Delayed Left Main Pulmonary Artery Rupture In Uniportal VATS Left Upper Lobectomy: A Case Report

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Background

Immediate rupture of the main pulmonary artery (MPA) with massive hemorrhage is a well-recognized life-threatening complication of video-assisted thoracoscopic surgery (VATS). In contrast, delayed MPA hemorrhage—defined as bleeding occurring tens of minutes to days after the initial vascular injury—is extremely rare but frequently catastrophic due to its abrupt onset and potential to cause rapid hemodynamic collapse.

Case and Operative Course

I performed a 2.5cm uniportal VATS left upper lobectomy with systematic lymph node dissection.
Preoperative CT showed calcified hilar lymph nodes, predicting difficult pulmonary artery dissection. Therefore, I first dissected stations 7 and 4L lymph nodes and freed the posterior wall of the main left pulmonary artery (LPA) for potential occlusion.
During dissection of the left upper lobe artery, extensive calcified adhesions were found between the artery (A3 to A1+2a+b branches) and the bronchus, making conventional dissection impossible. I temporarily occluded the main LPA with a 7-0 silk suture using a suture passer, then individually ligated and divided each arterial branch. When handling the A1+2a+b branch, a linear stapler was attempted twice but abandoned due to excessive resistance; the branch was ligated with silk and divided.
After lobectomy, the occlusion suture was removed. The LPA reperfused well with no evidence of bleeding.

Unexpected Complication and Management

Twenty minutes later, sudden jetting hemorrhage from the main LPA occurred. I immediately gently clamped the main LPA with oval forceps to control bleeding, aspirated the hemothorax, and reviewed the operative course. After re-clamping, I carefully inspected the entire LPA surface and the A1+2a+b stump—no tears or loose ligatures were found. Surprisingly, active bleeding ceased spontaneously after clamp release, but persistent minor oozing remained.
As a precaution, I clipped the A1+2a+b stump with a Hemolock. After repeated exploration, a concealed tear was finally identified near the stump: a 1cm adventitial tear with only a 0.3cm intimal tear. This was attributed to accidental injury by the stapler cartridge during the failed stapling attempt.
Due to the close proximity of the tear to the Hemolock clip, very little tissue was available for suturing. A figure-of-eight suture with 4-0 Prolene was attempted. The first two knots were tied gently, but excessive force when tightening the third knot caused the Prolene suture to cut through the arterial wall, resulting in suture failure.

Definitive Solution

I elected to excise en bloc the A1+2a+b stump, the Hemolock clip, and the Prolene-injured arterial wall, creating a new tear with healthy, smooth edges on the main LPA. Thrombus was removed, and the lumen was irrigated with heparinized saline. The artery was then repaired with 4-0 Prolene using a continuous suture technique: 9 stitches from distal to proximal, followed by a return suture to the distal end and knot tying.
After clamp removal, the LPA was well-perfused with no bleeding.

Operative Challenge and Data

Challenge: The entire procedure was performed through a 2.5cm single port, creating extremely limited working space for suturing. During the second repair, I replaced the distal vascular clamp with a silk suture occlusion to reduce instrument interference.
Total operative time: 150 minutes (70 minutes for bleeding management)
Estimated blood loss: 300ml

Figure A. Sudden jetting hemorrhage from the main left pulmonary artery

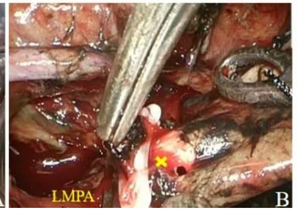

Figure B. Sharply incised healthy edge of the main left pulmonary artery (cross mark)

Figure C. Thrombus beneath the main left pulmonary artery tear

Figure D. Thrombus beneath the main left pulmonary artery tear

Key Takeaways

Never overlook the risk of delayed major vascular rupture during VATS, even after apparently perfect initial hemostasis.
This risk is significantly elevated in patients requiring temporary pulmonary artery occlusion.
Exercise caution with Hemolock clips for hemostasis before definitive localization of the bleeding site, as they may significantly interfere with subsequent vascular repair.
When suturing conditions are poor, resecting damaged tissue and creating a fresh repair site is safer than attempting a compromised suture.