

The authors reported no conflicts of interest.

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study by Hennon and colleagues⁴ indicated that RATS was not superior to VATS with respect to lymph node upstaging for lobectomy. Therefore, nodal upstaging is yet to be confirmed as a potential benefit of RATS in further studies.

We reported similar operative times in our study, and will clarify that operative times mentioned in both groups were calculated from skin to skin. As Song and Flores¹ mention, positioning and docking of the robotic equipment undoubtedly contribute to nonoperative anesthesia time, and this is why we have dedicated skilled assistants who are capable of completing it within 5 minutes. In addition, the operative time in the VATS group also contains the connection and disconnection to instruments and screens. The reason we chose this calculation of total time was to truly compare the operative time, including team cooperation time required, between the 2 surgical approaches.

The main argument against RATS compared with VATS is its increased cost. This is also the major problem that we face with robotic surgery in China. Another limitation is the limited availability of robotic systems because only about 140 hospitals in China are equipped with robotic systems, and most have only 1 or 2 systems that are shared by multiple surgical departments.

Finally, Song and Flores¹ mention the inability to directly palpate the tumor, especially GGO tumors, during the robotic approach, suggesting a need to have information regarding GGO versus solid components. We believe that palpation of GGO tumors is a common problem in minimally invasive surgery. It is difficult to directly palpate GGO tumors not only in robotic surgery, but also in VATS. For these patients, hook-wire localization and 3-dimensional images using computed tomography angiography and bronchography were selectively used in some difficult and/or atypical segmentectomies in both cohorts.

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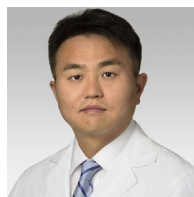
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References

1. Song KJ, Flores RM. Commentary: robot-assisted segmentectomy is safe and expensive: what is the debate? *J Thorac Cardiovasc Surg*. January 25, 2020 [Epub ahead of print].
2. Zhang Y, Chen C, Hu J, Han Y, Huang M, Xiang J, et al. Early outcomes of robotic versus thoracoscopic segmentectomy for early-stage lung cancer: A multi-institutional propensity score-matched analysis. *J Thorac Cardiovasc Surg*. January 25, 2020 [Epub ahead of print].
3. Wilson JL, Louie BE, Cerfolio RJ, Park BJ, Vallières E, Aye RW, et al. The prevalence of nodal upstaging during robotic lung resection in early stage non-small cell lung cancer. *Ann Thorac Surg*. 2014;97:1901-6.
4. Hennon MW, DeGraaff LH, Groman A, Demmy TL, Yendamuri S. The association of nodal upstaging with surgical approach and its impact on long-term survival after resection of non-small cell lung cancer. *Eur J Cardiothorac Surg*. 2020;57:888-95.

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REPLY: VIDEO-ASSISTED THORACOSCOPIC SURGERY VERSUS ROBOTIC ASSISTED SURGERY: CAN THEY BOTH CO-EXIST?



Reply to the Editor:

More than ever, driven by advancements in the technology, thoracic surgeons are using a robotic platform to perform anatomical pulmonary resection. There is an intense debate whether robotic-assisted surgery (RAS) offers any advantage over the video-assisted thoracoscopic surgery (VATS) technique. Several retrospective institutional studies and large database studies reported, for the most part, equivalent short-term safety profiles but greater costs associated with RAS.^{1,2} The article by Zhang and colleagues³ similarly shows VATS and robotic segmentectomy have an equivalent short-term clinical outcome with increased direct cost. RAS showed improved ability to perform lymphadenectomy, yet the oncologic benefit is less than clear. One may then wonder what is the utility of the robotic approach when the RAS costs more without clear clinical benefits?

