

Anesthesia for Emergency Abdominal Surgery



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KEYWORDS

- Emergency surgery • Laparotomy • Sepsis • Surviving Sepsis • Enhanced recovery
- High mortality • ELPQuIC bundle

KEY POINTS

- Emergency laparotomy is a common procedure with high mortality and morbidity.
- There is a diverse range of causes and surgical treatment, with up to 40% of patients having sepsis at the time of presentation.
- Patients who are elderly often have multiple comorbidities and a mortality of up to 25%, and for those undergoing emergency colorectal resection their life expectancy at 1 year is around 50%.
- Patients presenting for surgery have deranged body homeostasis and gut dysfunction, and a high incidence of sepsis; they are effectively experiencing a complication before surgery.
- Little research has been done in this area; however, the introduction of standardized pathways of care expediting diagnosis, resuscitation, and sepsis management with urgent surgery followed by critical care admission may improve outcomes.

INTRODUCTION

This article reviews the epidemiology and pathophysiology of patients presenting for emergency intra-abdominal surgery (excluding vascular and trauma-related surgery), particularly the generic operation known as emergency laparotomy. This procedure is well known to every anesthesiologist who deals with emergency surgery; however, the common factor of a surgeon opening an abdomen to manage an intra-abdominal emergency can have multiple causes, and multiple different procedures are encompassed by the overarching term laparotomy. This article examines the organizational issues that may challenge health care teams trying to optimize care for this group of patients. It reviews the latest developments and evidence base for anesthesia and perioperative care pathways to optimize outcomes.

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EPIDEMIOLOGY

Patients undergoing emergency general surgery (EGS) have much higher mortality and morbidity than those patients undergoing elective or scheduled procedures. US outcomes, using data from the American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP), showed a mortality of 14% at 30 days for patients who had undergone emergency laparotomy.¹ Comparison of hospital performance in emergency versus elective general surgery, adjusted for patient-related and operation-related risk factors, showed that emergency status was a significant predictor for morbidity, serious morbidity, and mortality.² Outcomes from other countries are similarly poor, with a large UK database study showing an average mortality of 15.6%,³ and a prospective study with data from 35 hospitals showing a mortality of 14.4% overall, with mortality in patients more than 80 years of age increasing to an average 24.4%.⁴ Other countries also show high average mortality, with a Danish cohort study showing a mean mortality of 18.5% at 30 days.⁵ Long-term outcomes are even worse, with only 49% of patients more than 80 years of age who had undergone nonelective colorectal resection alive at 1 year.⁶

The resource burden of emergency general surgery is high, with a 10-year analysis of the US Nationwide Inpatient sample (2001–2010) showing that 7.1% of all hospital admissions were related to EGS, with 29% of these patients requiring surgery; the population-adjusted case rate of 1290 admissions per 100,000 people was higher than the sum of all new cancer diagnoses, and has increased annually since 2001.⁷

Despite the volume of patient episodes, high mortality, and use of resources by this patient group there has been, until recently, little discussion about the management of these patients in the anesthetic or surgical literature. One of the reasons for this may be the number and diversity of causes of EGS, ranging from an incarcerated hernia to infarcted bowel, with an associated range of morbidity and mortality. Symons and colleagues³ analyzed the hospital episode statistics (HES) database of the UK National Health Service system for EGS admissions with a greater than 5% 30-day mortality. From a total of 367,796 patients, the investigators defined 8 groups of high-risk diagnoses, with 30-day mortality ranging between 7.4% and 47.4%. Al-Temimi and colleagues¹ found that the commonest indications for EGS in the NSQIP database were intestinal obstruction (33.6%), perforation (19%), and exploratory laparotomy with or without wound debridement or abscess drainage (10%); the strongest predictors of mortality were a white blood cell count of less than 4500/mm³ or greater than 20,000 mm³, septic shock, an American Society of Anesthesiologists (ASA) class IV at the time of surgery, age 70 years or older, and a dependent functional status. Patients with all these risk factors present had a predicted 30-day mortality of 50%.

The studies showing poor outcomes from EGS also show significant variation between hospitals after risk adjustment, with clear high and low outlying hospitals.^{1–4} Hospitals with low mortality from EGS had significantly more intensive care beds per 1000 hospital beds and made significantly greater use of computed tomography (CT) and ultrasonography.³ Saunders and colleagues⁴ showed that, despite the high mortality for patients undergoing EGS, and a Cochrane Review showing benefit for goal-directed fluid therapy in high-risk patients,⁸ only 15% of patients undergoing emergency laparotomy received intraoperative goal-directed fluid therapy. Hospital outcomes for EGS are not consistent with performance as an elective provider (ie, a hospital with good outcomes for elective surgery may not provide good outcomes for EGS).²

Patient outcomes for emergency surgery are likely to be improved by prompt investigation, diagnosis, and management. The National Emergency Laparotomy Audit in

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