

# Management of pulmonary arterial bleeding in the post induction setting

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**Background:** A minimally invasive approach to lung cancer resection offers many benefits over traditional open surgery. Pulmonary arterial injury is a widely cited reason for conversion to open surgery.

**Methods:** We present a case of pulmonary arterial injury complicating dissection of the pulmonary artery during thoroscopic left upper lobectomy. Ethical approval was obtained from the institutional ethics board and written consent was obtained from the patient.

**Results:** Thoroscopic management of pulmonary arterial bleeding is demonstrated. We show maintenance of a thoroscopic approach with establishment of proximal pulmonary arterial control, allowing suture repair of an injury to the ongoing pulmonary artery.

**Conclusions:** While pulmonary arterial injury may be a significant problem during thoroscopic lobectomy, minimally invasive approaches to repair are safe and effective.

**Keywords:** Pulmonary artery; bleeding; post induction

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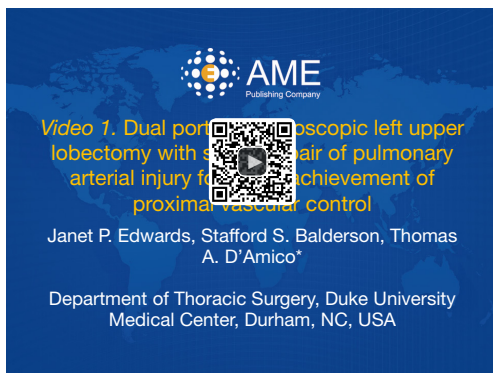
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## Text

Thoroscopic lobectomy is now considered the standard of care for surgical management of early stage pulmonary malignancy, offering many advantages over thoracotomy (1-5). Among the varied reasons for increased rates of complications, conversion to open surgery or planned conventional open surgery is the presence of difficult hilar or interlobar lymphadenopathy (6-8). This difficult to manage lymphadenopathy can be seen in the post induction setting, leading to a potentially increased risk of pulmonary arterial injury (7,9,10). While many thoracic surgeons advocate prompt conversion to thoracotomy in the setting of pulmonary arterial injury, with experience a minimally invasive approach to repair can be safe and effective. We present a case of pulmonary arterial injury during a thoroscopic left upper lobectomy in the post induction setting, demonstrating tamponade of the injury, with

subsequent proximal control and suture repair of the defect.

*Figure 1* is a video presenting a two incision thoroscopic left upper lobectomy complicated by a pulmonary arterial injury incurred while dissecting post induction adherent lymphadenopathy off of the ongoing pulmonary artery distal to the take off of the truncus anterior. At the outset of the video, a sponge ball has been placed overlying the injury to achieve tamponade. We then address the fissure, performing blunt dissection using a thoroscopic suction and lymph node grasper to raise the pulmonary parenchyma off of the underlying pulmonary arterial branches. The lingular and ascending branches of the pulmonary artery are then divided using a curved tip vascular load of the endoscopic stapler. The truncus anterior branch of the pulmonary artery is dissected out with a thoroscopic right angle and lymph node grasper and is divided using a curved tip vascular load of the endoscopic stapler as is



**Figure 1** Dual portal thoracoscopic left upper lobectomy with suture repair of pulmonary arterial injury following achievement of proximal vascular control (11).

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another ascending branch of the pulmonary artery. The left upper lobe bronchus is then divided with a regular load of the endoscopic stapler. The left upper lobe is then placed in a retrieval bag and removed from the chest cavity. The sponge ball is then lifted to check for hemostasis and ongoing bleeding is encountered. It is easily controlled with repeated tamponade. We then employ the thoracoscopic suction and lymph node grasper to dissect proximally on the left pulmonary artery allowing placement of a thoracoscopic vascular clamp proximal to the pulmonary arterial injury. Hemostasis is then adequate to allow a suture repair of the defect.

## Conclusions

This video is illustrative of several tips for management of difficult pulmonary arterial injury encountered during thoracoscopic lobectomy. First, if a pulmonary arterial injury is encountered control can usually be obtained with gentle pressure. The surgeon can then assess the degree of injury, their degree of confidence with techniques of vascular control and repair, and thus the safety of proceeding in a minimally invasive fashion. The need for proximal control should be weighed. Here we demonstrate an injury in a difficult location with significant bleeding after an extended period of tamponade. Proximal control in this case significantly improves visualization and provides an added layer of safety. We also demonstrate that in the setting of pulmonary arterial injury, moving away from the area of difficulty to complete dissection elsewhere can lead to good exposure in an indirect manner. We then

demonstrate the feasibility of performing a thoracoscopic sutured repair of the pulmonary arterial injury.

## Acknowledgements

None.

## Footnote

*Conflicts of Interest:* Dr. D'Amico is a consultant for Scanlan Instruments.

*Ethical Statement:* The study was approved by the University of Louisville IRB. Written informed consent was obtained from the patient. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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