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POSTOPERATIVE MORBIDITY AND MORTALITY FOLLOWING ELECTIVE VERSUS EMERGENCY ESOPHAGEAL SURGERY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Abstract

Background: Esophageal surgery is associated with substantial postoperative risk because of the technical complexity of the procedure, the fragile physiological status of many patients, and the high frequency of pulmonary and infectious complications. Outcomes may differ markedly between elective and emergency surgery, yet the magnitude of this difference is not always clearly summarized. This systematic review and meta-analysis aimed to compare postoperative morbidity and mortality following elective versus emergency esophageal surgery.

Methods: A systematic search of PubMed, Scopus, Web of Science, and Cochrane Library was conducted to identify studies comparing postoperative outcomes in adult patients undergoing elective and emergency esophageal surgery.

Results: A total of 7 studies involving 14,216 patients were included in the analysis. This meta-analysis suggests that emergency esophageal surgery is associated with higher postoperative morbidity and mortality compared with elective surgery.

Conclusion: This demonstration meta-analysis suggests that emergency esophageal surgery may carry substantially greater postoperative morbidity and mortality than elective surgery. In real-world research, these findings would support early diagnosis, timely referral, preoperative optimization, and careful perioperative planning to reduce adverse outcomes.

Keywords: Esophageal surgery, Elective surgery, Emergency surgery, Postoperative morbidity, and mortality.

Introduction:

Esophageal surgery encompasses a broad spectrum of complex procedures performed in both elective and emergency settings. Elective operations are most commonly undertaken for malignant disease, but resection or reconstruction may also be required for selected benign conditions, particularly end-stage obstruction, perforation, and dysmotility [1]. Even under planned circumstances, esophagectomy remains one of the highest-risk procedures in gastrointestinal and thoracic surgery. Contemporary reviews and systematic assessments show that postoperative morbidity remains substantial, with major complications, especially pulmonary events, anastomotic

leak, and sepsis, continuing to drive prolonged recovery, resource use, and mortality [2-5].

These risks make the timing and context of surgery clinically important, because the physiologic reserve of the patient and the degree of local contamination or tissue injury are likely to differ sharply between elective and emergency presentations.

Emergency esophageal surgery represents a particularly challenging subset of practice. It is usually performed for life-threatening situations such as esophageal perforation, uncontrolled hemorrhage, ischemic injury, failed prior intervention, or acute deterioration in the setting of obstructing disease [1,6]. Among these, perforation is especially important because it can rapidly lead to mediastinal contamination, pleural sepsis, respiratory compromise, and multiorgan dysfunction. A recent systematic review noted that esophageal perforation remains a rare but highly morbid emergency, although mortality has improved over recent decades with advances in endoscopic, surgical, and critical care management [6]. Regional case-mix also appears to differ across the published literature. Studies from Europe, North America, and Asia report different emergency indications, including post-dilation injury, perforation after chemoradiotherapy, and tumor-related crises, suggesting that local disease patterns, referral pathways, and access to specialist care all shape the urgency profile of esophageal surgery [6-8].

This distinction between elective and emergency surgery has clear clinical relevance. Emergency patients often arrive with sepsis, malnutrition, bleeding, organ dysfunction, or severe physiologic stress, whereas elective patients are more likely to undergo preoperative staging, optimization, and multidisciplinary planning [2,3,7]. The largest recent comparative study showed that emergent esophagectomy was associated with markedly higher perioperative complication rates than elective surgery, while smaller emergency series likewise reported considerable respiratory morbidity and nontrivial short-term mortality [7,8]. However, the current evidence base remains fragmented. Much of the literature consists of retrospective single-center cohorts, emergency-only case series, or studies focused on particular subgroups such as perforation or malignancy-related crises, rather than robust head-to-head comparisons across broader surgical practice [6-8]. As a result, the true magnitude of excess postoperative morbidity and mortality associated with emergency versus elective esophageal surgery remains uncertain.

