

Anesthesia for Esophagectomy



Adam Carney, MA, MB BChir, MRCP, FRCA^{a,*}, Matt Dickinson, MBBS, MSc, FRCA, FFICM^b

KEYWORDS

- Esophagectomy • Esophageal cancer • Anesthesia • Perioperative management
- Enhanced Recovery • Perioperative complications

KEY POINTS

- Esophagectomy remains a high-risk operation with significant perioperative morbidity and mortality.
- Patients should be appropriately selected for surgery, and offered an evidence-based risk assessment for their postoperative outcome to allow informed, shared decision making.
- Perioperative management is complex, and in many areas evidence is limited and needs to be carefully translated. However, close attention to detail in many areas of perioperative management should improve postoperative outcome.
- An enhanced recovery pathway for esophagectomy should be implemented as standard practice.

INTRODUCTION

Esophageal cancer is the eighth most common cancer worldwide and the sixth most common cause of cancer death. In 2011 there were 7603 deaths from esophageal cancer in the United Kingdom, accounting for 5% of all deaths from cancer.¹

Esophageal cancer presents as either squamous cell carcinoma or adenocarcinoma. Until relatively recently, squamous cell carcinoma accounted for most esophageal cancers worldwide; however, most new cases in the Western world are now adenocarcinoma.² The incidence of adenocarcinoma has increased 4-fold over the past 25 years, and it is the most rapidly increasing cancer in the United States.^{2,3}

Risk factors for adenocarcinoma include gastroesophageal reflux disease (GERD), Barrett esophagus, obesity, smoking, and a diet low in fruit.^{2,4} Alcohol and smoking are established risk factors for squamous cell carcinoma.²

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^a Department of Anaesthesia, Nottingham University Hospitals NHS Trust, City Campus, Hucknall Road, Nottingham NG5 1PB, UK; ^b Department of Anaesthesia, Perioperative Medicine and Pain, Royal Surrey County Hospital NHS Foundation Trust, Egerton Road, Guildford, Surrey GU2 7XX, UK

* Corresponding author.

E-mail address: adam.carney@nuh.nhs.uk

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Overall 5-year survival from esophageal cancer is between 15% and 25%,⁵ but only 25% to 30% of patients are potentially curable at presentation.⁶

Esophagectomy (often alongside neoadjuvant chemotherapy) is the gold-standard curative treatment for localized esophageal cancer.⁷ More than 5000 esophagectomies are performed in the United States and United Kingdom each year. The operation is an invasive and complex procedure carrying a high postoperative morbidity and mortality.⁸ Overall postoperative mortality remains around 8%, although rates in high-volume centers (>50 operations per year) are typically less than 5%.^{9–11} Both volume and standard of care seem to influence mortality, as 5-year survival after surgery is quoted at between 25% and 50%,^{7,10} with the best 5-year survival figures appearing to come from university hospitals (49.2%, compared with 27.3% for nonteaching hospitals).¹² There is some evidence that anesthetic expertise influences outcome,¹⁰ but a relationship has not been established between anesthetic volume and outcome.

Significant postoperative complications can occur in up to 60% of esophagectomies,¹³ with respiratory complications occurring in 25% of cases, cardiovascular in 12%, and anastomotic leak in 16%. Major pulmonary complications cause 50% of postoperative deaths.¹⁴

Improvement in outcome may be achieved by appropriate risk assessment and patient selection, choice of surgical technique, and optimization of perioperative patient care. Two recent reviews of anesthetic management for esophagectomy have focused on perioperative areas such as pulmonary morbidity, ventilatory management, thoracic epidural analgesia, intraoperative fluid management, the esophago-gastric anastomosis and conduit perfusion, vasopressor therapy, anastomotic leak, cardiac arrhythmias, and venous thromboembolism.^{15,16} It is unlikely that any single perioperative intervention alone will show benefit in outcome; however, an approach addressing several factors, and standardizing care (essentially an Enhanced Recovery After Surgery [ERAS] package) may demonstrate a significant impact.¹⁵ ERAS in colorectal surgery has halved complication rates and reduced length of stay by 3 days.¹⁷ Given the high risk and complexity of esophagectomy, it seems likely that standardized ERAS protocols in high-volume centers should help decrease both morbidity and mortality following esophagectomy.^{9,15}

This review addresses preoperative assessment and patient selection, perioperative care (focusing on pulmonary prehabilitation, ventilation strategies, goal-directed fluid therapy [GDFT], analgesia, and cardiovascular complications), minimally invasive surgery, and current evidence for ERAS in esophagectomy.

PREOPERATIVE ASSESSMENT AND PATIENT SELECTION

Esophagectomy is a high-risk procedure because of the invasive nature of the operation (with both abdomen and thorax being breached) and the preoperative pathophysiologic status of the patient.¹⁸ Although patients with potentially resectable disease should be offered surgery, it should not be undertaken on patients unable to survive the physiologic insult of the operation.

The changing epidemiology of esophageal cancer means the profile of comorbidities among patients is changing. Obesity, GERD, and ischemic heart disease are all increasing while patients are also getting older. Thirty percent of candidates for potentially curative surgery are American Society of Anesthesiologists (ASA) grade III or IV.^{19,20}

Accurately predicting which patients will develop complications is not easy. The following have been shown to be risk factors for morbidity and/or mortality after esophagectomy.^{5,10,13}

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