Editorial

How to teach uniportal VATS to younger and elder generations: two different methods or any common overlapping points?

Luca Bertolaccini

Department of Thoracic Surgery, Maggiore Teaching Hospital, Bologna, Italy

Correspondence to: Luca Bertolaccini, MD, PhD, FCCP. Department of Thoracic Surgery, Maggiore Teaching Hospital, Largo Nigrisoli 2, 40133 Bologna, Italy. Email: luca.bertolaccini@gmail.com.

Received: 02 September 2018; Accepted: 02 January 2019; Published: 15 January 2019.

doi: 10.21037/shc.2019.01.02

View this article at: http://dx.doi.org/10.21037/shc.2019.01.02

Introduction

The knowledge of the skills is fundamental in every medical curriculum. Therefore, the progress of expertise in surgery should correspond to the achievement of knowledge. Despite this, the proper valuation of surgical skills is not well established. In the current training background, the introduction of recognised testing for specific operative skills could be used to afford productive feedback and would be used in the resident evaluation identifying some deficiencies in the training programme. Nevertheless, the tools formerly existing are limited, although there is some evaluative scale to be used in the surgical training evaluation (1).

Many issues need to be measured when choosing appropriate models for evaluation of surgical ability. Consequently, the question was not about the validity of a task, but whether about the appropriateness for a defined target. Technical skill evaluations have many potentials uses beyond skill assessment. Technical performance during training could be determined by repeated examinations, leading to longitudinal analysis development and developmental feedback. The developmental feedback would permit helpful criticism regarding performance, allowing the highlight of specific deficiencies and the correction with beset training and could be used to determine the progress or the need for repetition of a training task (2). The skills in a new technique should not be built exclusively on the numbers of procedures but the assessment of skills and outcomes. The transparent educational involvement should include the verification of the acquisition of knowledge, skill, safety, and the monitor of the outcomes (3).

The learning curve of the video-assisted thoracic surgery (VATS) lobectomies

A learning curve is considered completed when the observed parameter reaches a steady state, and the results could be related to the limitations published in the medical literature. Multidimensional learning curves (including operative time, conversion to open surgery, blood loss, hospital length of stay, and postoperative complications) are mostly useful for the performance improvement analysis. The learning curves for video-assisted thoracic surgery (VATS) lobectomies have been intensely studied. VATS requires specialised dexterity different from open surgery due to the transformation of a two-dimensional video image into a three-dimensional surgical field, the need for excellent eye-hand coordination, and the compensation of the reduced tactile feedback. Before starting a VATS lobectomy program, the surgeon should have in the surgical curriculum a considerable number of other VATS procedures. Through these minor procedures, the surgeon obtains the necessary skills (dissecting, stapling, and suturing), can then proceed to gain the skills for major VATS procedures. The other key for a successful VATS lobectomy program is the knowledge and the efforts of the operating room staff. Naturally, the VATS lobectomy learning curve should growth from a more comfortable lobectomy to a challenging case. The inexpert surgeon should challenge first a VATS lobectomy of the right lower lobe, then of the left lower lobe, the right middle lobe, the right upper lobe, and lastly of the left upper lobe.

Along with increasing experience, patient selection include older, more advanced stage disease, and more

compromised pulmonary function patients, without any concession in disease-free survival (4). Also, the operative data collection in a database and the consultation with other skilled surgeons may help to abbreviate the learning curve (5). On the other hands, teaching VATS lobectomies requires an adequate volume of patients because it is also well known that the surgical volume of VATS lobectomies significantly affects the quality of the procedure (6). The valuation of performance has been the issue of rigorous investigation in the operating room, with the main aims of obtaining unfailing measures of the training effectiveness, and a certitude measure of surgeon skill related to the advancement of competence (1).

The increasing demand for VATS training face challenges regarding both quality and quantity. About quality, the quality of thoracic surgical training in many countries remains uncertain. Concerning quantity, a surgical trainee should be exposed to many operations in a limited period and the trend for reduced working hours could lead to insufficient clinical exposure. However, the training is often contradicted by political and financial pressures on surgeons to provide more clinical service rather than teaching. Building international collaborations for training and education could be an essential route towards overcoming these challenges. For trainees, a large volume of experience could be obtained in a quite short training period. Live surgery always involves surgeons at work in unaware situations, whereas in international collaborations courses, all attendees watch the faculty performing restfully in their hospitals. Being inside the operating room allows direct interaction with the surgeon and the appreciation of fine details of the surgeon's movements easily missed on a video (7).

How assess the junior learning curve?

Surgical skills depend on the essential cognitive element (knowledge of the procedure) and the manual dexterity component (the process of execution). Cognitive elements are longer to absorb, and it is the acquisition of manual dexterity component that differentiates able from the skilled performance. Tools for an objective evaluation of the learning curve could be divided into objectively structured scales and analysis of motion. Objectively structured scales are useful and reliable methods of appraising surgical dexterity for the assessment of technical ability in the animal, cadaveric and live simulation environments. Analysis of motion has been utilised for the assessment of surgical tasks, such as suturing or knot-tying.

Nevertheless, some factors should be considered in the choosing of appropriate assessment models such as the validity of the task (correct discrimination between experienced, intermediate and novice), if there is a maximum or minimum effect (too easy or too complicated task) or if the skill to be assessed could be isolated from the task (2). Also, VATS procedures offer unique contests to teaching in the operating room because the supervisor has less opportunity to manipulate during the ongoing than the thoracotomy. During thoracotomy lobectomy, the role of operator and supervisor can exchange as the challenge of the case changes. The supervisor can even dissect with suction catheters without using the scissors. However, during VATS lobectomy the side where the operators stand, the specificity, the configuration, and placement of the instrumentation fix much more rigidly the role of the operator and supervisor during the procedure. If the supervisor would take over a significant portion of the operation, he will likely have to change positions with the operator (8).

