

# First Case Report of Single Port Video-Assisted Thoracoscopic Middle Lobectomy for the Treatment of Pulmonary Aspergilloma in a Pediatric Patient

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## Abstract

### Keywords

- ▶ single port video-assisted thoracoscopic
- ▶ aspergilloma

We present the case of an 11-year-old girl with pulmonary aspergilloma secondary to a hematologic disease successfully treated with a single port video-assisted thoracoscopic lobectomy. This surgical procedure was not previously reported. We consider this approach to be a safe and appropriate procedure for lung resection, in children or adults requiring minimal intervention and early recovery.

## Introduction

Neutropenic patients are at high risk of developing invasive fungal infections. In this patient population, invasive aspergillosis is the most common systemic fungal infection. The primary therapy for invasive aspergillosis is based on drug treatment. However, surgical resection is indicated in hemoptysis or progressive radiological findings.<sup>1</sup>

Video-assisted thoracic surgery (VATS) and anatomic lobectomy were initially described in 1993 mainly for the treatment of lung cancer. By the mid-1990s, VATS became an important approach for the treatment of lung and mediastinal lesions in adults and some specific cases in children. No significant experience in children with thoracoscopic lobectomy has been previously reported. VATS surgery is usually performed using three incisions; however, some surgeons employ just two ports or even only one in a superior surgical approach.<sup>2</sup>

## Case Report

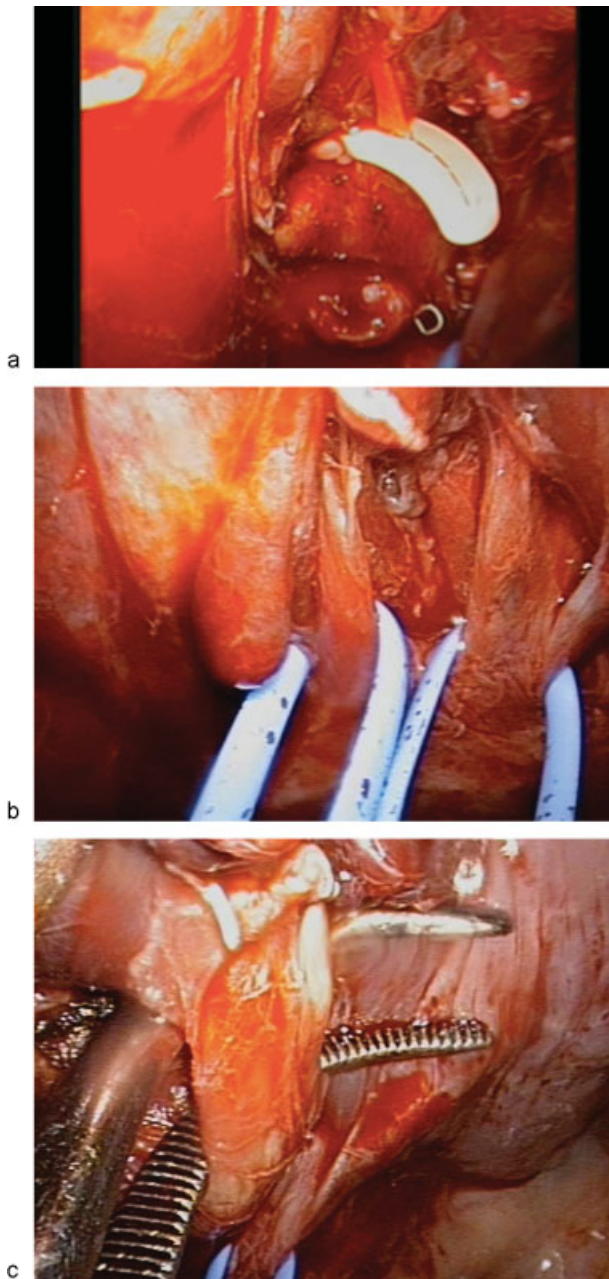
An 11-year-old girl was recently diagnosed with acute lymphoblastic leukemia. After a course of the chemotherapy, she developed persistent fever. A computed tomography (CT) scan of the lungs showed new right interstitial infiltrates. Antifungal prophylaxis was given, but because of the patient's

persistent fever, the treatment was changed to broad-spectrum antibiotics. Five days from the beginning of the new treatment, a second CT scan showed a right hydro-pneumothorax. A chest tube was placed to drain fluid. No viral, bacterial, or fungal agents were isolated from the fluid. Two weeks later, the fever persisted and the CT scan of the lungs showed a new localized lesion in the middle pulmonary lobe in direct contact with the lower right lobe fissure and the parietal pleura (▶Fig. 1). These findings suggested the diagnosis of pulmonary aspergilloma and antifungal treatment with voriconazole was added to medical treatment. As part of the treatment for the hematologic disease, the patient was waiting for stem cell transplantation; however, it is well known that these therapies increase the risk of mortality for invasive aspergillosis. Therefore, a multidisciplinary team (a hematologist, a pneumologist, pediatricians, and thoracic surgeons) decided a therapeutic approach by combining the most conservative pulmonary resection using the less aggressive approach and systemic antifungal treatment. Accordingly, the patient underwent a surgical resection of the pulmonary lesion with a minimal approach for VATS single port. A middle lobectomy and wedge right lower lobe resection were performed. Histopathological examination confirmed the diagnosis of pulmonary aspergilloma. No