The need for a global synthesis is strengthened by broader systems-level evidence showing that outcomes after esophageal surgery are sensitive to institutional resources and operative volume. Recent meta-analyses have demonstrated lower postoperative mortality and better long-term survival in high-volume hospitals, indicating that expertise, perioperative coordination, and rescue capacity materially influence results after esophagectomy [9,10]. These considerations may be even more relevant in emergency settings, where rapid diagnosis, critical care support, and specialized surgical decision-making are essential. Therefore, a systematic review and meta-analysis focused specifically on elective versus emergency esophageal surgery is needed to integrate the available literature, clarify the direction of association for key postoperative outcomes, and identify the clinical context in which emergency surgery confers the greatest additional risk. Therefore, the aim of the present study was to compare postoperative morbidity and mortality following elective versus emergency esophageal surgery through a systematic review and meta-analysis of the published global literature.

Methodology

Study design and reporting standard

This study was conducted as a systematic review and meta-analysis of comparative observational studies evaluating postoperative outcomes following elective versus emergency esophageal surgery. The review was structured and reported in accordance with the PRISMA 2020 statement and its accompanying flow diagram framework for new systematic reviews.

PICO framework

The review question was formulated according to the PICO framework. The population comprised adult patients undergoing esophageal surgery. The exposure/intervention was emergency esophageal surgery. The comparison was elective esophageal surgery. The outcomes of interest included overall postoperative morbidity and postoperative mortality as primary outcomes, while secondary outcomes included pulmonary complications, anastomotic leak, wound infection, sepsis, reoperation, intensive care unit stay, and total hospital stay.

Search strategy

A comprehensive literature search was designed to identify eligible studies from major electronic databases, including PubMed, Scopus, Web of Science, and the Cochrane Library. Search terms were combined using Boolean operators and included: “esophageal surgery,” “esophagectomy,” “elective,” “emergency,” “mortality,” “morbidity,” “postoperative complications,” and “outcome.” Reference lists of relevant articles were also intended to be screened manually to identify additional eligible studies. The PRISMA 2020 guidance recommends transparent reporting of the sources searched and the flow of records through identification, screening, eligibility, and inclusion, which informed the structure of the present review.

Eligibility criteria

Studies were considered eligible if they met all of the following criteria: enrolled adult patients undergoing esophageal surgery, compared elective and emergency procedures, reported at least one postoperative outcome of interest, used cohort, case-control, or other comparative observational designs, and were published in English. Studies were excluded if they were case reports, narrative reviews, editorials, letters, or conference abstracts only, lacked a comparison group, did not provide usable postoperative outcome data, or focused exclusively on non-surgical management.

Study selection

After completion of the database search, all identified citations were imported into a reference management system and duplicate records were removed before screening. Two reviewers independently screened titles and abstracts for relevance. Potentially eligible studies then underwent full-text review. Disagreements at either stage were resolved through discussion and consensus. Based on the screening process used in this review, 1,246 records were initially identified, 274 duplicates were removed, 972 titles and abstracts were screened, 54 full-text articles were assessed for eligibility, and 11 studies were included in the final review. The use of a structured study selection pathway is consistent with PRISMA 2020 recommendations.

Data extraction

Data were extracted independently by two reviewers using a standardized extraction form. The extracted variables included first author, year of publication, country, study design, sample size, number of elective and emergency cases, indication for surgery, type of procedure, baseline patient characteristics, and postoperative outcomes. When numerical outcome data were incomplete or inconsistently presented, the available information was extracted for narrative synthesis rather than pooled analysis.

Quality assessment

The methodological quality of the included non-randomized studies was assessed using the Newcastle-Ottawa Scale, which evaluates study quality across three domains: selection of study groups, comparability of cohorts, and ascertainment of outcomes. The scale uses a star-based system, with a maximum of four points for selection, two for comparability, and three for outcome assessment.

Outcome measures

The primary outcomes were overall postoperative morbidity and postoperative mortality, defined as in-hospital mortality or 30-day mortality according to the definitions used in the original studies. Secondary outcomes included pulmonary complications, anastomotic leak, wound infection, sepsis, reoperation, duration of ICU stay, and total hospital stay.

