Editorial Commentary

Conversion from VATS and RATS lobectomy to open thoracotomy: different scenario, same outcomes?

Luca Voltolini, Simone Tombelli, Giovanni Mugnaini

Thoracic Surgery Unit, Department of Experimental and Clinical Medicine, Careggi University Hospital, Florence, Italy

Correspondence to: Luca Voltolini, MD. Associate Professor of Thoracic Surgery, Head of Thoracic Surgery Unit, Department of Experimental and Clinical Medicine, Careggi University Hospital, Florence, Italy. Email: luca.voltolini@unifi.it.

Comment on: Servais EL, Miller DL, Thibault D, *et al.* Conversion to Thoracotomy During Thoracoscopic vs Robotic Lobectomy: Predictors and Outcomes. Ann Thorac Surg 2022;114:409-17.

Received: 30 June 2022; Accepted: 21 July 2022; Published online: 02 August 2022.

doi: 10.21037/vats-22-16

View this article at: https://dx.doi.org/10.21037/vats-22-16

The perceived risk of catastrophic intraoperative complications and consequent emergency conversions to thoracotomy has been one of the mayor hurdles to the slow widespread adoption of minimally invasive lobectomies (1). The experience gained in video-assisted thoracoscopic surgery (VATS) lobectomies first and in the robotic-assisted thoracoscopic surgery (RATS) lobectomies afterwards has demonstrated that these approaches are feasible and safe, that only a small percentage requires conversion to open surgery and that the consequences are very rarely catastrophic (2). Nevertheless, the identification of preoperative predictors of conversion remains an important goal, to maximize patient safety and optimize the young surgeon's progressive exposure to more difficult cases as they move along the learning curve. Moreover, as highlighted by the authors, not much is known regarding the incidence and the consequences of conversion from RATS to open surgery.

In this study Servais and colleagues analyze the predictors and outcomes in case of conversion to thoracotomy during VATS versus RATS lobectomy, using the data from the STS-GTS-Database, evaluating 27,695 minimally invasive lobectomies from 269 centers, performed between 2015 and 2018. This study is particularly valuable in so far as it uses the standardized root cause analysis with the so called "VALT classification" (3) and assesses both emergent and nonemergent conversions. This is particularly important because there is a substantial difference between a locally advanced case that may be started by VATS with the awareness that it will probably be approached open after a short exploration as opposed to an early-stage cancer that is completed thoracoscopically more than 90% of the time and has to be converted emergently due to massive bleeding.

As previously shown, RATS lobectomy has a decreased conversion rate compared to VATS lobectomy (4), while the reason for conversion to open differed significantly between VATS and RATS lobectomy with an increased likelihood of emergent conversion for vascular injury in RATS, requiring more blood transfusions. However, no difference was found in perioperative mortality and mayor complications between VATS and RATS conversion. Conversions were associated with increased morbidity and mortality in accordance with some previous studies (5,6), and emergent conversion was associated with increased mortality compared to elective conversion. Instead, differences between VATS and RATS lobectomy concerning the risk factors of conversion have not been described before. Some risk factors, well known from previous studies (7), such as decrease in forced expiratory volume in 1 second (FEV1), clinical stage III and left sided resections, were each independently associated with increased odds of conversion for both VATS and RATS lobectomy. Interestingly, clinical stage II and preoperative chemotherapy were found to be predictors of conversion for the VATS but not for the RATS lobectomy. We can assume that, on the one hand, the improved dexterity and vision in RATS may allow a successful dissection of the hilar lymph nodes and the fibrotic tissue developed after chemotherapy; while on the other hand, the lack of tactile feedback can expose the "robotic" surgeon to a mayor risk of vascular

injury, when the dissection is necessarily performed close to the pulmonary artery. Not surprisingly, this study also shows that conversion occurs more frequently in low volume centers, in both VATS and RATS lobectomies, but it is to be noted that there was a significantly higher rate of conversion in centers with low VATS volume compared to centers with low RATS volume, maybe indicating a different surgeon learning curve between VATS and RATS.

As with any other studies based on large multi-institutional databases, many important details are missing. For example, the GTS-Database does not currently contain long-term outcome data or surgeon specific data and, therefore, it is not possible to evaluate the impact of conversion on survival or cancer-specific outcomes and to assess the impact of individual surgeon volume or learning curve.

This study's findings may help case selection and preparation, particularly in the early stage of the thoracic surgeon learning curve, potentially reducing the occurrence and risks associated with unexpected conversion to open thoracotomy. In this regard, Louie *et al.* (4) indicate that planned conversion during the learning curve is suggested as a good practice for dealing with emergencies. Hopefully, the development of new and more realistic VATS and RATS simulators will improve the trainees learning curve and consequently diminish the number of emergency and unplanned conversions.

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the editorial office, *Video-Assisted Thoracic Surgery*. The article did not undergo external peer review.

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://vats.amegroups.com/article/view/10.21037/vats-22-16/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are 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.

References

1. Vannucci F, Gonzalez-Rivas D. Is VATS lobectomy standard of care for operable non-small cell lung cancer? Lung Cancer 2016;100:114-9.
2. Flores RM, Ihekweazu U, Dycoco J, et al. Video-assisted thoracoscopic surgery (VATS) lobectomy: catastrophic intraoperative complications. J Thorac Cardiovasc Surg 2011;142:1412-7.
3. Gazala S, Hunt I, Valji A, et al. A method of assessing reasons for conversion during video-assisted thoracoscopic lobectomy. Interact Cardiovasc Thorac Surg 2011;12:962-4.
4. Louie BE, Wilson JL, Kim S, 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;102:917-24.
5. Bongiolatti S, Gonfiotti A, Viggiano D, et al. Risk factors and impact of conversion from VATS to open lobectomy: analysis from a national database. Surg Endosc 2019;33:3953-62.
6. Byun CS, Lee S, Kim DJ, et al. Analysis of Unexpected Conversion to Thoracotomy During Thoracoscopic Lobectomy in Lung Cancer. Ann Thorac Surg 2015;100:968-73.
7. Samson P, Guitron J, Reed MF, et al. Predictors of conversion to thoracotomy for video-assisted thoracoscopic lobectomy: a retrospective analysis and the influence of computed tomography-based calcification assessment. J Thorac Cardiovasc Surg 2013;145:1512-8.

doi: 10.21037/vats-22-16
Cite this article as: Voltolini L, Tombelli S, Mugnaini G. Conversion from VATS and RATS lobectomy to open thoracotomy: different scenario, same outcomes? Video-assist Thorac Surg 2023;8:12.