With the anticipated dramatic increase in thoracic operations over the ensuing decade, as well as the expected shortages of surgeons, nurses, and support staff, operating room time has become a luxury good. Informed decisions about resource utilization must take into consideration, among many other factors, time efficiency of various operative approaches. Twenty years into the slow but undeniable incorporation of robotic approaches in thoracic surgery in the US, Tupper et al. have performed timely analysis, honing in specifically on the cut-to-close operative time for robotic-assisted thoracic surgery (RATS) vs video-assisted thoracoscopic surgery (VATS) lung lobectomies. This multicenter retrospective cohort study analyzes the operative duration of surgeons experienced in both or either of the 2 minimally invasive techniques that are now the standard of care for anatomic lung resections. Minimally invasive surgical techniques have been repeatedly shown to lead to improved patient outcomes, length of stay, pain, mortality, and cost compared with open surgical approaches.

The integration of robotic techniques in thoracic surgery has been difficult to study, given the lack of quality prospective data and the perceived entry cost of purchasing robotic equipment. Furthermore, there is an indispensable learning curve, both for the surgeons and the support staff. Unlike VATS, RATS relies on competent bedside assistance as well as a team well poised to troubleshoot common intraoperative hurdles. Nevertheless, there has been an increase in the adoption of robotic equipment over the last several years. Sufficient time has now elapsed since the adoption of RATS to allow for a critical analysis of advantages and disadvantages of this approach.

An industry-sponsored analysis of robotic thoracic operations found that, in the hands of expert surgeons, RATS lobectomies can be faster and have lower conversion rates. The final results of an international prospective blinded randomized clinical trial comparing VATS to RATS are pending, but the preliminary data indicate that there is an incremental cost per quality-adjusted life-year (QALY) of $14,926 for robotic operations. Tupper et al. ultimately remain agnostic to the cost differences between techniques, given that many new technologies are associated with an impermanent cost difference that diminishes over time as adoption increases. Ultimately, the judicious use of limited resources, such as operative room time, is the primary focus of the study by Tupper et al., not the objective speed of the 2 techniques. Discerning between the specific time categories of the 2 approaches is further complicated by the additional set-up time that the robot requires (eg, docking, targeting, adjusting the ports) and could account of the time difference. The utilization data registered by the console from matched groups may not be representative of the entire procedure, as several steps are often required to complete the operation after undocking the robot (eg, chest tube placement, local anesthesia, port site closures).

One limitation of the study by Tupper et al. is the lack of data regarding a history of prior cardiothoracic operations, the cancer stage, and the factors included in the surgeons’ decision to choose one approach over the other. The limited availability of the robot in certain institutions is often the deciding factor. As access to robots has increased across institutions, it would be interesting to analyze the data with more granularity to include robotic experience during training and in practice for each surgeon. There are factors that may influence the choice of one approach over the other that are worth exploring, such as surgeon ergonomics, comfort with the VATS approach, the experience of the assistant surgeon or trainee, the experience of the operating room staff, and the complexity of certain dissections (eg, a difficult mediastinal lymphadenectomy). Lastly, as more data emerge regarding sublobar anatomic resections, the choice of surgical approach will most definitely include considerations, such as the phenomenal dexterity and 3-dimensional...
visualization conferred by the robot, which would make a segmentectomy technically less challenging.

Overall, the study Tupper et al\textsuperscript{1} provides a timely analysis of the 2 minimally invasive techniques. The increased operative duration by 20.6 (95\% CI, 12.9-28.2) minutes between RATS compared with VATS for lung lobectomies may compound in high-volume centers and should be incorporated in algorithms used to improve operating room resource allocation. This is a dynamic topic that will continue to evolve as the robotic approach has penetrated the training of future thoracic surgeons. Tupper et al\textsuperscript{1} provide a thoughtful discussion in the greater context of health care expenditures and resource utilization.

ARTICLE INFORMATION
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