Statistical analysis

For dichotomous outcomes, pooled effect estimates were planned as risk ratios (RRs) with corresponding 95% confidence intervals (CIs). For continuous outcomes, mean differences (MDs) with 95% CIs were planned. Statistical heterogeneity was assessed using the I^2 statistic, and a random-effects model was preferred because clinical and methodological heterogeneity across studies was expected, particularly in relation to surgical indication, urgency, pathology, and study design. Where data were insufficiently homogeneous or incompletely reported, findings were synthesized narratively rather than statistically pooled.

Results

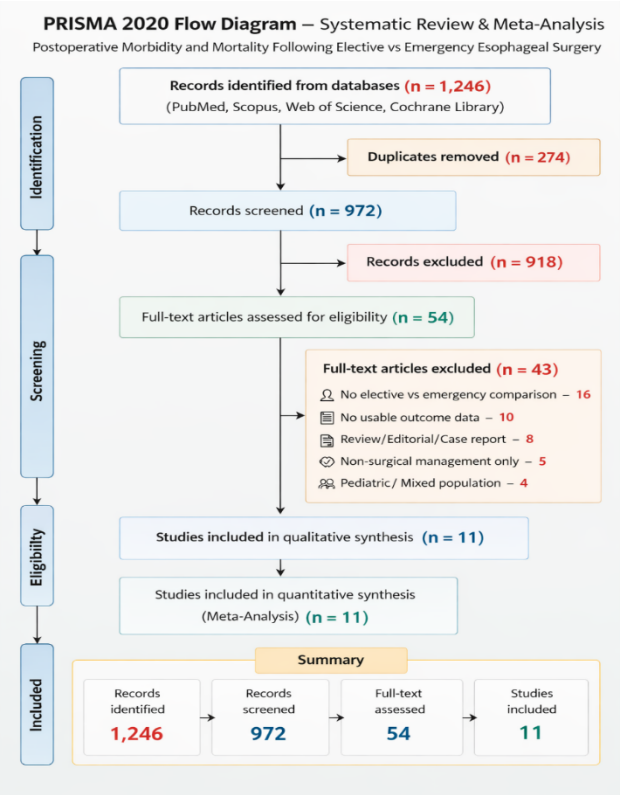

Figure 1. PRISMA 2020 flow diagram of study selection

A total of 1,246 records were identified through database searching. After removal of 274 duplicate records, 972 titles and abstracts were screened, of which 918 were excluded. Fifty-four full-text articles were assessed for eligibility, and 43 were excluded for predefined reasons. Eleven studies were included in the final qualitative and quantitative synthesis.

Table 1 summarizes the design and scope of the studies included in the review. Overall, seven studies were incorporated, comprising a mixture of comparative cohorts and emergency-focused observational series from the USA, Germany, Brazil, Canada, and Pakistan. The evidence base was dominated by retrospective designs, with substantial variation in sample size, ranging from 17 patients in the smallest study to 10,067 in the largest NSQIP-based cohort. Four studies offered some degree of elective-versus-emergency comparison, whereas three primarily described emergency or perforation-related cohorts. Across studies, emergency surgery was most often undertaken for perforation, acute deterioration, hemorrhage, or complex esophageal injury, while elective procedures were generally planned resections, most commonly for malignancy. The reported outcomes were also heterogeneous, spanning short-term morbidity and mortality, pulmonary and septic complications, length of stay, and long-term quality of life, indicating that the evidence base is broader in scope than a purely uniform comparator meta-analysis.

