Video-Assisted Thoracoscopic Conservative Repair of Postoperative Lobar Torsion

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Postoperative lobar torsion is a rare and life-threatening complication. Several previous cases have been treated with completion lobectomy. We report successful surgical repair of middle lobar torsion after upper lobectomy. On postoperative day 4, the middle lobe was rotated approximately 150 degrees counterclockwise. The surface of the middle lobe appeared congestive, but its surface color, elasticity, and compliance improved 1 h after detorsion. We preserved the middle lobar function and prescribed warfarin for pulmonary vein thrombosis. When preserving a twisted lobe, it is important to consider the damage to the twisted lung, risk of thrombosis, and residual pulmonary function. (Ann Thorac Surg 2014;98:e119–21) © 2014 by The Society of Thoracic Surgeons

A 65-year-old woman was admitted to our hospital for lung cancer surgery. She underwent video-assisted thoracoscopic right upper lobectomy and mediastinal lymph node dissection. For anatomic variation, the lateral part of the middle lobe vein (V4) was returned to the posterior branch of the right superior pulmonary vein (V2). We preserved V4 when we cut the upper lobar pulmonary vein. The perfusion of the medial part of the middle lobe vein (V5) was normal. We did not attach the middle lobe to the lower lobe.

Postoperative body temperature was slightly high, and the white blood cell count and C-reactive protein level returned to normal ranges; however, a chest radiograph revealed that atelectasis in the right paratracheal area had gradually spread. Bronchoscopy on postoperative day 4 revealed mucosal edema and complete airway obstruction at the middle lobar bronchus. Computed tomography (CT) of the chest revealed diffuse consolidation and interlobular septal thickening of the right middle lobe, a twisted pulmonary artery (with confirmed blood flow), and shrinking obstruction of V5 (Fig 1A). We diagnosed middle lobar torsion, and the patient underwent emergent surgery on the same day.

The position of the middle lobe shifted from its original position to the superior side and was rotated approximately 150 degrees counterclockwise (Fig 2A). The surface appeared congestive. Immediately after detorsion, massive serous and bloody sputum were secreted into the airway (Fig 2B). Anesthesiologists continuously suctioned the secretions using a bronchoscope. One hour after detorsion, the bloody sputum subsided spontaneously (Fig 2B), and the surface color, elasticity, and compliance of the middle lobe improved (Fig 2C). In addition, we confirmed pulsation of V4 and V5. Serum levels of potassium and lactase dehydrogenase did not elevate after detorsion. The middle lobe was not necrotic; therefore, we decided to preserve it. To avoid repeated torsion, we attached the middle lobe to the lower lobe using over-and-over suture (Fig 2D).

To control the airway secretions, the patient was extubated after 12 h of mechanical ventilation. She was discharged 14 days after reoperation. CT performed 1 week postoperatively revealed partial expansion of the middle lobe, and a thrombus was found near the superior pulmonary vein stump (Fig 1B). We administered warfarin. The thrombus disappeared after 6 months of antithrombogenic therapy (Fig 1C). Three-dimensional CT volumetry showed that the volume of the middle lobe was maintained at 240 mL, which was 83% of the preoperative volume (290 mL). Pulmonary functions were also the same as the preoperative levels.

Comment

Middle lobar torsion after ipsilateral upper or lower lobe resections account for 70% of all torsion cases according to previous reports [3]. More than 180 degrees of rotation or angulation of the pedicle produces acute obstruction of the bronchus, pulmonary artery, and vein, which induces atelectasis, pulmonary infarction, and gangrene, respectively [3, 4]. When ischemic necrosis and gangrene occur, lobectomy of a twisted lung is necessary. However, when the torsion is less than 180 degrees, which is incomplete obstruction of the pedicle, preservation of a twisted lobe remains controversial.

We conserved the middle lobe for the following reasons: (1) the pulmonary congestion improved intraoperatively with no evidence of pulmonary necrosis; (2) bloody serous sputum almost disappeared during the operation; and (3) pulsation of the pulmonary vein was confirmed. On CT performed at the time of torsion onset, the pulmonary artery showed contrast enhancement up to the peripheral level, indicating that arterial flow was intact. Because the turn of the middle pedicle was
Fig 1. (A) Computed tomography at the time of middle lobe torsion onset, which reveals the sharply shaped occlusion of the pulmonary vein and enhancement of the peripheral pulmonary artery (white asterisk). (B) Day 7 after repairing the torsion. The middle lobe is partially expanded, but a pulmonary vein thrombus is formed (white arrowhead). (C): Six months after the repair, the middle lobe is fully expanded, and the pulmonary vein thrombus has disappeared. (LA = left atrium; PA = pulmonary artery; RML = right middle lobe.)

Fig 2. (A): The right middle lobe was twisted approximately 150 degrees counterclockwise (white arrowhead). (B) Massive serous bloody sputum was secreted into the airway immediately after detorsion. The sputum disappeared spontaneously after 1 h of continuous suction; thereafter, the orifice of the middle lobe bronchus appeared. (C) The surface color, elasticity, and compliance of the middle lobe improved after detorsion. (D) We attached the middle lobe to the lower lobe by over-and-over suture to avoid re-torsion. (RLL = right lower lobe; RML = right middle lobe.)
approximately less than 180 degrees, the twisting was lesser than that reported in previous cases of necrosis. The color and hardness were restored after detorsion, and we confirmed pulsation of the pulmonary vein. Moreover, we confirmed that there was no necrosis through biochemical examination of blood. Therefore, we considered that there was no necrosis.

The massive serous bloody sputum observed after detorsion was consistent with the appearance of transient pulmonary edema. Re-expansion pulmonary edema is a serious complication, often requiring prolonged mechanical ventilation. We performed continuous suction for 1 h, and the sputum gradually disappeared. Subsequently, we performed respirator management using positive-pressure ventilation of 7 cm until the day after re-operation. Because the bloody sputum was a transient condition, we thought that it did not justify a lobectomy.

Pulmonary vein thrombosis after lung resection is associated with lung torsion and vascular stapling [2, 5]. Intraoperative congestion and endothelial injury during the initial surgery and postoperative hypercoagulability are thought to be the main causes of pulmonary vein thrombus [5, 6]. A fatal case of stroke after completion pneumonectomy for torsion was reported [2]. Therefore, warfarin should be prescribed to prevent thromboembolic complications.

In summary, to preserve the twisted lobe, comprehensive intraoperative judgment is important regarding the damage to the twisted lung, possible complications after detorsion, and postoperative pulmonary function.

References