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Case Report
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Video-Assisted Thoracoscopic Lobectomy of a Giant Bulla: A Case Report

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Abstract

A 52-year-old male was admitted to our hospital with dyspnea. Chest X-ray and computed tomography confirmed the presence of a giant bulla on the upper lobe of the right lungs, and the presence of bullas on the middle and lower lobe of the right lungs. A video-assisted thoracic surgery with lobectomy on the right upper lobe and with bulla suture ligation on the middle and lower lobe of the right lungs was performed. No serious complications occurred in the postoperative course, as the patient showed good lung re-expansion and no prolonged air leak.

Keywords: Giant bulla; Lobectomy; VATS

Introduction

In this paper, we defined a bulla as the presence of emphysematous areas with complete destruction of lung tissue producing airspace bigger than 1cm in diameter a giant bulla is define as a bulla occupying at least one-third of the hemithorax and the giant bulla often compresses the surrounding normal lung parenchyma. Apparently, the bullous lung tissue does not involve in broncho-alveolar oxygenation, and, particularly the giant bullae, can cause dyspnea, hypoxia, symptomatic chest pressure or pain, hemoptysis, spontaneous pneumothorax, and even slow progression to malignancy [1-3].

A routine chest X-ray and High resolution computerized tomography (HRCT) is often used to determine the extent and distribution of the bullous disease, and assess co-existing problems such as bronchiectosis and cysts and pneumothorax. The bullous disease is clearly associated with smokers, alpha-1 antitrypsin deficiency and marijuana abuse [4].

In terms of the treatment of a bulla, surgery is often indicated to treat the complications related to the bullous disease, such as pneumothorax. On the other hand, when a bulla occupying more than one-third of hemithorax, when a bulla compressing to the healthy adjacent lung tissue, and when a bulla increasing in size at follow-up, surgery is also indicated to remove the bulla. We describe the successful treatment of a giant bulla via VATS.

Case Presentation

A 52-year-old male patient with dyspnea was admitted to the thoracic department of our hospital from other hospital for surgical treatment of the giant bulla of the right upper lobe. The patient suffered from dyspnea for 2 years. Medical history revealed active smoking and high blood pressure. Physical examination showed a diminished breath sounds on the right upper chest without other abnormal clinical findings.

A routine chest X-ray and HRCT were performed, and showed a giant bulla with occupying over two-thirds of right hemithorax. HRCT showed the giant bulla originated from the right upper lobe, and a small part of back segment of the right upper lobe showed compressed. The giant bulla significantly compressed the normal lung tissue of the middle and lower lobe of the right lungs. Laboratory examination showed no obvious abnormal findings except PO_2. Pre-surgical arterial blood gas analysis showed PO_2 40mmHg. Because pre-surgical assessment indicates that surgical resection of the giant bulla might improve post-operative lung function, no lung function test was done.

The patient underwent VATS with the right upper lobectomy. Surgery was performed under general anesthesia with double lumen endotracheal intubation and discontinuing ventilation during lobectomy on the right side in half lateral position. An anterolateral incision with 8cm long was made through the fourth intercostal space, and a camera trocar was used through the seventh intercostal

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space. The giant bulla was located on the right upper lobe, and was opened. It was found that numerous bronchioles were directly opened to the airspace of the giant bulla, and that the pulmonary blood vessels of the right upper lobe shrank permanently, because of severe adhesion, to an extent that there was no blood perfusion into the lung from pulmonary artery except bronchiole artery. The blood vessels of the right upper lobe were clamped, cut and suture ligated, and the near end of the bronchus of the right upper lobe was closed with intermittent silk sutures. After removal of the right upper lobe, small bullas which exist on the middle and lower lobe were suture ligated.

The remaining right lungs expanded well and the pleural cavity was drained with two chest tubes. There was no persistent air leak from the middle and lower lobe. The symptom of dyspnea was relieved after surgery. Chest radiography showed good expansion of the right lungs without pneumothorax or significant pleural effusions.

Discussion

Until present time, surgery is a major option for the treatment of the giant bulla which is accompanied by symptoms including dyspnea, chest pain etc. There are various surgical procedures for the treatment of the giant bulla, such as thoracoscopic endoloop ligation, intra-cavitory bulla drainage, laser bullous ablation, bullous fibrin glue treatment, Brompton technique, VATS bullectomy etc [5]. Among those surgical techniques, VATS bullectomy has been more frequently used for the treatment of the giant bulla in recent years.

The mortality rates within perioperative period for localized bullous emphysema is less than 2.5%, and postoperative complications are related to prolonged air leak, a trial fibrillation, mechanical ventilation, pneumonia, postoperative incisional pain etc. Importantly, postoperative prolonged air leak constitute one of the major factors which prolong patient hospital stay and increase the opportunity of the infection acquired within the thoracic pleural cavity.

One of the findings in our patient which is different from other authors described before is that the blood vessels of the right upper lobe shrank permanently to an extent that there was no blood perfusion into the lung from pulmonary artery except bronchiole artery. Therefore, we believe that the entire lobe of the right upper lobe lost function, and that simple bullectomy of the right upper lobe is not enough and would have no beneficial effect to the patient. In our case, lobectomy for the treatment of the giant bulla is necessary.

Conclusion

The pathophysiological aspect in which the giant bulla effect to lung tissue remains known incompletely. In our case, the entire right upper lobe where the giant bulla was localized lost function, which is supported by the findings that the blood vessels of the right upper lobe shrank permanently to an extent that there was no blood perfusion into the lung from pulmonary artery except bronchiole artery. In such case, simple bullectomy of the right upper lobe is not preferred, and lobectomy including the giant bulla is necessary. In our case, VATS with lobectomy is a good option.

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