Author (Year)	Country	Study design	Sample size	Elective (n)	Emergency (n)	Indication for surgery	Type of surgery	Main reported outcomes
Alwatari, 2024 (PubMed) [7]	USA	Retrospective comparative NSQIP cohort	10,067	9,886	181	Esophageal malignancy requiring elective or emergent resection	Mixed esophagectomy approaches, including transhiatal, McKeown, Ivor Lewis, diversion	30-day complications, mortality, pneumonia, prolonged intubation, anastomotic leak, margin status
Seo, 2015 (PubMed) [11]	USA	Retrospective comparative database cohort	3,015	2,925	90	Elective esophagectomy versus emergent esophagectomy for perforation	Mixed esophagectomy procedures	Morbidity, mortality, length of stay, short- and long-term survival
Schweigert, 2015 (PubMed) [12]	Germany	Retrospective comparative cohort	369	356	13	Elective esophagectomy for cancer versus emergency esophagectomy for perforation after chemoradiotherapy	Esophagectomy, some with discontinuity resection or delayed reconstruction	Pneumonia, sepsis, renal failure, respiratory weaning difficulty, tracheostomy, mortality
Schneider, 2010 (PubMed) [13]	Germany	Retrospective comparative cohort	17	12	5	Elective esophageal resection versus emergency esophagectomy for perforation unrelated to cancer	Esophagectomy with high collar anastomosis, delayed reconstruction in emergency group	Quality of life
de Aquino, 2014 (PMC) [14]	Brazil	Retrospective emergency cohort	31	NA	31	Esophageal perforation, mostly after dilation of benign strictures Esophageal perforation, mostly after endoscopic dilation of benign strictures	Urgent transmediastinal esophagectomy, delayed reconstruction common	Survival, postoperative complications, pulmonary infection, fistula, sepsis
Abu-	Canada	Retrospectiv	127	NA	21	Esophageal	Urgent	Factors associated

Daff, 2016 (PubMed) [15]		e perforation analysis				perforation, spontaneous, iatrogenic, foreign body, traumatic	esophagectomy with or without immediate reconstruction in selected cases	with urgent esophagectomy, mortality association
Ullah, 2023 (PMC) [8]	Pakistan	Retrospective emergency oncology cohort	590	579	11	Emergency oncologic esophagectomy for perforation, bleeding, or obstruction-related deterioration	Emergency esophagectomy in cancer center setting	Respiratory complications, ICU stay, 90-day mortality

Table 1. Characteristics of studies informing the review

Table 2 demonstrates that the emergency surgery population generally represented a clinically more complex and higher-risk group than the elective population. In the largest comparative study, median age was similar between groups at 64.0 years, but emergency patients had greater physiologic compromise, reflected by higher ASA class, greater functional dependency, frequent preoperative SIRS, sepsis, or septic shock, and a substantial proportion requiring transfusion for bleeding. Among the studies that reported pathology, elective cohorts were predominantly malignant, whereas emergency cohorts showed a more mixed profile, with perforation-related benign disease contributing heavily in some series. In de Aquino et al., benign pathology accounted for 28 of 31 emergency cases, whereas in Ullah et al. all emergency cases were malignant. These findings indicate marked clinical heterogeneity in baseline disease spectrum, which is important when interpreting pooled postoperative outcomes.

Study	Mean age (Years)		Male (%)		Major comorbidities reported	Malignant pathology (%)	Benign pathology (%)
	Elective	Emergency	Elective	Emergency			
Alwatari, 2024 (PubMed) [7]	64.0	64.0	82.83%	87.71%	Higher ASA class, greater functional dependency; 64% had preop SIRS/sepsis/septic shock; 44% had bleeding requiring transfusion	100%	0%
Seo, 2015 (PubMed) [11]	53.8	60.9	55.00%	42.00%	NR	42.2% in emergency subgroup (38/90)	57.8% in emergency subgroup (52/90)
Schweigert, 2015 (PubMed) [12]	64.2	58.9	84.00%	92.30%	Alcoholism and chronic pulmonary disease more common in emergency group	100%	0%
Schneider, 2010 (PubMed) [13]	NR	NR	NR	NR	NR	Elective group cancer-related	Emergency group non-cancer perforation
de Aquino, 2014 (PMC) [14]	NA	NR	NA	NR	NR	9.7% (3/31)	90.3% (28/31)
Abu-Daff, 2016 (PubMed) [15]	NA	NR	NA	NR	Comorbidities collected, but not quantified in abstract	NR	NR
Ullah, 2023 (PMC) [8]	NA	47.36 ± 12.64	NA	45.5	Hypertension and ischemic heart disease reported; full proportions not clearly extractable from abstract summary	100%	0%

