Editorial

Single-direction thoracoscopic lobectomy: a step in the right direction

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Thoracoscopy in the treatment of thoracic disease is not a recent phenomenon. As early as 1910, Jacobaeus *et al.* examined the thoracic cavity and pleura with a cystoscope (1). The thoracoscope's role was in management of pleural disease or for limited lung biopsies. In the 1990s, with improvements in anesthesia and video technology, the first reports were published of minimally invasive lung resections with the assistance of a video thoracoscope. From utilization in wedge resections (2-4), to anatomic lobectomies (5), video-assisted thoracoscopic surgery (VATS) became an accepted modality in the treatment of lung cancer (6-9). In comparisons with thoracotomy, VATS lobectomy has shown decreased postoperative complications and length of stay with equivalent oncologic outcomes (9-12). Despite the relatively safe record of VATS lobectomy, catastrophic intraoperative complications are not unheard of and have been reported at 1% (13). A variety of operative approaches have been proposed to standardize the VATS lobectomy. Techniques have ranged from simultaneously stapling all hilar structures (14), to a "no-touch fissure" anterior approach (15), to uniportal VATS lobectomy (16). In 2010, Liu and his group from Sichuan introduced a novel technique—the single-direction thoracoscopic lobectomy (17). They completed the procedure in 26 of 28 patients with an average operative time of 135 minutes, average blood loss of 125 mL, average lymph nodes dissected of 11.8, average postoperative hospital stay of 7.4 days and no perioperative deaths (17). They have also published on their method of non-grasping mediastinal lymph node dissection by maximizing use of the metal endoscopic suction with the electrocoagulation hook and ultrasonic scalpel (18).

In this month's journal, the group from Sichuan University presents the steps to their single-direction thoracoscopic lobectomy in detail (19). The dissection is performed at the hilum with an anterior to posterior approach for the upper and middle lobes and a caudal to cranial approach for the lower lobes. For the right upper lobe, the right upper lobe vein is divided first, then the truncus arteriosus, then the ascending posterior artery. Dissecting the lymph nodes between the upper lobe bronchus and bronchus intermedius allows for successful division of the upper lobe bronchus. The fissure was divided last. For the right middle lobe, the right middle lobe vein is divided first, followed by the bronchus, then the middle lobe arterial branches, and finally the fissure. For the right lower lobe, the inferior pulmonary vein is divided first. Removal of the lymph nodes between the right lower and middle lobe bronchus allows for safe division of the lower lobe bronchus, followed by the superior segmental and basal arteries, and lastly the fissure. In this way, the authors can perform a fissureless dissection without the need to flip the lung over repeatedly, thus minimizing tissue trauma and ideally ensuring efficiency. The authors also present excellent videos of all three right-sided lobectomies that are clear and instructive (19).

The authors demonstrate good fissure-less techniques for right sided lobectomies, with the goal of minimizing air leaks and length of stay. It is interesting to note that despite this technique, in their previously published papers in 2010 and 2015, the average length of stay is greater than 7 days (17,18). This is much longer than those commonly reported in the United States with a length of stay of 4 to 5 days in large VATS lobectomy series (9,12). It is unclear whether this is due to institutional or cultural differences, or if the length of stay is shorter in their more recent series.

The authors highlight some of the potential pitfalls and ways to avoid them with the single-direction thoracoscopic lobectomy (19). During a right upper lobectomy, the superior segmental artery could be mistaken for the posterior ascending artery, and the authors recommend closely looking at the course of the arteries to distinguish between the two. During a right middle lobectomy, the arterial branches can be small and not amenable to stapling thus requiring ligation with silk ties. During the right lower lobectomy, the bronchus intermedius could be mistaken for the lower lobe bronchus and occasionally the superior segmental artery and basal arteries needed to be ligated separately. One minor critique of the single-direction thoracoscopic lobectomy is the need for silk ligation of certain vessels due to the difficult angle with a vascular stapler. While the authors point towards the cost efficacy of this technique, it may be more dangerous especially when tying on a fragile vessel and may add time to the procedure. In addition, as a minor technical point, the use of the Harmonic scalpel to divide small pulmonary arterial branches that have been ligated proximally is not cost effective. It could have been done with clipping distally towards the specimen side and dividing with scissors. If the Harmonic is to be used, Swanson and others at the Brigham have shown that ultrasonic shears is sufficient for small diameter (≤5 mm) pulmonary arterial and venous ligation (20).

Liao and coauthors should be commended for their simplification and distillation of the VATS lobectomy with their single-direction approach. The article has clear and precise descriptions of each of the right sided lobectomies and the videos are an excellent adjunct to the paper. Their work is an important addition to the literature on VATS lobectomy. The single-direction thoracoscopic lobectomy is certainly a step in the right direction towards standardizing and improving the safety of the VATS lobectomy.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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