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Commentary: Overreliance of propensity-score matched studies in thoracic surgery

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In a well-executed, propensity score–matched study published in this issue of the *Journal*, Xie and colleagues¹ report superior perioperative outcomes with video-assisted thoracoscopic surgery (VATS) sleeve lobectomy compared with thoracotomy. Specifically, VATS was associated with less operative blood loss, fewer days in the intensive care unit, shorter chest tube duration, and shorter hospital stay. Unfortunately, the authors omitted their methods of analgesia and did not report data regarding postoperative pain, readmission, functional recovery, or quality of life. Of note, this study reflects outcomes from experienced VATS surgeons, as the authors performed more than 50 cases of VATS sleeve lobectomy before enrollment and 70% of VATS cases employed a uniportal technique.

Despite superior perioperative outcomes with VATS, there were no statistical differences in major morbidity or 30- and 90-day mortality. Equally, at an approximate 3-year follow-up, recurrence-free and overall survival were similar. In assessing survival, the patients were well balanced, but the criteria for multivariate analysis regarding tumor biology were somewhat imprecise: pathology was only differentiated by squamous histology (or not) and overall TMN stage.

In summary, for a complicated procedure such as sleeve lobectomy, the data do not provide a clear directive regarding approach, but rather—to use the authors' own words—“the decision to perform sleeve lobectomy by either approach remains [was] based on surgeon's preference.” Given the limited number of patients who require sleeve resection, this propensity-matched cohort of 188 patients (116 thoracotomy, 72 VATS) is

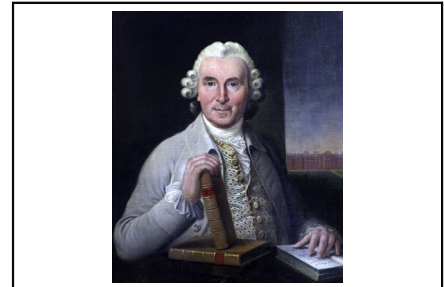
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James Lind, Royal Naval surgeon, conducted the first “randomized scurvy trial” in 1747.

CENTRAL MESSAGE

Propensity-score studies have shown the superiority of VATS. Now, as robotic surgery rises, thoracic surgeons should perform randomized trials to provide greater level of evidence for these approaches.

laudable. However, despite the efforts of the researchers to balance the patient arms and select the appropriate variables for analysis, the data remain open to confounding and selection bias. Perhaps thoracic surgeons have overly relied on propensity score–matching studies to determine “the standard of care.” Why are we less fervent regarding our statistical approach than our surgical one?

Over the last decade, we have seen numerous propensity score match studies comparing VATS versus thoracotomy for pulmonary lobectomy: data derived from large national databases such as the Society of Thoracic Surgeons database,^{2,3} the American College of Surgeons National Surgical Quality Improvement Program database,⁴ the Nationwide Inpatient Sample database,⁵ the Surveillance Epidemiology and End Results-Medicare database,⁶ the Premier Prospective Database,⁷ and the National Cancer Data Base,⁸ all overwhelmingly reported superior outcomes for VATS versus thoracotomy. This evidence against thoracotomy seems insurmountable, but can we honestly declare VATS the “gold standard” approach for lobectomy in the absence of a well-designed multicenter randomized trial? As stated by the statistical editor of our *Journal*, Dr Blackstone,⁹ “balancing score methods are not substitutes for a properly designed randomized trial; they cannot account

for unknown variables affecting outcome that are not correlated strongly with measured variables, they lack discipline and rigor of a randomized trial.” Furthermore, thoracic surgeons have seemingly lost their equipoise to enroll patients in randomized studies: minimally invasive surgeons remain concerned over the unnecessary potential morbidity of a thoracotomy, and open surgeons may not be comfortable performing minimally invasive operations. Thoracic surgeons must set aside their biases and enroll patients in randomized trials for the benefit of the entire community.

The same questions posed regarding VATS versus thoracotomy will be continually revisited as new minimally invasive techniques and technologies—including robotic surgery—challenge traditional approaches to VATS. A randomized trial may seem arduous and inefficient, but the feasibility of completing these studies in thoracic surgery is exemplified by the TIME (Traditional Invasive vs Minimally Invasive Esophagectomy) trial, the MIRO trial, and the ongoing ROMIO (Randomised Oesophagectomy: Minimally Invasive or Open) trial,¹⁰ which compare minimally invasive approaches against open esophagectomy. As a community of surgeons, our investments in high-quality research will assure we are providing our patients with optimal care and are not merely approximating excellence.

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