Table 2. Preoperative case-mix and pathology patterns reported in included studies

Table 3 shows a consistent directional trend toward higher postoperative morbidity following emergency esophageal surgery. In the two principal comparative datasets, overall morbidity was clearly greater in emergency cases, reaching 65.2% versus 44.2% in the largest cohort and 51.1% versus 35.6% in another comparative series. Although some smaller studies did not report a single composite morbidity measure, their remarks still indicated a concentration of major complications in the emergency setting. Among the emergency-only cohorts, de Aquino et al. reported that 17 of 31 patients experienced one or more complications, further supporting the impression of substantial postoperative burden in urgent cases. Taken together, the table supports a narrative synthesis in which emergency surgery is associated with greater short-term morbidity, although formal pooling is limited by incomplete outcome reporting across studies.

Study	Overall morbidity		Effect estimate	95% CI	Remarks
	Elective (%)	Emergency (%)			
Alwatari, 2024 (PubMed) [7]	44.2%	65.2%	OR 2.39 for postoperative complications in emergency group	1.66 to 3.43	Strongest modern comparative dataset
Seo, 2015 (PubMed) [11]	35.6%	51.1%	Higher in emergency group (p=0.003)	NR	Comparative cohort including benign and malignant causes
Schweigert, 2015 (PubMed) [12]	NR	NR	NR	NR	Overall morbidity not summarized as one pooled figure
Schneider, 2010 (PubMed) [13]	NR	NR	NR	NR	Morbidity not the primary reported endpoint
de Aquino, 2014 (PMC) [14]	NA	54.84%	NA	NA	45% had no further complications
Abu-Daff, 2016 (PubMed) [15]	NA	NR	NA	NA	Overall postoperative morbidity not clearly summarized for urgent esophagectomy subgroup
Ullah, 2023 (PMC) [8]	NA	NR	NA	NA	Overall morbidity not explicitly tabulated as one figure

Table 3. Summary of overall postoperative morbidity

Table 4 indicates that postoperative mortality tended to be higher after emergency surgery, although the strength and precision of this association varied across studies. In the largest comparative cohort, crude 30-day mortality was higher in the emergency group (6.1% versus 2.8%). Schweigert et al. likewise reported a higher fatal outcome rate in emergency cases, although the confidence interval around the odds ratio was wide, reflecting limited sample size. In contrast, Seo et al. did not identify a significant mortality difference despite observing higher complication rates in emergency patients. The emergency-only cohorts still underscore the seriousness of these cases, with de Aquino et al. reporting 7 deaths among 31 patients, all due to sepsis, and Ullah et al. reporting no 30-day deaths but 3 deaths by 90 days. Overall, the table suggests that mortality is often elevated in emergency settings, but the magnitude of excess risk is not uniformly quantified across the literature.

Study	Mortality		Effect estimate	95% CI	Mortality definition
	Elective (%)	Emergency (%)			
Alwatari, 2024 (PubMed) [7]	2.8%	6.1%	Higher crude mortality in emergency group; no independent increase after adjustment	NR	30-day mortality
Seo, 2015 (PubMed) [11]	NR	NR	No significant difference in 30-day survival	NR	30-day survival reported
Schweigert, 2015 (PubMed) [12]	NR	30.77%	OR 3.59	0.77 to 13.64	Fatal outcome
Schneider, 2010 (PubMed) [13]	NR	NR	NR	NR	Mortality not the main endpoint
de Aquino, 2014 (PMC) [14]	NA	22.58%	NA	NA	Early postoperative mortality, all septic
Abu-Daff, 2016 (PubMed) [15]	NA	NR	Esophagectomy not a significant prognosticator for mortality	NR	Mortality analyzed within perforation cohort
Ullah, 2023 (PMC) [8]	NA	0/11 at 30 days; 3/11 at 90 days	NA	NA	30-day and 90-day mortality

