

Prevention of middle lobe torsion after right upper lobectomy with a polymeric sealant

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Lobar torsion is a rare and potentially serious complication after pulmonary resection. A number of procedures have been described to prevent it. We report an easy and quick technique to avoid this complication after right upper lobectomy.

Torsion of the lung represents a rotation of the hilar structures (bronchus, artery, and vein), with consequent vascular compromise and airway obstruction. Reported occurrence rates are between 0.1% and 0.3%.¹ The degree of rotation is generally 180°, but 90° and 360° torsions have also been described.¹ This complication occurs more frequently in the middle lobe after right upper lobectomy; however, torsion of even the entire lung has been reported after the resection of other lobes,^{2,3} chest surgery not involving pulmonary resection,^{4,5} or lung transplant.⁶ Mortalities from 12% to 16% has been reported for complicated torsions. Several methods of fixation of the remaining lobes have been described to prevent this dreadful complication.⁷⁻¹⁰

We describe here a method of fixing the middle lobe after right upper lobectomy by application of a synthetic polymeric sealant.

METHODS

When the middle lobe is completely separated from the lower lobe, fixation should be done at the end of the upper lobectomy. After completion of the pulmonary resection, including complete lymphadenectomy, hemostasis, control of air leaks, testing of the bronchus, and washing of the pleural cavity, the remaining lobes are inflated. In cases in which the risk of middle lobe torsion is anticipated (oblique fissure complete, middle lobe mobile, long hilar pedicle, potential residual pleural space), a thin layer of Coseal (Baxter International Inc, Deerfield, Ill) is sprayed on the inferior surface of the middle lobe and upper surface of the lower lobe, at the level of the anterior aspect of the oblique fissure (Figure 1, A). The lobes are approximated with gentle pressure to allow adhesion. In 2 minutes, the glue sets and links the 2 lobes together (Figure 1, B). The remaining glue can be used to control residual air leaks as previously described.^{11,12}

We have used this method in 9 patients undergoing right upper lobectomy for lung cancer through a lateral thoracotomy. In all cases the procedure required only a few minutes, and no intraoperative or postoperative complications have been observed.

DISCUSSION

Lobar torsion after pulmonary resection, although rare, may carry extremely high morbidity and mortality if undiagnosed. Conditions that may favor the onset of this complication include a freely mobile lobe with the presence of complete interlobar fissures. A long hilar pedicle or the presence of pneumothorax, atelectasis, or pleural fluid may facilitate torsion.¹ Torsion usually produces infarction, ischemia, and hemorrhagic engorgement. This is the classic

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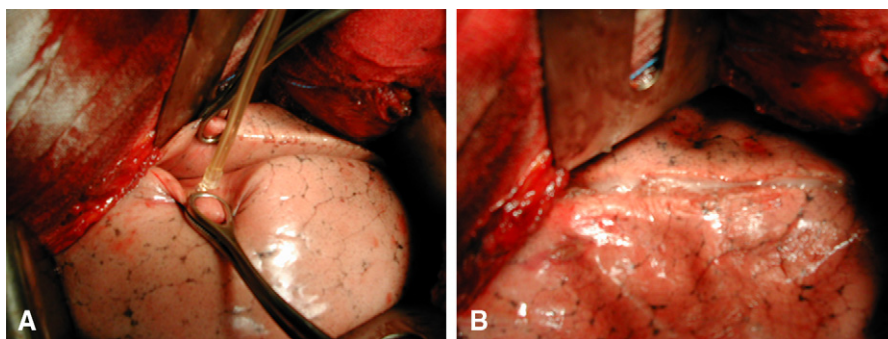


FIGURE 1. A, The middle and lower lobe are inflated. The anterior part of the oblique fissure is complete. The tip of the catheter used to spray the sealant is visible. B, The middle and lower lobes are sealed together.

situation that requires prevention, because diagnosis is not easy and thus treatment may be too late to save the lung parenchyma. The remaining lung must be examined before chest closure to ensure proper anatomic positioning. Stabilization has been advocated, with suggested techniques including suturing the lung to the parietal pleura, stapling the middle and lower lobes together, and apposition of fibrin glue or other hemostatic products.⁷⁻¹⁰ Although the first 2 techniques have been extensively used at our institution and have certainly contributed to keeping the rate of torsion extremely low, with only 1 anecdotal case, they may produce air leaks in emphysematous lungs.

Coseal is a synthetic polymer that does not carry the risk of any blood-borne infection related to a bovine origin, and it has already been widely tested in preventing prolonged air leaks after major pulmonary resections.^{11,12} No complications have been described with its use, and in this setting it allows prevention of lobar torsion. This technique is fast and simple, and it is certainly less likely to injure the parenchyma than other means of fixation. It may show some limitations with a thoracoscopic approach, however, as it has not yet been tested in that setting. The sealant should be applied on inflated lungs to avoid unintentional restriction of lung expansion.

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Intrauterine rupture of anterior tricuspid valve papillary muscle: Tricuspid valve chordae replacement on the first day of life

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Severe neonatal cyanosis not responding to medical or ventilatory treatment requires stabilization by extracorporeal membrane oxygenation (ECMO) unless a repairable structural cause can be found indicating emergency surgery. We present a case of tricuspid valve repair on the first day of life after intrauterine rupture of the anterior tricuspid valve

papillary muscle due to premature closure of the ductus arteriosus.

CLINICAL SUMMARY

A neonate presented with profound cyanosis immediately after birth. Ventilation and administration of prostaglandin did not improve oxygenation. Echocardiography showed right ventricular hypertrophy and dilatation, severe tricuspid valve insufficiency, reduced low-velocity antegrade pulmonary artery flow, normal pulmonary artery bifurcation, no patent ductus arteriosus, and right to left shunt at the foramen ovale. Despite ventilation with nitric oxide and administration of milrinone, hypoxemia persisted. Detailed echocardiography revealed flail anterior leaflet of the tricuspid valve with severe regurgitation and hyperechogenic papillary muscles of the hypertrophied right ventricle (Figure 1).

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