



As minimal as possible

Travis C. Geraci

Division of Thoracic Surgery, Department of Cardiothoracic Surgery, New York University Langone Health, New York, NY, USA

Correspondence to: Travis C. Geraci, MD. Division of Thoracic Surgery, Department of Cardiothoracic Surgery, New York University Langone Health, 530 First Avenue, Suite 9V, New York, NY 10016, USA. Email: travis.geraci@nyulangone.org.

Comment on: Zhang C, Yu Z, Li J, *et al.* Hybrid video-assisted thoracoscopic surgery sleeve lobectomy for non-small cell lung cancer: a case report. *J Thorac Dis* 2020;12:6836–46.

Keywords: Lung; resection; video-assisted; thoracotomy; sleeve; lobectomy

Submitted Jan 01, 2023. Accepted for publication Jan 12, 2023. Published online Mar 01, 2023.

doi: 10.21037/jtd-23-1

View this article at: <https://dx.doi.org/10.21037/jtd-23-1>

While the fundamentals of anatomic lung resection—dissection and division of the vascular and bronchial structures, division of the lung parenchyma, and mediastinal and hilar lymphadenectomy—have remained relatively constant, there has been a renaissance of minimally invasive surgical approaches to lung resection that have evolved from the open thoracotomy era. Since the initial report of video-assisted thoracoscopic surgery (VATS) in 1992 which included three patients who underwent lobectomy, innumerable publications, case reports, and videos, have demonstrated decreased surgical stress via video-assisted, robotic, and uniportal techniques (1). While the optimal approach to lobectomy remains an open question, what is generally agreed upon is that when compared to open thoracotomy, a minimally-invasive approach results in superior perioperative outcomes, including reduced pain, decreased morbidity, and an accelerated functional short-term recovery (2). Importantly, these outcomes have been achieved while maintaining oncologic outcomes including locoregional recurrence and survival (2).

In their case report, Zhang and colleagues detail the technique of a hybrid VATS approach to sleeve lobectomy, which per the authors “lies between open and VATS” (3). Stated simply, it’s a less morbid approach than a traditional thoracotomy, but it’s easier than traditional VATS. The question remains, is there a role for this Goldilocks-type “hybrid” approach that utilizes elements of open and minimally-invasive surgery? Is it “just right”?

The operation described by Zhang and colleagues,

involved an 8 cm non-rib spreading incision in the 5th intercostal space paired with a VATS camera port. The patient had a pulmonary adenocarcinoma with endoluminal growth at the origin of the bronchial orifice of the right upper lobe with concomitant regional spread to mediastinal lymph nodes. A complete response was achieved after two cycles of cisplatin-based chemotherapy and the decision was made to perform a right upper lobe sleeve lobectomy. In the operation, infiltrating lymphadenopathy abutting the posterior (A2) and anterior (A3a) pulmonary artery branches, mandated pulmonary arterioplasty. Next, the right mainstem and bronchus intermedius were opened sharply and frozen section confirmed negative margins. An end-to-end airway anastomosis was performed in a bi-directional continuous fashion. The patient recovered well and was found to have had a complete pathologic response.

The primary advantage of the technique promoted by the authors is the increased visualization provided by the VATS camera, while preserving direct tissue manipulation and an expedited and/or enhanced performance of the bronchial and arterial anastomoses via the thoracotomy incision (versus VATS instrumentation). Compared to standard thoracotomy, this approach offers additional views and perspectives, exhibited by the intraoperative photos provided by the authors which demonstrate the pulmonary and mediastinal anatomy clearly.

The authors are commended for achieving a good clinical outcome after a particularly challenging surgery. They are also correct in reporting that a sleeve lobectomy should be considered prior to performing a

pneumonectomy, but that given the complexity of the operation, it has had a slower adoption on minimally-invasive platforms. While certainly, there are minimally-invasive surgeons who perform sleeve lobectomy, there are equally a significant number of surgeons that do not have the resources, staff, or training to perform complex minimally-invasive thoracic surgery. Notably, a substantial number of patients in the United States undergo lobectomy via thoracotomy, and the conversion rate, although declining, remains relatively high (4). The value of the hybrid VATS approach, therefore, is the potential for adoption of this technique among surgeons who would otherwise perform an open thoractomy.

Comparative data favors a minimally invasive approach to pulmonary resection (2). The number and/or total measured length of the incisions, however, is difficult to compare and may have diminishing returns regarding pain control, hospitalization, and overall recovery. Anecdotally, there appears to be value in avoiding the use of rib-spreading and retracting. Equally, an 8 cm incision theoretically induces less tissue trauma than a traditional 12–15 cm thoracotomy incision. Furthermore, the avoidance of muscle division is seemingly correlated to postoperative function and recovery. The authors do not report this detail, but it's likely that the camera VATS incision can be used for the postoperative chest tube, which further economizes the incisional burden.

In our experience, a completely portal robotic sleeve resection is safe and achieves good intermediate oncologic outcomes (5). In a consecutive series, 18 patients underwent successful robotic sleeve resection, two of which included pulmonary arterioplasty. As the authors note, robotic systems are not always available or covered by insurance programs.

It is our preference to perform a running anastomosis with a locking suture. The anastomosis starts on the distal bronchus connecting the inferior most aspects of the cartilaginous airways. The suture is run anteriorly along the cartilaginous portion of the airway. When complete, the second suture is run posteriorly down the membranous portion of the airway. The membranous portion is completed last to avoid tearing. A pleural wrap is not obligatory, but can be used to cover the bronchial anastomosis to promote healing.

While it may seem there should be an optimal approach to pulmonary resection, what is ultimately important is performing safe and efficient surgery that achieves strong short and long-term outcomes. Approaches to surgery that limit the burden of surgical stress while maintaining oncologic

principles will continue to be utilized and promoted. The surgical hybrid technique reported by Zhang and colleagues may be adopted by surgeons currently performing a standard thoracotomy for pulmonary sleeve lobectomy, and in doing so, increasing the number of patients who undergo minimally-invasive surgery, or at least, a hybrid one.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the Editorial Office, *Journal of Thoracic Disease*. The article did not undergo external peer review.

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at <https://jtd.amegroups.com/article/view/10.21037/jtd-23-1/coif>). The author has no conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Open Access Statement: This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International License (CC BY-NC-ND 4.0), which permits the non-commercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

References

1. Lewis RJ, Caccavale RJ, Sisler GE, et al. One hundred consecutive patients undergoing video-assisted thoracic operations. *Ann Thorac Surg* 1992;54:421-6.
2. Klapper J, D'Amico TA. VATS versus open surgery for lung cancer resection: moving toward a minimally invasive approach. *J Natl Compr Canc Netw* 2015;13:162-4.
3. Zhang C, Yu Z, Li J, et al. Hybrid video-assisted thoracoscopic surgery sleeve lobectomy for non-small cell lung cancer: a case report. *J Thorac Dis* 2020;12:6836-46.

4. Potter AL, Spasojevic A, Raman V, et al. The Increasing Adoption of Minimally Invasive Lobectomy in the United States. [Epub ahead of print]. doi: 10.1016/j.athoracsur.2022.09.032.
5. Geraci TC, Ferrari-Light D, Wang S, et al. Robotic Sleeve Resection of the Airway: Outcomes and Technical Conduct Using Video Vignettes. *Ann Thorac Surg* 2020;110:236-40.

Cite this article as: Geraci TC. As minimal as possible. *J Thorac Dis* 2023;15(3):943-945. doi: 10.21037/jtd-23-1