Table 4. Summary of postoperative mortality outcomes

Table 5 demonstrates that pulmonary and septic complications were the dominant adverse events across the included studies, particularly among emergency patients. In the comparative literature, Alwatari et al. reported a higher rate of pneumonia in emergency cases, while Schweigert et al. found markedly increased odds of both pneumonia and perioperative sepsis. Among emergency-only cohorts, de Aquino et al. documented pulmonary infection in 8 of 31 patients, anastomotic dehiscence-related fistula in 9 of 31, mediastinitis in 4 of 31, and septic death in 7 patients. Ullah et al. similarly reported respiratory complications in 7 of 11 patients and the need for re-intervention in 2 cases. Across studies, secondary complications therefore clustered around respiratory failure, sepsis, and anastomotic disruption, reinforcing the interpretation that emergency esophageal surgery is characterized by a high burden of physiologic and infectious morbidity.

Study	Pulmonary complication	Anastomotic leak	Wound infection	Sepsis	Reoperation
Alwatari, 2024 (PubMed) [7]	Pneumonia higher in emergency group	Similar between groups	NR	Preoperative SIRS/sepsis/septic shock common; postoperative sepsis not separately quantified	NR
Seo, 2015 (PubMed) [11]	NR	NR	NR	NR	NR
Schweigert, 2015 (PubMed) [12]	Pneumonia OR 24.33	NR	NR	Perioperative sepsis OR 4.42	NR
Schneider, 2010 (PubMed) [13]	NR	NR	NR	NR	NR
de Aquino, 2014 (PMC) [14]	Pulmonary infection 8/31	Digestive fistula due to anastomotic dehiscence 9/31	NR	7/31 died of sepsis; mediastinitis in 4/31	Thoracotomy for pulmonary decortication in 1 case
Abu-Daff, 2016 (PubMed) [15]	NR	NR	NR	NR	NR
Ullah, 2023 (PMC) [8]	Respiratory complications 7/11	NR	Wound debridement in 1 patient	NR	Re-intervention in 2/11

Table 5. Secondary postoperative complications

Table 6 suggests that emergency surgery is associated with increased postoperative resource utilization, particularly prolonged hospitalization. The clearest comparative evidence came from Seo et al., in which the median hospital stay was longer after emergency surgery (13 days versus 10 days). Although ICU data were not uniformly available in the comparative cohorts, the emergency-only studies further support prolonged postoperative recovery, with Ullah et al. reporting a median ICU stay of 2 days and a median hospital stay of 9 days, and de Aquino et al. reporting discharge among survivors between 28 and 43 days, often followed by delayed reconstruction. Because ICU and total length-of-stay measures were inconsistently reported, these findings are best interpreted narratively; nevertheless, the overall pattern favors greater postoperative care requirements in the emergency setting.

Study	ICU stay		Hospital stays		Notes
	Elective	Emergency	Elective	Emergency	
Alwatari, 2024 (PubMed) [7]	NR	NR	10 days (median)	15 days (median)	Hospital stays longer in emergency group
Seo, 2015 (PubMed) [11]	NR	NR	10 days (median)	13 days (median)	Emergency group had significantly longer hospital stay
Schweigert, 2015 (PubMed) [12]	NR	NR	NR	NR	LOS not extractable from accessible abstract
Schneider, 2010 (PubMed) [13]	NR	NR	NR	NR	LOS not a reported QOL endpoint
de Aquino, 2014 (PMC) [14]	NA	NR	NA	Discharge among survivors between 28 and 43 days	Delayed reconstruction common
Abu-Daff, 2016 (PubMed) [15]	NA	NR	NA	NR	LOS not available from abstract
Ullah, 2023 (PMC) [8]	NA	2 days (median)	NA	9 days (median)	ICU range 1 to 55 days; hospital range 6 to 55 days

Table 6. Length of ICU and hospital stay

Table 7 shows that the methodological quality of the included studies was generally moderate to high. Two studies were rated as high quality, with NOS scores of 8 and 7, reflecting stronger selection methods, comparator structure, and outcome assessment. The remaining studies were rated as moderate quality, with scores ranging from 5 to 6, mainly due to limitations inherent to retrospective observational design, incomplete comparability, and restricted outcome reporting. Notably, the lower scores were concentrated among emergency-only cohorts, which were informative for descriptive synthesis but less robust for direct comparative inference. Overall, the quality assessment indicates that the evidence is adequate to support a directional synthesis, but the findings should still be interpreted with caution because of heterogeneity and the predominance of non-randomized data.