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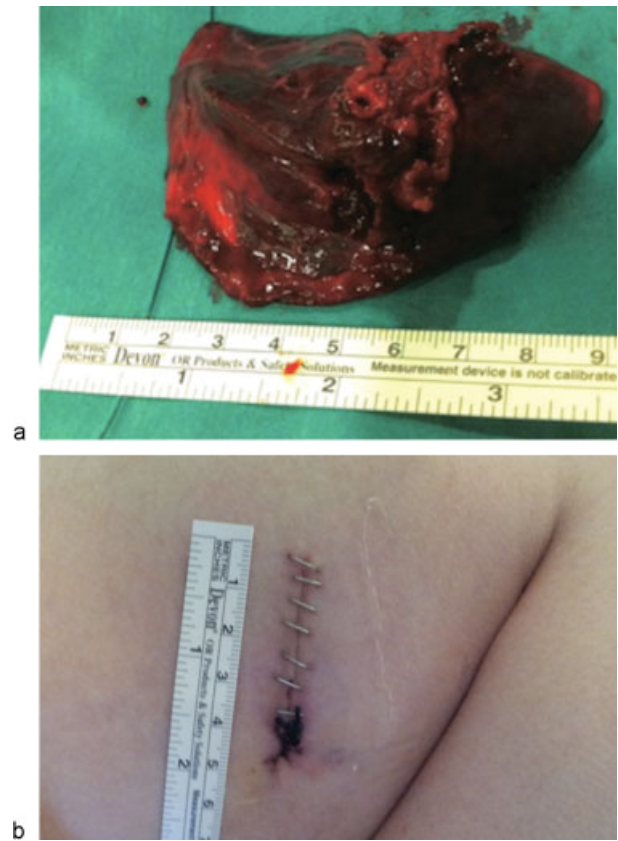


**Fig. 1** (a) The middle pulmonary artery. (b) The superior and middle pulmonary vein. (c) The middle lobe bronchus.

surgical complications were observed. Postoperative course was successful. After 2 days of operation, the chest drain was removed and pain was managed just with acetaminophen.

### Surgical Technique

The unilateral lung ventilation was achieved with a double-lumen Robertshaw 26 endotracheal left tube (P3 Medical Ltd.). The patient was positioned in usual lateral decubitus position. A 4 cm single incision was made in the fifth intercostal space (→Fig. 2b). A 5 mm/30° camera was used to get an enhanced view. Multiple pulmonary adhesions were found and they were isolated by blunt dissection using Endopath (Ethicon) and LigaSure (Covidien) devices. The lesion was visualized in the middle lobe, across the major



**Fig. 2** (a) Surgical piece consisting of the middle and lower lobe right pulmonary segments. (b) 4-cm single port incision.

fissure affecting the lower and middle lobes. The pulmonary artery and its branches were identified within the fissure (→Fig. 1a). Then, the lung was rotated to expose the superior and middle pulmonary vein (→Fig. 1b). The middle branch was divided and ligated with a vascular stapler; afterward the middle bronchus was carefully identified, dissected, and sectioned with a bronchial stapler (→Fig. 1c). Once the middle bronchus was transected, the middle lobe artery was exposed and clipped proximally and thermo-sealed distally. The minor fissure was completely opened through serial application of GIA stapler. Finally, the inferior pulmonary vein was identified. The middle lobectomy was completed including a wedge resection of the lower lobe by stapling this lobe from the dissected inferior vein to the stapled line of the minor fissure (→Fig. 2a).

The chest drain was extracted after 3 days from surgery, and the pain was controlled with oral acetaminophen for 6 days. No postoperative complications were observed.

### Discussion

Pulmonary aspergilloma is a severe complication in immunosuppressed patients. Standard treatment, combining early surgery and antifungal therapy, has the best prognosis in these cases. Surgical resection can be curative in certain patients after antifungal treatment. Furthermore, in patients who would need immunosuppressive treatment, aggressive surgical management has been suggested.<sup>3</sup>

The surgery for pulmonary aspergilloma can be technically challenging because multiple adhesions can be usually found between the main lesion and adjacent normal anatomical structures. Despite the potential benefits of a minimally invasive procedure in immunosuppressed patients, the VATS approach to perform lobectomy for pulmonary aspergilloma is anecdotal. We have not found studies of pulmonary aspergilloma treated by VATS single port in adults, and no significant experience with thoracoscopic lobectomy in children has been previously reported.

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#### Conflict of Interest

None

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