parenchyma separate from the hilar structures. They can evolve toward the expansion, infection or intralesional hemorrhage causing compressive complications of the tracheal-bronchial tree and esophagus.<sup>1</sup> The treatment of BCs is their complete excision. For asymptomatic cases indication to the excision is still controversial.<sup>2,3</sup> Before the advent of prenatal diagnosis, most BCs were identified late in childhood either as incidental finding or following complications. Prenatal diagnosis has changed BCs management allowing early surgical resection.<sup>4</sup> Video-Assisted Thoracoscopic Surgery (VATS) seems to be the gold standard approach in the absence of severe adhesions to the surrounding mediastinal organs.<sup>5</sup> We report a successful thoracoscopic treatment of an antenatally diagnosed mediastinal BCs.

## Case Report

A primiparous pregnant 26-year-old-woman was referred to our service under suspicion of a fetal dilatation of distal esophagus (11 mm) on routine prenatal Ultrasound (US). US and fetal magnetic resonance at 33 weeks of gestation showed a cystic lesion located in the posterior mediastinum compatible to a BC (Figure 1A) and the lesion did not increase size during the pregnancy. At birth the patient was asymptomatic and revealed no abnormalities at physical examination. The chest x-ray and the thoracic Magnetic Resonance (MRI) showed a well circumscribed subcarinal mediastinal cyst that did not create airway shift or compression (Figure 1B). A preoperative Computed Tomography (CT) scan of the chest was performed at the age of 6 months and confirmed the finding of a fluid-filled cyst (25x24x18 mm) positioned in the posterior mediastinum, under the carina (Figure 2). In addition an upper gastrointestinal x-ray was performed in order to document an external compression and exclude a communicating duplication cyst, as would be the case with esophageal cystic duplication. At the age of 8 months the patient had no symptoms or history of stridor, dysphagia, hemoptysis, or chest pain, and was therefore considered eligible to VATS for removing the mass.

The patient was placed in left semilateral prone position with the affected side elevated 45 degrees after selective endotracheal intubation and single lung ventilation achieved by right bronchus occlusion using a pediatric endobronchial blocker (Cook Medical 5 Fr). Three 5 mm trocars were used, with the first was positioned at the fifth intercostal space behind the posterior axillary line, the work trocars were positioned on the middle and posterior axillary line at the fifth and sixth intercostal spaces. The cyst was identified in the posterior mediastinum below the arch of the azygos vein. The mediastinal pleura was opened and the lesion was separated from adjacent mediastinal structures, such as esophageal and

the subcarinal trachea, by a combination of electrocautery hook and dissecting tools, no harmonic scalpel was used. After the initial mobilization, aspiration of the cyst was performed to facilitate dissection. The cyst was completely removed and extracted through

the trocar, and a chest tube was placed through the anterior trocar. The operative time was about two hours and there were no intra-operative complications. The patient was extubated on the first postoperative day and stayed in PICU until the removal of the chest tube, which occurred on the second postoperative day. The patient was discharged on the fourth postoperative day. Pathologic examination confirmed the diagnosis of a congenital bronchogenic cyst. The patient underwent six-monthly visits in the first two years. During the follow-up, surgical visits and chest-x rays were performed which showed no signs of recurrence.

