

Minimally Invasive Esophagectomy in the Community Hospital Setting

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- Esophagectomy • Minimally invasive • Esophageal cancer
- Community hospital

Although associated with substantial morbidity and mortality, esophagectomy remains the preferred treatment for resectable esophageal cancer. Minimally invasive techniques have been used for esophagectomy in an effort to reduce the morbidity and mortality of this complex operation. In this report, the authors describe their experience with minimally invasive esophagectomy (MIE) at Carolinas Medical Center, a community academic medical center serving western North Carolina and northern South Carolina.

MIE describes the use of laparoscopic or thoracoscopic techniques to mobilize the esophagus for resection and restoration of gastrointestinal continuity. These techniques were derived after recognizing the significant postoperative morbidity and mortality associated with traditional open esophageal resection. Rates of postoperative morbidity from the traditional open esophageal resection range as high as 40% to 60% with mortality rates of 5% to 20%.¹ With the likelihood of postoperative complications, surgeons have sought to find new and different approaches with the goal of lowering overall morbidity and mortality.

OPEN ESOPHAGECTOMY TECHNIQUES

The 3 most commonly performed open esophagectomy procedures are the transhiatal esophagectomy, transthoracic (Ivor Lewis) esophagectomy, and the 3-stage

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(McKeown) esophagectomy. All 3 operations begin with a midline laparotomy for mobilization of the stomach and formation of a gastric conduit. A transhiatal esophagectomy uses a cervical incision to mobilize the cervical esophagus. The thoracic esophagus is then mobilized by blunt dissection from the abdominal and cervical incisions. The gastric conduit is brought up to the neck and a cervical anastomosis constructed. Transthoracic esophagectomy uses a right thoracotomy to mobilize and remove the esophagus and allow creation of an intrathoracic anastomosis. A 3-stage esophagectomy uses a right thoracotomy for mobilization of the esophagus, but in addition removes the proximal esophagus and creates a cervical anastomosis.

MINIMALLY INVASIVE ESOPHAGECTOMY TECHNIQUES

Increasing experience with laparoscopic surgery in the 1990s led to the development of MIE techniques. The precursor to this was the thoracoscopic mobilization of the esophagus in 1992 by Cuschieri and colleagues.² Later work by Dallemagne³ combined laparoscopic and thoracoscopic resection of esophageal cancer, which led to the current techniques used in MIE. In modern practice, the 3 most frequently performed procedures for MIE include the thoracoscopic/laparoscopic esophagectomy with a cervical anastomosis, thoracoscopic/laparoscopic Ivor Lewis esophagectomy, and laparoscopic transhiatal esophagectomy with a cervical anastomosis. Many variations in technique have been described.

MINIMALLY INVASIVE VERSUS OPEN ESOPHAGECTOMY

To date, no randomized trials have compared outcomes of esophageal resection using a minimally invasive approach with open esophagectomy.⁴ Several nonrandomized comparative reports have been published, which have generally compared the two techniques with the same institution, often using historical experience within open esophagectomy. A meta-analysis of 12 comparative reports encompassing 672 MIEs and 612 open esophagectomies found shorter hospital stay, less blood loss, and fewer complications with MIE.⁵ An analysis of 1008 patients in 8 comparative studies⁶ found equivalent outcomes with the exceptions of higher stricture rate among MIE and lower overall morbidity after MIE compared with open esophagectomy. A retrospective review of 699 MIEs conducted in England between 1996 and 2008 found lower in-hospital, 30-day, and 365-day mortality as compared with open esophagectomy.⁷ Overall, the reported comparisons between MIE and open esophagectomy demonstrate MIE to be safe, with at least comparable outcomes in morbidity and mortality, and with some evidence to suggest better overall outcomes in terms of postoperative pulmonary complications, blood loss, and hospital stay. An important consideration regarding MIE for esophageal cancer is the adequacy of lymph node clearance as compared with the standard open esophagectomy. The 2 meta-analyses cited here have shown no difference in lymph node recovery rates between open esophagectomy and MIE.^{5,6}

OPERATIVE TECHNIQUE

The operative technique used for a minimally invasive Ivor Lewis esophagectomy at Carolinas Medical Center is performed in 2 phases, beginning with laparoscopic mobilization of the stomach and dissection of the mediastinum from the abdomen. The technique is similar to that described by Bizakis and colleagues.⁸ The operation is conducted by 2 surgical teams including fellows and residents, each led by an attending thoracic surgeon and gastrointestinal surgical oncologist.

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