American Association for Thoracic Surgery Cardiothoracic Ethics Forum Mini-Symposium: Measuring surgical competence: Why, when, how, and what to do about it

Robert M. Sade, MD

The original idea for the Cardiothoracic Ethics Forum session at the 101st Annual Meeting of the American Association for Thoracic Surgery (2021) was to address the problem of declining surgical capabilities in the form of a debate pitting mandatory against voluntary physical and cognitive testing of aging surgeons. As we discussed the idea with a range of cardiothoracic surgeons interested in this area of study, it became clear that evaluation of surgical competence is much more complicated than originally envisioned.

For example, a chronological sequence of decline starts with physical strength, then eyesight, then manual dexterity, and finally, cognitive function (Figure 1).¹ Each of those losses can independently and cumulatively influence surgical performance.

Whereas other changes begin earlier, declining cognitive function accelerates around age 65 to 70 years.² Figure 2 provides an example of cognitive testing—the paired associates learning task—associated with age. A sharp increase in errors occurs at age 65 years. The overall cognitive decline actually begins at midlife, around age 40 to 50 years, and at any given age, physicians perform at a higher level than nonphysicians.³

The age at which deterioration of physical and cognitive functioning begins and the rate at which they progress is highly variable among individuals, so a mandatory retirement age does not make sense because some surgeons would retire too early and others too late for the safety of their patients.⁴

CENTRAL MESSAGE

Surgical competence is difficult to measure, but doing so is important at all phases of a surgeon's career.

FIGURE 1. Loss of capacities with aging is inevitable; it usually occurs over time in the sequence depicted, although the precise sequence of onset and rates of decline are highly variable among individuals.¹

From the Division of Cardiothoracic Surgery, Department of Surgery, Medical University of South Carolina, Charleston, SC.

Read at the 101st Annual Meeting of The American Association for Thoracic Surgery: A Virtual Learning Experience, April 30-May 2, 2021.

Disclosures: The author reported no conflicts of interest.

The *Journal* policy requires editors and reviewers to disclose conflicts of interest and to decline handling or reviewing manuscripts for which they may have a conflict of interest. The editors and reviewers of this article have no conflicts of interest.

Received for publication Sept 13, 2021; revisions received Oct 21, 2021; accepted for publication Nov 2, 2021; available ahead of print Nov 16, 2021.

Address for reprints: Robert M. Sade, MD, Division of Cardiothoracic Surgery, Department of Surgery, Medical University of South Carolina, 30 Courtenay Dr, MSC 295, Charleston, SC 29425 (E-mail: sader@musc.edu).

J Thorac Cardiovasc Surg 2022;164:1011-3
0022-5223/\$36.00

Copyright © 2021 by The American Association for Thoracic Surgery

<https://doi.org/10.1016/j.jtcvs.2021.11.021>

FIGURE 2. Performance on the paired associate learning task indicates that with increasing age, the mean number of errors per trial increased, and the number of stages where the correct responses were made on the first trial decreased. Reprinted with permission.²

The problem of declining surgical ability associated with aging cannot be addressed by simply measuring functional deterioration. With increasing experience over time, clinical judgment usually improves. The inverse relationship of decreasing capacity and increasing wisdom has been studied and the results have been mixed. Some studies have shown surgical results becoming worse with advancing age, but 1 particularly large and well-done study

showed the opposite.⁵ With increasing age, the adjusted rate of adverse outcomes (defined as death, readmission, and major complications) per 1000 operations showed a linear decrease starting at age 30 years and persisting well into the 70 years decade (Figure 3).

In the same study, the adjusted odds ratio for better outcomes favored surgeons aged 65 years and older compared with those younger than age 65 years, across nearly all

FIGURE 3. The adjusted surgical adverse outcome rate per 1000 events is depicted by surgeon age. The composite outcome—death, readmission, or complication within 30 days of operation—declines with increasing surgeon age. Reprinted with permission.⁵

FIGURE 4. Adjusted odds ratios (ORs) for adverse postoperative outcomes—death, readmission, or complications—among patients treated by older (age ≥65 years) and younger (age <65 years) surgeons are stratified by physician, patient, and hospital factors in a dichotomized analysis. Older surgeons have fewer adverse outcomes than younger surgeons in nearly every category, including, specifically, cardiovascular and thoracic surgeons. ADG, Aggregated diagnosis group. Reprinted with permission.⁵

specialties, including cardiovascular (top of the list) and thoracic surgery (Figure 4). Recently trained surgeons are known to be associated with higher mortality rates than more mature surgeons.⁶ The problem of evaluating surgical competence, clearly, is not restricted to older surgeons—it applies to the entire spectrum of a career in surgery.

Rather than focusing on evaluation of aging surgeons, this mini-symposium, based on the presentations at the Cardiothoracic Ethics Forum’s session at the 101st Annual Meeting of the American Association for Thoracic Surgery, explores a wide range of issues related to assessing the physical and cognitive capabilities of cardiothoracic surgeons at all career stages.

References

1. Blasier RB. The problem of the aging surgeon: when surgeon age becomes a surgical risk factor. *Clin Orthop Relat Res.* 2009;467:402-11.
2. Bieliauskas LA, Langenecker S, Graver C, Lee HJ, O’Neill J, Greenfield LJ. Cognitive changes and retirement among senior surgeons (CCRASS): results from the CCRASS Study. *J Am Coll Surg.* 2008;207:69-78.
3. Rosengart TK, Doherty G, Higgins R, Kibbe MR, Mosenthal AC. Transition planning for the senior surgeon: guidance and recommendations from the Society of Surgical Chairs. *JAMA Surg.* 2019;154:647-53. Erratum in: *JAMA Surg.* 2019;154:676.
4. Dellinger EP, Pellegrini CA, Gallagher TH. The aging physician and the medical profession: a review. *JAMA Surg.* 2017;152:967-71.
5. Satkunasivam R, Klaassen Z, Ravi B, Fok KH, Menser T, Kash B, et al. Relation between surgeon age and postoperative outcomes: a population-based cohort study. *Can Med Assoc J.* 2020;192:E385-92.
6. Tsugawa Y, Jena AB, Orav EJ, Blumenthal DM, Tsai TC, Mehtsun WT, et al. Age and sex of surgeons and mortality of older surgical patients: observational study. *BMJ.* 2018;361:k1343.