

Middle lobe torsion after right upper and lower lobectomy: repositioning of lobar torsion using a 3-cm uniportal video-assisted thoracoscopic surgery

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Abstract

We aimed to describe a method for repositioning of right middle lobar torsion by using a 3-cm uniportal video-assisted thoracoscopic surgery (VATS) approach. Middle lobe torsion occurred after right upper and lower lobectomy in a 74-year-old man. Immediate re-exploratory thoracotomy using the 3-cm uniportal VATS approach was performed. The torsion was corrected, and the lobe was anchored to the anterior chest wall with Prolene stitches. The patient recovered well postoperatively with daily improvements in chest radiographic findings. Follow-up examination was performed using fiberbronchoscopy, which revealed an unobstructed right middle lobe bronchus and sticky yellow sputum. Follow-up chest computed tomography was performed 3 months after the primary surgery and revealed increased expansion of the right middle lobe. We repositioned the right middle lobe successfully by using the 3-cm uniportal VATS approach, but more cases are needed to confirm the feasibility of the approach. Lobectomy remains the primary treatment option for such cases.

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Key words: lobe torsion; 3-cm uniportal; video-assisted thoracoscopic surgery (VATS)

Lobar torsion is a rare but life-threatening complication of elective pulmonary resection. As the fissure between the middle and lower lobes is often not well developed, the right middle lobe is the most common site of torsion after lobectomy. Traditionally, treatment includes re-exploratory thoracotomy with resection of the affected lobe. We present a case of right middle lobe torsion after right upper and lower lobectomy that was treated surgically using a 3-cm uniportal video-assisted thoracoscopic (VATS) approach.

Clinical summary

A 74-year-old man with right upper lobe and hilus pulmonis masses was referred to our institution for lung resection. Preoperative computed tomography (CT) and the values of lung cancer markers were consistent with the diagnosis of lung cancer. The patient underwent right upper and lower lobectomy with the 3-cm uniportal VATS approach. A systematic lymph node dissection was also performed. The fissures were well developed, and the inferior pulmonary ligament was partially mobilized. He was extubated immediately after surgery and was transferred to the ward as per routine practice.

Postoperative chest radiography revealed satisfactory expansion of the right middle lobe (Fig. 1).

On the first postoperative day, the patient maintained stable vital signs without systemic upset. He was coughing up sticky yellow sputum; fiberbronchoscopic suction was performed to enhance his recovery.

On postoperative day 5, the patient suddenly became tachypneic and tachycardic, but reported having cough with less sputum. Physical examination revealed loss-of-breath sounds on the right lung field. Fiberbronchoscopic examination revealed right middle lobar bronchus stricture with reduced sputum. The bronchoscope could not pass through the right upper and lower lobes, and the bronchial stumps were intact. Emergency CT was performed and revealed right middle lobe atelectasis (Fig. 2).

Immediate re-exploratory thoracotomy was performed by using the 3-cm uniportal VATS approach. At surgery, the right middle lobe had undergone a 180° clockwise torsion at its bronchovascular pedicle. The lobe was a little dusky and edematous but still viable. The torsion was corrected, and the lobe was anchored to the anterior chest wall with Prolene sutures. The patient recovered

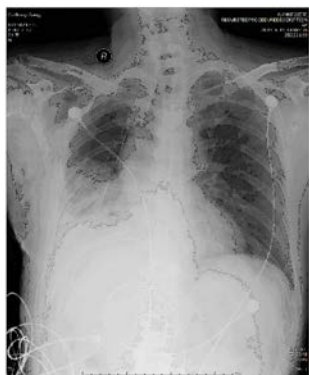


Fig. 1 Postoperative chest radiography revealed satisfactory expansion of the right middle lobe. Chest radiograph.

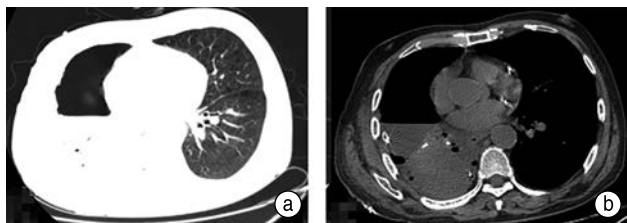


Fig. 2 Chest computed tomographic images revealed right middle lobe atelectasis. (a) Pulmonary window; (b) Mediastinal window

