

See Article page e233.



Commentary: Totally minimally invasive esophagectomy: Are we there yet?

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Esophagectomy is arguably one of the most complex procedures performed by thoracic surgeons. Mortality for open esophagectomy can be high and was documented at close to 25% when performed by low-volume surgeons in low-volume centers.¹ The advances in optical technology and instrumentation in the 1980s and 1990s brought minimally invasive surgery to the forefront of surgical therapy. Despite the high complexity of the procedure, in 1995, DePaula and colleagues² reported on a small cohort of patients who underwent minimally invasive transhiatal esophagectomy. Shortly after that, Luketich and colleagues³ reported their initial experience with minimally invasive esophagectomy (MIE). In 2003, the same group reported on their first 222 MIEs, with surgical mortality of only 1.4%.⁴ A multicenter trial of the feasibility of MIE confirmed that Luketich and colleagues⁵ initial results were reproducible in the hands of others. A randomized study showed that MIE indeed improves the morbidity and quality of life of patients undergoing esophagectomy.⁶ However, MIE is hard to learn and perform.^{7,8}

A potentially attractive approach to increased adoption of MIE is hybrid MIE. Investigators from the MIRO randomized trial compared hybrid MIE (laparoscopy and thoracotomy) with open MIE and found significant advantages over the open procedure.⁹ Without head-to-head comparisons with total MIE and hybrid MIE's benefits compared with open

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CENTRAL MESSAGE

Evidence is mounting that totally minimally invasive esophagectomy is superior to hybrid approaches. Totally minimally invasive esophagectomy is associated with improved patient outcomes.

surgery, many consider hybrid MIE a good compromise between the steep learning curve of MIE and the disadvantages of open surgery.¹⁰ Therefore, for many surgeons performing open esophagectomies, hybrid MIE offered a transition to a more minimally invasive approach, and some considered it their final destination...But should it be?

In this issue of the *Journal*, Harriott and colleagues¹¹ attempt to clarify the continuum of esophagectomy surgical approaches by performing an extensive meta-analysis comparing outcomes between open, hybrid, and totally minimally invasive esophagectomies (TMIEs). The manuscript exhibits many strengths. The end points of the study are perioperative outcomes, which are befitting when comparing surgical approaches. The authors included only patients who had transthoracic (Ivor Lewis) esophagectomy to improve heterogeneity that permeates many meta-analyses. Notably, the authors distinguish hybrid MIE from TMIE, the first large study to compare the 2 techniques. Both hybrid MIE and TMIE were found to have decreased overall morbidity, lower incidence of pneumonia, reduced postoperative mortality, and shorter length of hospital stay compared with open esophagectomy. However, TMIE was associated with decreased postoperative mortality and a shorter length of stay compared with the hybrid MIE group. The study is perhaps the first strong indication that TMIE is superior to hybrid approaches.

The study's findings are reassuring to surgeons like us, who strongly believe in the value of totally minimally invasive techniques.¹² However, there are important issues with the work that may cloud the interpretation of the findings.

First, comorbidities were not considered in the analysis. This omission is understandable, considering that many surgical papers report morbidity in different terms, and some do not report it at all. A second important issue is that a meta-analysis cannot control for factors related to surgical and postoperative management, such as pyloric-emptying procedure, use of jejunostomy, nasogastric tube, etc. These factors may affect outcomes but are impossible to control in a meta-analysis. Still, we feel that the manuscript's conclusions are based on "big numbers" and are likely valid.

The field of minimally invasive esophageal resection is currently crowded, and it is not easy to sift through the data. Robotic esophagectomy, like traditional MIE, was also superior to open surgery in a randomized trial.¹³ Adding robotic esophagectomy to the mix and including hybrid techniques, the permutations can be endless and include hybrid open and robotic, laparoscopic and robotic, etc. What will our final destination be? Surgeons will need to choose the technique with which they are most comfortable and provide patients with superior short- and long-term outcomes. For us, our go-to technique is totally robotic Ivor Lewis esophagectomy.

Harriot and colleagues get us a step closer to our destination in choosing the best procedure for patients requiring esophageal resection and suggest that our destination is totally MIE.

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