

Case Report

Video-Assisted Direct Closure of Bronchial Fistula

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ABSTRACT

Video-assisted thoracoscopic surgery is a well-established method for managing persistent air leak in spontaneous pneumothorax. We describe a case of complicated spontaneous secondary pneumothorax in a patient with bullous emphysema that was treated by video-assisted manual suture of the bronchial fistula at the end of the right upper bronchus.

INTRODUCTION

THE FIRST THERAPEUTIC OPTION for secondary spontaneous pneumothorax (SSP) is tube thoracostomy. In most cases, air leaks eventually seal with thoracostomy tube suction. Nevertheless, in about 30% to 40% of these patients, the air leak persists beyond 7 days and requires additional treatment. The goal in managing this problem is to obliterate the pleural cavity and stop the air leak. This is usually accomplished by resecting the apical blebs and obliterating the pleural cavity with chemical or mechanical pleurodesis via thoracotomy, thoracoscopy, or video-assisted thoracoscopic surgery (VATS). Pleurodesis is possible only when contact between the pleural layers is achieved. This is sometimes difficult, especially in cases of large-output bronchopleural fistula in which tube thoracostomy fails to control the air leak.

We present a case of secondary complicated pneumothorax successfully treated by direct suture of the bronchopleural fistula with the use of VATS.

CASE REPORT

A 38-year-old man was admitted to our hospital with a right recurrent SSP and a mediastinal shift to the right. Pulmonary tuberculosis of the right upper lobe had been

diagnosed and treated 1 year earlier. A 9F chest tube (Pleurocath®; Plastimed, Sain-Leu-La-Fôret, France) was inserted, but no clinical improvement was noticed. Chest radiography showed a persistent right pneumothorax. Furthermore, a significant air leak was observed through the chest tube. An additional large-bore chest tube (28F) was inserted, but despite continuous suction through the chest drainage tube, air leakage persisted, and the patient's condition did not improve. Because of the inability to achieve lung reexpansion, surgical closure of the air leak was indicated.

A double-lumen endotracheal tube was used. The patient was placed in the left lateral decubitus position, and a right thoracoscopic approach was undertaken. The thoracoscope was introduced through a 1-cm incision over the auscultatory triangle. Two additional small ports were placed 4 cm posterior and inferior to the lower pole of the scapula to introduce the endoscopic operating instruments. The entire upper lobe was found to be essentially bullous tissue adherent to the apical pleura. The adhesions were not entirely divided. Talc pleurodesis was thought not to be indicated in this case because of the inability to reexpand the lung. The large apical bulla was opened with cautery, and the thoracoscope was introduced therein. Tracheal ventilation was started, but the lung did not expand. Warm saline solution was instilled into the bulla cavity to identify the sites of air leak. Con-

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siderable air bubbling was observed at the bottom of the bulla in an area corresponding to the distal end of the right upper lobe bronchus. With the use of endoscopic and conventional instruments, direct closure of the bronchial defect was performed under video-assisted thoracoscopic guidance with a 4-0 polypropylene suture. Two milliliters of cyanoacrylate (Glubran®; GEM, Viareggio, Italy) were then instilled through a fine cannula over the suture to reinforce it. Minimal air leakage was observed on saline irrigation. The lung finally expanded, and the operation was completed with talc pleurodesis. Two 28F chest tubes were inserted in the port sites facing the apex, and the patient was placed on 10-cm suction. The immediate postoperative x-ray film showed complete lung expansion, and minimal bubbling was observed through the tubes. The patient's recovery was uneventful, and the chest tubes were removed 7 days later.

DISCUSSION

SSP is a common phenomenon in patients with bullous emphysema. The first therapeutic approach in SSP is tube thoracostomy, to achieve complete lung expansion and control of the air leak. In case of failure, surgical intervention may be necessary. The presence of abnormal lung tissue and a higher surgical risk in many of these patients limits the role of open thoracotomy as the standard therapeutic approach.^{1,2} VATS may be the best technical approach in these particular cases. VATS makes it possible to suture the ruptured bulla with endo-staplers and perform mechanical pleurodesis in most cases.^{3,4} The goal of this procedure is complete and stable lung expansion resulting in pleural adhesion.

In our patient, the air leak was significant enough to preclude adequate expansion, and therefore surgical treatment was indicated. The VATS approach confirmed the diagnosis of a destroyed right upper lobe that was completely replaced by a large bulla, with preservation of the

middle and lower lobes. The thin wall of the bulla did not allow direct closure. The bulla was incised, and the optical equipment was introduced into it. The end of the upper lobe bronchus, just at the beginning of the segmental division, could then be clearly identified after the instillation of saline solution. It was decided to attempt direct closure of the right upper bronchus of an otherwise destroyed, nonfunctioning right upper lobe. After endoscopic manual suture, cyanoacrylate was used to reinforce the closure.

We consider this case a unique surgical problem that was successfully treated by using an uncommon therapeutic approach.

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