How assess the senior learning curve?

The duty for ensuring that a surgeon has developed the proper training and mentorship in the use of innovative technology lies with the physician and the hospital (3). VATS lobectomies in early-stage pulmonary cancer are performed in about 35% of potential patients not only for the costs of VATS instrumentation or the absence of a case-mix but also for the lack of preference for VATS by thoracic surgeons (9). Also, the educative attention to senior surgeons (independently practised for more than ten years) is faulty for the absence of a defined and transparent path (10). Since the spread of VATS lobectomy, the most senior surgeons should be enrolled to the new skills. Therefore, there is a possible benefit in understanding more flexibility of some VATS tenets with the aim of facilitating the training of senior surgeons. For example, they could look through the utility port during well-established phases of the procedure and only for many limited times during the initial vertical part of the learning curve. A 6–8 cm length of the utility thoracotomy could be primarily acceptable, and they could dissect around essential structures of the hilum for a defined time. Therefore, the measure of progress in the learning curve could be defined by the number of ports, the case selection for VATS lobectomy, and, the overall percentage of VATS lobectomies per year (11). The VETUS

(Very Experienced Time-honoUred Surgeons) project introduced an approach to the VATS lobectomy involving senior surgeon. The VETUS is based on a self-assessment program where the senior surgeon (independently and in complete anonymity) follows a one-year approach to VATS lobectomy. At predefined time intervals, the Surgeon evaluates his performance regarding the indications of VATS lobectomy, the number of ports used and utility incision length, time of dissection of the hilar structures and the overall percentage of VATS lobectomy. The results obtained at each time interval produce a final score that is an indication of the level of the training. VETUS is also a useful tool for surgeons already introduced to VATS lobectomy with difficulty to move to a higher level of experience. Nevertheless, the VETUS Score should be part of a complete training program (e.g., wet lab, simulation, mentorship, proctorship) (12).

Acknowledgments

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the Guest Editors (Stefano Margaritora, Roberto Crisci and Elisa Meacci) for the series "The Second Roman Tips and Tricks in Thoracic Surgery - the Great Potential of Uniportal VATS" published in *Shanghai Chest*. The article did not undergo external peer review.

Conflicts of Interest: The author has completed the ICMJE uniform disclosure form (available at http://dx.doi.org/10.21037/shc.2019.01.02). The series "The Second Roman Tips and Tricks in Thoracic Surgery - the Great Potential of Uniportal VATS" was commissioned by the editorial office without any funding or sponsorship. LB serves as an unpaid editorial board member of *Shanghai Chest* from Jun 2017 to May 2019. The author has no other 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.

References

1. Wohaibi EM, Earle DB, Ansanitis FE, et al. A new web-based operative skills assessment tool effectively tracks progression in surgical resident performance. J Surg Educ 2007;64:333-41.
2. Datta V, Bann S, Aggarwal R, et al. Technical skills examination for general surgical trainees. Br J Surg 2006;93:1139-46.
3. Blackmon SH, Cooke DT, Whyte R, et al. The Society of Thoracic Surgeons Expert Consensus Statement: A Tool Kit to Assist Thoracic Surgeons Seeking Privileging to Use New Technology and Perform Advanced Procedures in General Thoracic Surgery. Ann Thorac Surg 2016;101:1230-7.
4. Lee PC, Kamel M, Nasar A, et al. Lobectomy for Non-Small Cell Lung Cancer by Video-Assisted Thoracic Surgery: Effects of Cumulative Institutional Experience on Adequacy of Lymphadenectomy. Ann Thorac Surg 2016;101:1116-22.
5. Zhao H, Bu L, Yang F, et al. Video-assisted thoracoscopic surgery lobectomy for lung cancer: the learning curve. World J Surg 2010;34:2368-72.
6. Carrott PW, Jr., Jones DR. Teaching video-assisted thoracic surgery (VATS) lobectomy. J Thorac Dis 2013;5 Suppl 3:S207-11.
7. Sihoe ADL, Gonzalez-Rivas D, Yang TY, et al. High-volume intensive training course: a new paradigm for video-assisted thoracoscopic surgery education. Interact Cardiovasc Thorac Surg 2018;27:365-71.
8. Kauvar DS, Braswell A, Brown BD, et al. Influence of resident and attending surgeon seniority on operative performance in laparoscopic cholecystectomy. J Surg Res 2006;132:159-63.
9. Abdelsattar ZM, Allen MS, Shen KR, et al. Variation in Hospital Adoption Rates of Video-Assisted Thoracoscopic Lobectomy for Lung Cancer and the Effect on Outcomes. Ann Thorac Surg 2017;103:454-60.
10. Rocco G, Internullo E, Cassivi SD, et al. The variability of practice in minimally invasive thoracic surgery for

pulmonary resections. Thorac Surg Clin 2008;18:235-47.
11. Rocco G. The impact of outliers on the mean in the evolution of video-assisted thoracoscopic lobectomy. Eur J Cardiothorac Surg 2017;51:613-5.
12. Bertolaccini L, Solli P, Crisci R, et al. The Very Experienced Time-honoUred Surgeons (VETUS) project. J Vis Surg 2018;4:2.

doi: 10.21037/shc.2019.01.02
Cite this article as: Bertolaccini L. How to teach uniportal VATS to younger and elder generations: two different methods or any common overlapping points? Shanghai Chest 2019;3:7.