The debate over medical robotics is nothing new; it has challenged and, in certain fields, shifted the treatment paradigm. This change was the most notable in the urology field, where RAS is now the most common approach for radical prostatectomy in the United States. Yet, in early-phase adoption, the cost effectiveness of robotic surgery over laparoscopic surgery and open surgery was often questioned and debated. It was found that the robotic surgery was associated with greater cost compared with laparoscopic surgery without significant clinical benefit.⁴ More contemporary studies have shown, however, that robotic surgery is either comparable or costs less compared with laparoscopic and open prostatectomy.⁵

It can be surmised that as the experience and data regarding robotic anatomic pulmonary resection matures,

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a better understanding of the optimal minimally invasive surgical approach will emerge in the future. A recent study published using more contemporary data, for instance, indicates that once a hospital performs 25 or more pulmonary resections, the cost of the RAS and VATS is equivalent.⁶ Until better understanding of the superiority of one technique over the other, the VATS and RAS should be viewed as complementary, and not competing, approaches and the decision for the operative approach should be guided by practice patterns, institutional resources, and individual surgeon experience.

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References

1. Louie BE, Wilson JL, Kim S, Cerfolio RJ, Park BJ, Farivar AS, et al. Comparison of video-assisted thoracoscopic surgery and robotic approaches for clinical stage I and stage II non-small cell lung cancer using the Society of Thoracic Surgeons database. *Ann Thorac Surg.* 2016;102:917-924.8.
2. Bao F, Zhang C, Yang Y, He Z, Wang L, Hu J. Comparison of robotic and video assisted thoracic surgery for lung cancer: a propensity-matched analysis. *J Thorac Dis.* 2016;8:1798-803.
3. Zhang Y, Zhang J, Li H. Robotic segmentectomy: we are still on the way. *J Thorac Cardiovasc Surg.* 2020;160:e87-8.
4. Lotan Y, Cadeddu JA, Gettman MA. The new economics of radical prostatectomy: cost comparison of open, laparoscopic and robot assisted techniques. *J Urol.* 2004; 172:1431-5.
5. Kockerling F. Robotic vs. standard laparoscopic technique—what is better? *Front Surg.* 2014;1:15.
6. Nguyen DM, Sarkaria IS, Song C, Reddy RM, Villamizar N, Herrera LJ, et al. Clinical and economic comparative effectiveness of robotic-assisted, video-assisted thoracoscopic and open lobectomy. *J Thorac Dis.* 2020;12:296-306.

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additional clarification, our fundamental assessment remains the same: RATS anatomic resections are safe but expensive and lack proven benefits.

Plainly, N1 node retrieval is surgeon-dependent, and increased node retrieval without a change in upstaging leaves the clinical relevance of this finding unclear. This adds to the uncertainty of justifying an expensive procedure.

While we agree that ground-glass opacity lesions can be difficult to palpate in video-assisted thoracic surgery, we contend that those with at least a partially solid component are more readily palpable by this approach than by RATS. In addition, surgery for pure ground-glass opacities can be avoided or delayed indefinitely with careful surveillance.² The authors' selective use of preoperative hook-wire localization also introduces other potential complications such as inaccurate identification or displacement.

Drs Zhang and Li clarified that the operative times used in their study were calculated from skin to skin. While dedicated skilled assistants can minimize this time, this expertise and its requisite training/volume may not be feasible at many hospitals. At an upfront investment of up to \$2.5 million with additional annual and per-procedure expense,³ the cost might be prohibitive for an already-burdened health care system, especially for a platform without a clear clinical advantage.

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**REPLY FROM
 AUTHORS: ROBOTIC
 SEGMENTECTOMY:
 BENEFIT?**



Reply to the Editor:

We thank Drs Zhang and Li¹ for their response in this discussion about the role of robot-assisted thoracic surgery (RATS) for sublobar anatomic lung resections. Despite the

References

1. Zhang Y, Zhang J, Li H. Robotic segmentectomy: we are still on the way. *J Thorac Cardiovasc Surg.* 2020;160:e87-8.
2. Yankelevitz DF, Yip R, Smith JP, Liang M, Liu Y, Xu DM, et al. CT screening for lung cancer: nonsolid nodules in baseline and annual repeat rounds. *Radiology.* 2015;277:555-64.
3. Perez RE, Schwaitzberg SD. Robotic surgery: finding value in 2019 and beyond. *Ann Laparosc Endosc Surg.* 2019;4:51.

<https://doi.org/10.1016/j.jtcvs.2020.04.091>