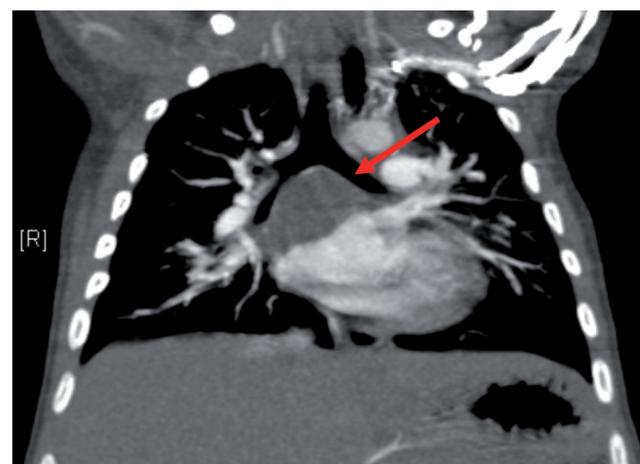


**Figure 1.** Prenatal (A) and neonatal (B) magnetic resonance images showing a posterior mediastinal cyst.

## Discussion

BCs are congenital lesions derived from the abnormal budding of the primitive foregut during the first trimester of gestation and account for 6% to 15% of primary mediastinal masses.<sup>6</sup> They are lined by ciliated epithelium and have focal areas of hyaline cartilage, smooth muscle and bronchial glands within their walls. They are usually located in the mediastinum and less commonly involve the lung parenchyma.<sup>7</sup> BCs have a wide range of clinical manifestations. They may be found incidentally on a radiographic study or when symptoms are produced, as a result of compression of the surrounding structures or infection, becoming sometimes a life threatening condition.<sup>2</sup> The antenatal diagnosis is of great importance to plan the postnatal care. Davenport *et al.* reported accurate prenatal ultrasound diagnosis in 77% to 100% of cases with better performance of equipment and interpretation of images.<sup>8</sup> The prenatal ultrasonography finding of bronchogenic cyst is an anechoic image. However, Lecomte *et al.*, in a longitudinal study with 14 fetuses with hyperechoic lung lesions, found one case of BC.<sup>9</sup> Cysts can enlarge during pregnancy with compression of the normal lung tissue and/or the heart, causing lung hypoplasia, polyhydramnios, fetal hydrops and death. Fetal therapy of BC by ultrasound-guided percutaneous aspiration of the cyst or deployment of a thoracoamniotic shunt can be performed in a fetus of under 32 weeks gestation in the presence of hydrops and in selected cases of significant compression of the normal lung tissue, polyhydramnios or mediastinal shift.<sup>10</sup>

In neonates BC are usually asymptomatic and a CT scan is performed in all cases detected during pregnancy. In our case, a tho-



**Figure 2.** Preoperative computed tomography showing the bronchogenic cyst located in the subcarinal region.

racic MRI performed during the neonatal period to confirm the prenatal diagnosis of mediastinal cyst. The CT scan was performed preoperatively to better determine the anatomic relation with adjacent anatomic structures.

The management of asymptomatic cyst remains controversial. Early diagnosis of mediastinal cysts makes operation possible before infections cause adhesions and fibrosis. Many Authors recommend the surgical excision to prevent a more complex surgery once they become infected with a greater risk of complications.<sup>10,11</sup> Also, even if the natural history of BCs remains unknown most of the asymptomatic BCs became symptomatic when observed.<sup>3</sup> In fact the growth rate of BCs is slow during the first months of life but, even in absence of manifestations, size increases constantly at an exponential rate.<sup>12</sup> The traditional approach for the excision of these cysts is thoracotomy. In the last decades, numerous reports of thoracoscopic excision of the mediastinal cyst have appeared in literature.<sup>5,7,12-14</sup> The advantages of thoracoscopic treatment of these cysts include less postoperative pain, early mobilization, shorter hospital stay and better cosmesis. In 1993, Hazelrigg published a series of seven BCs removed thoracoscopically with favorable results; minimally invasive complete resection was possible in all except one patient in whom the cyst was adherent to the vital structures.<sup>13</sup> Martinod *et al.* reported a series of 20 cases of BCs.<sup>14</sup> Thirteen lesions were resected completely by thoracoscopy and reasons for conversion were bleeding in two cases and dense adhesions to surrounding vital structures in five. In a report by Michel *et al.*, thoracoscopy was performed on 22 children. Fifteen were found to have a bronchogenic cyst that was treated successfully in 86 % of cases.<sup>5</sup> History of preoperative complications like infections, intra-operative injuries to neighboring structures and major adhesions to vital structures were factors responsible for conversion to thoracotomy.

## Conclusions

In summary, we present a successful thoracoscopic excision of an asymptomatic mediastinal cyst discovered during pregnancy. Early thoracoscopic treatment of these cysts is feasible, safe and effective with low conversion rate and reduced morbidity compared to the traditional thoracotomy approach.

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