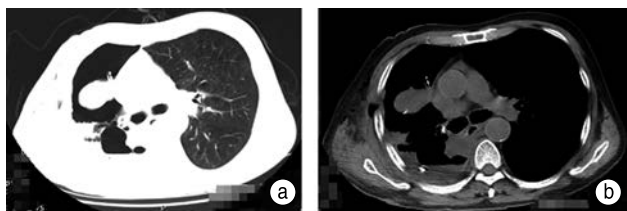


Fig. 3 Chest computed tomographic images revealed reexpansion of right middle lobe. (a) Pulmonary window; (b) Mediastinal window

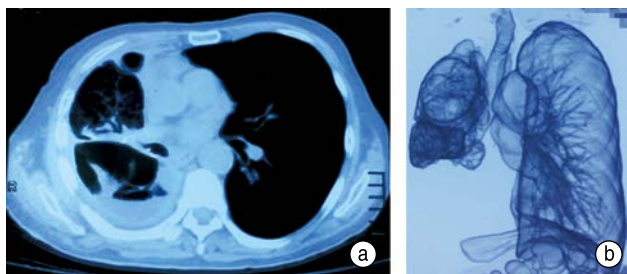


Fig. 4 Chest computed tomographic images: 3 months after the primary surgery showed increased expansion of the right middle lobe. (a) Pulmonary window; (b) 3D Reconstruction

well postoperatively with daily improvements in chest radiographic findings. Follow-up examination with fiberbronchoscopy was performed and revealed an

unobstructed right middle lobar bronchus and sticky yellow sputum (Fig. 3).

Follow-up chest CT performed 3 months after the primary surgery showed increased expansion of the right middle lobe (Fig. 4).

Discussion

Lobar torsion refers to a rotation of the bronchovascular pedicle that results in airway obstruction or vascular flow interruption [1]. It is a rare complication that may occur after trauma, any thoracic procedures, and lobectomy [2-5]. It usually involves the right middle lobe after right upper or lower lobectomy, especially in the presence of a complete fissure, and necessitates anchoring of the middle lobe to the remaining lobe to prevent torsion. [6] However, other lobes can also be involved. Isolated reports in the English literature have documented 35 cases of lobar torsion occurring after thoracotomy, with 25 of these occurring after pulmonary resection [7-10].

The true incidence of lobar torsion after pulmonary resection is difficult to determine. The signs and symptoms may present notably with fever, tachycardia, and loss-of-breath sounds over the affected lung field. Radiographic and fiberbronchoscopic examinations are essential to confirm the typical radiographic findings, including homogenous consolidation on plain radiography and absence of contrast enhancement in the affected lobe on CT. A careful bronchoscopic examination may reveal abnormally tight and obstructed orifice of the affected lobe. Suturing the middle lobe to the lower lobe after a right upper lobectomy has been suggested to possibly prevent lobar torsion. In our case, right upper and lower lobectomy was performed to retain the middle lobe only, so lobe torsion occurred much more easily.

After a diagnosis of lobar torsion is established, treatment must begin immediately. Delayed surgical treatment may result in increased risk of mortality. The current treatment of lung torsion involves thoracotomy with lung resection of the nonviable lobe [11]. However, in our case, right upper and lower lobectomy had been performed earlier; performing the middle lobectomy would have been the same as performing a pneumonectomy. Therefore, we did our best to avoid such a case. At surgery, the right middle lobe was a little dusky and edematous but viable. Thus, the torsion was corrected, and the lobe was anchored to the anterior chest wall with Prolene sutures.

Although the incidence of lobar torsion after lung resection is low, delayed diagnosis may contribute to severe complications. For cases of lobar torsion occurring after thoracoscopic lobectomy, emergency thoracoscopy should be performed. Surgeons should be aware of the possibility of lobar, segmental, or

pyramid torsion occurring after lung resection. However, for remaining lobes that are mobile after lobectomy, fixation to the diaphragm is recommended to prevent lobar torsion. In our case, we repositioned the right middle lobe successfully by using the 3-cm uniportal VATS approach, which has never been reported before. Although the uniportal VATS access may cause less pain and further improve cosmesis, even experienced VATS surgeons can find the limited access challenging because of the cramping of instruments and difficulty in achieving stapling angles^[12] during the procedure. We investigated many methods to overcome the difficulties, including the following: crossing the instruments; selecting thinner and curved instruments; and changing the posture to minimize obstruction of the view by lobes. In addition, establishing a team with high skill in lobectomy is needed in order to make the uniportal VATS approach easier to perform. Therefore, lobectomy and many other operations can be completed with the application of the 3-cm uniportal VATS approach.

In the present case, we successfully repositioned the torsion lobe by using the 3-cm uniportal VATS approach. However, more cases are needed to confirm the feasibility of the approach, and lobectomy remains to be the primary treatment option.

Conflicts of interest

The authors indicated no potential conflicts of interest.

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