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Video-assisted thoracic surgery for cancer after thoracic aortic aneurysm repair

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Abstract

Video-assisted thoracoscopic surgery is increasingly accepted as an alternative to open thoracotomy and has established efficacy in the management of non-small-cell lung cancer, but the presence of extensive intrapleural adhesions has been considered a deterrent to a minimally invasive approach. We report the successful use of video-assisted thoracoscopic surgery in 3 patients with history of open thoracic aortic aneurysm repair who presented with left lower lobe stage I non-small-cell lung cancer. While this approach is feasible, it is technically demanding and thus, at the present time, we recommend that its use be limited to high-volume video-assisted thoracoscopic surgery centers.

Keywords

Aortic aneurysm; thoracic; Carcinoma; non-small-cell lung; Lung neoplasms; Pneumonectomy; Thoracic surgery; video-assisted

Introduction

Since the 1990s, video-assisted thoracoscopic surgery (VATS) has been increasingly accepted as an alternative to thoracotomy and has established efficacy in the management of pulmonary malignancy. However, compared to many intraabdominal minimally invasive procedures, VATS has been slower to gain widespread popularity. Until recently, the tacit standard of care was to avoid this technique in patients suspected of having extensive intrapleural adhesions from previous surgery. We report 3 cases of successful left VATS pulmonary resection for early-stage non-small-cell lung cancer in patients with a history of open vascular reconstructive surgery.

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Declaration of conflicting interests

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Case reports

Three patients were referred to our institution for surgical management of left lower lobe stage I non-small-cell lung cancer discovered incidentally on aneurysm surveillance imaging or during work-up for shortness of breath (Figure 1). The first was a 71-year-old woman with a past history of aortic valve replacement and open repair of an ascending aortic aneurysm followed by endovascular repair of a descending thoracic aneurysm. The second patient was a 75-year-old woman with a history of type IV thoracoabdominal aortic aneurysm for which open repair via a left thoracoabdominal incision had been performed 2 years earlier. Similarly, a 56-year-old man presented 6 months after open repair of a type IV thoracoabdominal aortic aneurysm that developed in the setting of an endoleak complicating his previous endovascular abdominal aortic aneurysm repair. Due to their extensive thoracic surgical history, we counseled each patient preoperatively that although VATS would be the initial approach, conversion to an open procedure was a real possibility. The surgeon placed each patient in the right lateral decubitus position and entered the left chest via 3 thoracic ports in addition to a 3-cm access incision in the 5th intercostal space. Extensive adhesions, particularly to the diaphragm and posterolateral chest wall along the aortic graft, necessitated careful dissection to safely isolate the inferior pulmonary vein, and identification of the fissure required complete decortication. Due to marginal pulmonary function in the setting of severe emphysema, the decision was made preoperatively to proceed with a wedge resection and placement of brachytherapy mesh in the first patient. The second patient underwent a left lower lobectomy, and the third received bisegmentectomy in addition to mediastinal lymph node dissection. Significant adhesiolysis and extrapleural dissection led to increased sanguineous chest tube output, resulting in a blood transfusion on the first postoperative day in one patient. Recovery was otherwise uneventful, and all 3 patients were discharged by postoperative day 6. Surgical pathology demonstrated negative margins in each case, without lymph node involvement. All 3 patients have been followed without evidence of recurrent disease up to 2 years postoperatively.

Discussion

Over the past 20 years, VATS lobectomy has become an increasingly accepted technique. A recent meta-analysis reported significantly lower overall complications of VATS compared to thoracotomy, including decreased perioperative mortality, atrial arrhythmias, and pneumonia.¹ In regards to oncologic effectiveness, VATS has been shown to be a safe and technically feasible approach for resection of early-stage non-small cell lung cancer.² The presence of extensive adhesions, whether from previous thoracic surgery or neoadjuvant chemoradiation, has been considered a relative contraindication to VATS. A panel of 50 international experts recently convened to develop a consensus statement addressing controversial points in the field based on 20 years of clinical experience. Regarding eligibility, the panel agreed that VATS lobectomy is contraindicated for tumor invasion of the chest wall or ribs and in patients with forced expiratory volume in 1 s <30% of predicted or carbon monoxide diffusion in the lung <30% of predicted; however, it is not contraindicated in patients who have undergone previous thoracic surgery.³

With an aging population, the need to manage patients with both aneurysmal disease and thoracic malignancy becomes increasingly important. While there are reports of patients in whom thoracoabdominal aortic aneurysm and lung cancer were diagnosed concomitantly and managed with either simultaneous open surgery or endovascular repair followed later by lobectomy,^{4,5} our experience is unique in the literature. We present the above cases in support of an expanded role for VATS in the setting of prior open thoracic surgery. Although feasible, this approach is technically demanding and therefore we recommend limiting its use to high-volume VATS centers. Due to the density of adhesions typically localized to the diaphragm and lower chest, we emphasize caution when dissecting around the inferior pulmonary vein, and surgeons attempting this approach should feel comfortable with VATS intrapericardial dissection because this may prove to be a cleaner plane. It is important to note that conversion to an open procedure in these patients should not be perceived as a failure. With regards to oncologic efficacy, the restriction of mediastinal lymph node dissection by extensive adhesions is a legitimate concern. Further research is recommended to determine whether a minimally invasive approach has equivalent long-term survival to thoracotomy in this patient population.

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Figure 1.
Computed tomography of the chest demonstrating a left lower lobe nodule.