Commentary

Learning how to do esophagectomies

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Open esophagectomy is a complex operation with a high risk of complications. Studies have shown peri-operative mortality rates of 11.3% with limited improvement over time at high-volume centers (1). Despite ample investigation into the outcomes of this procedure, literature regarding the proficiency of surgeons performing open esophagectomy is scarce.

Markar and colleagues conducted a nationwide study to identify proficiency-gain curves relating to mortality for esophageal cancer. They studied 1,821 patients with esophageal cancer who underwent esophagectomy (mostly open esophagectomy, 98%) performed by 139 surgeons. They recorded mortality and performance-contributing factors and defined the proficiency-gain curves using risk-adjusted cumulative sum curves. These curves were designed to increase if observed outcomes exceed expected outcomes. Proficiency-gain curves were identified for several variables: 30- and 90-day all-cause mortality, 30- and 90-day disease-specific mortality, 1-, 3-, 5-year all-cause mortality, 1-, 3-, 5-year disease-specific mortality, and R0 resection. There were differences in the inflection curves in the proficiency numbers for short- and long-term mortality outcomes. Short-term mortality and cancer-specific mortality improved after 15-18 cases, while long-term all-cause mortality and cancer-specific mortality improved after 35-59 cases. This difference is explained intuitively as the first concern of an inexperienced surgeon is to curb short-term mortality, which improves results. Improvement in the frequency of R0 resection occurred after 17 cases, similar to the number of cases required to decrease short-term mortality.

It is not surprising that proficiency-gain curves exist, because the factors that improve as a surgeon gains proficiency, in this paper lymph node harvest, resection with tumor-free margins, and re-operation, also influence survival (2-5). While the authors note that a minority of the 139 surgeons may have practiced esophageal surgery prior to the start of the study data collection, the study fails to identify the training background and proficiency level achieved by the participating surgeons prior to the start of the study data collection period. This information could assist in accounting for the range of proficiency-gain curve change-points, as training has been shown to have some positive benefits on outcome (6,7). It is also not known if the patients' Charlson comorbidity scores and tumor stages were distributed equally across the surgeon's time in practice; though based on the data in Table 1, this data could be examined. It would be helpful to know if the difficulty of cases approached initially was the same as those being performed at a later time. One can assume that there were changes in staging modalities during the study period, such as PET scan and EUS, and that patients were better selected for surgery later in the study period, likely eliminating advanced-stage patients and decreasing 1–3 years mortality. Finally, there have been important changes in neoadjuvant and adjuvant therapy since 1987 with improvement in both radiation therapy and medical oncology, and in combination with better staging, this could account for some of the improvement in long-term mortality. Admittedly, however, it is unlikely that these factors can account for all the differences found in this study.

The focus on quality improvement in both surgical training and patient oncologic results is receiving current attention in outcomes research. To the cynical eye, these may appear to be mutually exclusive ideas. This work by Markar and colleagues, however, demonstrates the interplay between those two concerns during esophageal

cancer treatment. Pursuit of a common solution to the shortcomings in surgical training and patient care should be a topic that resonates with former, current, and aspiring surgeons. Further investigation is urgently needed, especially in the face of the rising incidence of esophageal cancer, diminishing numbers of trained thoracic surgeons in the U.S., and restricted training hours for surgical residents (8,9). I wish to offer the authors my gratitude for not reflexively endorsing simulation as a solution for achieving competency in their conclusions. This is a recurring theme in the recent literature (10). The increase in trainee participation in simulation is well-documented (11). Despite this trend, more trainees are seeking additional training after completion of residency (12). Additionally, I want to build on the concept that Markar and colleagues introduced as "structured national training" and "mentorship programs." The notion of establishing this type of environment has also been suggested by Sutton and colleagues, who advised for ongoing mentorship in the post-accreditation period with assignment of a mentor and placement at a high-volume center (13).

The larger question remains: what more can be done in an uncommon, high-risk procedure, such as open esophagectomy, to provide structured national training and mentorship without sacrificing patient outcomes? I have several suggestions to bring forward. Leaders in the field who are active in the various professional societies (e.g., Society of Thoracic Surgeons, American Association for Thoracic Surgery, European Society for Thoracic Surgery) should form a joint initiative with the mission of developing a method for ensuring competency in open esophagectomy. The first goal should be to define the core competencies for open esophagectomy and the means by which those can be measured. As pointed out by Heffron and colleagues, these should be such that the expectations are well-known to the instructor and the learner, and that gaps can be identified and remedied (14). One good example to follow is the Society of American Gastrointestinal and Endoscopic Surgeons Safe Cholecystectomy program (15). This initiative lays out a concise strategy for adopting a common culture of safety to minimizing bile duct injury. Analogous to that method, would be the conduction of an anastomotic time-out procedure in which distractions are minimized, because complications in the operating room have been shown to be higher during times of increased volume (1). Other less formal but possible interventions include briefing and debriefing the case with a senior mentor, intra-operative consultation with inspection of the field by a senior mentor, and early escalation of supervision following a complication.

In conclusion, the authors have done well to highlight the importance of surgical competency as a key to ensuring improved outcomes in patients undergoing open esophagectomy. While the prominence of this procedure may be declining due to increase in use of minimally invasive techniques, the demand for technical mastery and superb patient results are institutional to the field of surgery. The focus must now be driven toward the development of a system for achieving competency in open esophagectomy while measuring and protecting patient outcomes. With the establishment of such a model, adaptations can be applied to other high-risk procedures, propagating a culture of competency focused surgical training and excellent patient outcomes.

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Footnote

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