



## Improving Esophagectomy Outcomes in France: *Petit a Petit*

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Esophageal cancer is a major global health problem with significant morbidity and mortality. It is the eighth most common cancer worldwide and the sixth leading cause of cancer death.<sup>1</sup> Its high mortality rate is due to multiple factors including delayed presentation and resultant poor prognosis. When discovered early, endoscopic therapy such as submucosal resection may be pursued, but surgical resection remains a mainstay in treatment, often in the setting of trimodality therapy.<sup>2</sup> The Ivor Lewis esophagectomy, originally described as laparotomy for dissection and mobilization and subsequent thoracotomy for esophageal resection and esophagogastric anastomosis, performed as a staged procedure,<sup>3</sup> has seen continued improvement since its inception and now is performed via a variety of techniques, including totally minimally invasively. Advances in this technique include the use of a hybrid-minimally invasive technique, described in the USA by the NCCN as a laparoscopic abdominal dissection followed by right thoracotomy and, more recently, a totally minimally invasive technique, involving laparoscopic abdominal dissection, conduit creation, followed by thoracoscopy for resection and reconstruction, either or both of which may be completed robotically where these resources are available.<sup>2</sup> These are the generally accepted techniques for Ivor Lewis esophagectomy.

In their review of “Effect of phased implementation of totally minimally invasive Ivor Lewis esophagectomy for esophageal cancer after previous adoption of the hybrid minimally invasive technique: results from a French

Nationwide population-based cohort study,” Nuytens et al. accomplished a significant undertaking in providing a comprehensive look at outcomes of esophagectomies across the spectrum of open to totally minimally invasive techniques on a nationwide level in France.<sup>4</sup> Their results reinforced outcomes from prior studies while allowing insight into the nuances of the three different Ivor Lewis esophagectomy techniques, defined in the study as open esophagectomy (OE), hybrid-minimally invasive esophagectomy (HMIE), and totally-minimally invasive esophagectomy (TMIE). Nuytens et al. provided new insight into sequential transition from OE to TMIE with HMIE as a steppingstone, and the improved outcomes therein in its and breadth as a nationwide sample. Comparison of outcomes across the spectrum of Ivor Lewis esophagectomy techniques showed lower mortality and postoperative complications with TMIE compared with OE. A few caveats could be the small sample size of the TMIE population, the high anastomotic leak rate, high mortality rate, and long length of stay. The authors acknowledge the limitations of the PMSI database, which did not allow for more nuanced data (i.e., staging, lymph node yield, etc.). Overall, the authors deserve credit for completing a large, nationwide, comprehensive analysis of Ivor Lewis esophagectomies in France across the spectrum from OE via HMIE to TMIE techniques.

While the authors of this study do not specifically identify the techniques for this study, one can assume that OE entails a laparotomy followed by right thoracotomy in a single procedure, HMIE refers to laparoscopy followed by right thoracotomy, and TMIE indicates laparoscopy followed by right thoracoscopy. In the TMIE cohort, there is no indication that either portion of the procedure was performed robotically, although this is a well-described approach.

The authors aimed specifically at identifying short-term outcomes in centers performing TMIE, after previous adoption of HMIE, compared with OE. The authors accomplished this task by utilizing the PMSI database, a coding database originally designed to determine financial allocation based on healthcare performance,<sup>5</sup> which allowed them to create a study involving three cohorts: OE, HMIE, and TMIE. These cohorts were made up from patients from multiple institutions across France and provide a robust and comprehensive analysis of the three different techniques for Ivor Lewis esophagectomies. Regarding their results, there are few outcomes as important as a reduction in postoperative mortality. Their results reinforce prior studies that have demonstrated decreased postoperative mortality after minimally invasive esophagectomy compared with open esophagectomy. The additional demonstration of reduced overall and postoperative pulmonary complications between the HMIE and TMIE group, while not unexpected, reinforces the need for continued innovation as surgeons work to create newer and safer techniques.

Nuytens et al. acknowledge some of the study's weaknesses, including its use of the PMSI database, which does not allow for more a nuanced comparison (i.e., surgical outcomes, including final pathology, lymph node yield, and staging) between the three cohorts. Of note, some of the study's results, such as length of stay for all cohorts, postoperative mortality rate for HMIE and TMIE, and anastomotic leak rate for all cohorts, were notably high. Finally, the TMIE cohort represents only 6.5% ( $N = 174$ ) of the overall study population, a significant limitation in this study which aimed to compare the TMIE cohort with OE ( $N = 1003$  or 37.4%).

Overall, Nuytens et al. are credited with providing a comprehensive analysis of minimally invasive esophageal surgery in France and reinforcing the lower postoperative complication rate and postoperative mortality rate of minimally invasive esophagectomy compared with open esophagectomy. In doing so, they have identified an opportunity for improved surgical outcomes of patients with surgical esophageal cancer in France.

Future work may include a reanalysis as the penetrance of TMIE increases to assess whether these results hold across a larger sample size.

**DISCLOSURES** The authors declare no conflicts of interest.

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