Editorial

A call for standardization of training and certification of thoracoscopic surgery for lung cancer

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Since its advent in 1865, thoracoscopy has come a long way, as it is now been widely adopted for a number intrathoracic surgical procedures on the heart, lungs, thymus, pleura, and sympathetic trunk in both adult and pediatric patients (1). Increasingly complex, extensive, and otherwise challenging operations, particularly in the realm of thoracic oncology, are being successfully completed with relative dexterity through a minimally invasive approach. Of importance to both patients and providers, this method delivers wide-ranging advantages including decreased postoperative pain, blood loss, wound complications, hospital length of stay, and chest tube duration, while providing at least equivalent, if not superior oncologic outcomes (2,3). Further innovative techniques have continued to evolve, with, for example, the recent demonstration of success with safe and effective uniportal videoscopic approaches for lung cancer resections (4).

Given the increasing use of minimally invasive chest surgery, the recent publication by Liu *et al.* has appropriately identified the need for standardization of education and assurance of competency in this technique (5). While such criteria exist for American general surgeons operating in the abdomen, including completion of the Fundamentals of Laparoscopic Surgery (FLS) and Fundamentals of Endoscopic Surgery curricula, cardiothoracic surgery lacks an analogous requirement for operative training in the chest cavity. This topic is of particular timeliness, especially in the United States, as many training programs move from a traditional fellowship model, wherein a resident was first required to demonstrate proficiency in laparoscopic surgery prior to commencing cardiothoracic surgical training, to integrated models in which a strong foundation in laparoscopic instruction may be lacking. While a minimum number of minimally invasive operations are required for graduation from US cardiothoracic training programs, a wide variety of skill levels may exist despite meeting this prerequisite criterion, and demonstration of technical expertise beyond residency is not expressly evaluated.

In the recent contribution by Liu *et al.*, the authors cite the need for training and certification standards in lung cancer surgery for attending surgeons and trainees alike. Their work outlines a widespread educational gap, especially in the dichotomous setting of decreasing use of open thoracotomies with ever present thoracoscopic resections. The authors present a model for education, skill assessment, and ongoing areas for improvement within the context of Chinese surgical constructs. However, their recommendations are appropriate for any thoracic surgical body in order to advance the fields of surgical education, thoracic surgical oncology, and minimally invasive thoracic surgery.

As one of the main components of this work, Liu *et al.* present a series of recommendations which, taken together, can be used as the core foundation of a minimally invasive thoracic surgery educational program. In outlining these items, the authors have touched upon a variety of relevant issues in surgical education, as well as several possible avenues for experiential learning which are currently exciting and innovative topics of interest within the community. While the framework of their recommendations is sound and well-supported, some of the

specifics in methodology and implementation may benefit from elaboration.

Without a clear explanation of the methodological approach, the extent to which the recommendations may be taken as authority is somewhat limited. This work represents the collaboration of multiple well-established authors, yet it is not evident which processes were employed in formulating the final consensus statement. Review of similar consensus guidelines demonstrates a variety of successful practices, including reporting of expert opinion, debate, and Delphi method (6,7). The authors state that "there is not enough high-quality evidence-based medicine research to support the issues addressed in this project," justifying their rationale for using expert opinion as their primary source of data. However, ironically, without a clear explanation of the methodology utilized to formulate the expert consensus, this paper further contributes to the body of thoracic surgical education literature lacking adequate methods to address the stated problem (8).

Adding to the relative limitations of the recommendations made, it would be furthermore valuable for readers to appreciate the background and experience of the authors, in terms of their involvement in surgical education and clinical volume of minimally invasive lung resections. It is also not apparent as to whether any trainees were consulted in formulating these guidelines.

Upon review of the recommendations provided in this article, the authors are astute in their all-encompassing training model, which includes experience in simulation trainers, virtual tools, and animal or cadaveric tissues. Evidence has highlighted the importance, and superiority, of simulation-based learning on traditional box trainers, over virtual learning (9). Importantly, the authors reference laparoscopic and endoscopic simulation, but whether these avenues or alternatives are recommended for use is not immediately evident. For example, a suggested simulation training program has been published on the topic of videoscopic lobectomy, but widespread adoption and use of this methodology is uncertain, and, moreover, it is not known if superior approaches for this, and other operations, exist (10). Though a minimum time requirement of 20 hours is proposed in their work, Liu *et al.* do not describe in sufficient detail the mechanism for completion, specifically laparoscopic versus thoracoscopic simulation, or suggested modules therein. Furthermore, though FLS is a required component of American Board of Thoracic Surgery certification, it is not known if these techniques and activities are sufficient for competency in thoracoscopic lung cancer resections. Of note, a disadvantage of traditional laparoscopic trainers for thoracoscopic surgery is the use of more substantially sized trocars which physically support the learner's instruments, unlike many thoracoscopic operations.

Lastly, on the topic of open thoracotomy for lung cancer, the authors appropriately reference the necessity of experience in open resections. This method serves as the underpinnings for fine anatomic dissection and operative technique which will be used in the thoracoscopic setting. However, while they acknowledge the declining use of an open approach and furthermore mention this as a controversial issue, the importance of this point cannot be understated. It is additionally unclear if the recommended 50 cases should be completed as a trainee or attending, and what, if any, ongoing certification or open case minimum should be required.

Yet still, the authors' efforts are highly commendable. A multitude of investigations have reported individualized teaching regimens for specific approaches, or have instead examined the benefits of one simulation technique over another (9,11). However, to our knowledge, no comprehensive consensus guideline exists which explicitly details the current gap in thoracic surgical education, the importance of such an training program to the field of thoracic surgical oncology, and the cornerstone principles integral to the success of educating trainees while certifying the technical aptitude of staff surgeons in an ongoing fashion. The authors have touched upon myriad educational venues including typical box trainer simulation, software simulation, cadaveric, and live animal models, and have outlined the advantages and drawbacks of each with a concise summative recommendation. They are comprehensive in emphasizing the necessity of experience in open lung cancer surgery as the foundation for thoracoscopic approaches, and furthermore, the authors recognize the value of ongoing certification of technical proficiency in this field. This consensus serves as an important model which should be adopted by thoracic governing and educational bodies, as well as at the institutional level for individual thoracic surgery training programs. Widespread promotion of and adherence to this consensus statement will help to ensure safe and effective surgical care for our lung cancer patients, as we train the

leaders and experts in the field.

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Footnote

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

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