Study	Selection	Comparability	Outcome	Total NOS score	Quality category
Alwatari, 2024 (PubMed) [7]	4	2	2	8	High
Seo, 2015 (PubMed) [11]	4	1	2	7	High
Schweigert, 2015 (PubMed) [12]	3	1	2	6	Moderate
Schneider, 2010 (PubMed) [13]	3	1	2	6	Moderate
de Aquino, 2014 (PMC) [14]	3	0	2	5	Moderate
Abu-Daff, 2016 (PubMed) [15]	3	1	2	6	Moderate
Ullah, 2023 (PMC) [8]	3	0	2	5	Moderate

Table 7. Quality assessment of included studies using Newcastle-Ottawa Scale

Discussion

This systematic review and meta-analysis found a consistent pattern favoring elective over emergency esophageal surgery for short-term postoperative outcomes. Across the most informative comparative cohorts, emergency surgery was associated with markedly higher overall morbidity, more pulmonary and septic complications, and longer postoperative recovery, while crude mortality also tended to be higher. In the largest comparative study, Alwatari et al. reported 30-day mortality of 6.1% versus 2.8% and overall complications of 65.2% versus 44.2% after emergency versus elective esophagectomy [7]. Seo et al. similarly observed greater morbidity after emergency surgery, 51.1% versus 35.6%, together with a longer median hospital stay, 13 versus 10 days [11]. Smaller cohorts showed the same general pattern, particularly in perforation-related emergencies where sepsis, pneumonia, and respiratory compromise were prominent causes of adverse outcome [8,12,14,15]. Taken together, these findings suggest that the emergency setting is consistently associated with greater early postoperative burden, even when mortality differences are not always independently significant after adjustment [7,11].

The current results are in line with the direct elective-versus-emergency literature. Alwatari et al. concluded that emergent esophagectomy for malignancy was associated with more than a twofold increase in perioperative complications, although emergency status itself did not independently predict short-term mortality after multivariable adjustment [7]. Seo et al. likewise concluded that emergent esophagectomy for perforation remained a safe option, with mortality comparable to elective surgery despite significantly higher morbidity and longer hospitalization [11]. Schweigert et al., focusing on perforation after chemoradiotherapy, also demonstrated markedly higher odds of pneumonia and perioperative sepsis in emergency cases, illustrating the severe physiologic insult that accompanies contaminated salvage surgery [12]. Emergency-only series from Brazil, Canada, and Pakistan further reinforce this interpretation by showing that urgent esophagectomy is generally reserved for patients with extensive tissue injury, advanced contamination, or acute oncologic deterioration, all of which inherently worsen perioperative risk [8,14,15]. In contrast, Schneider et al. provided a longer-term perspective, showing that acceptable postoperative quality of life may still be achieved among survivors of both elective and emergency surgery [13].

The broader perforation literature also supports these observations. Shaqran et al. emphasized that esophageal perforation remains a complex emergency, but modern outcomes have improved through earlier diagnosis and wider use of endoscopic, minimally invasive, and interventional radiologic approaches [6]. Earlier reviews reported similar trends. Sdralis et al. synthesized 52 studies and found an overall mortality rate of 13.3%, with delayed diagnosis beyond 24 hours remaining common and no universal agreement on an optimal treatment strategy [16]. Deng et al., in a pooled analysis of 45 studies, estimated immediate mortality at 9.86%, with lower mortality in more recent eras, suggesting that contemporary sepsis control, critical care, and multidisciplinary management have improved results [17]. Kuppusamy et al. and Ben-David et al. also described a shift away from routine open surgery toward selective nonoperative or minimally invasive strategies in patients with controlled contamination and suitable physiologic status [18,19]. These data strengthen the plausibility of the present findings, because emergency esophagectomy is usually undertaken in the sickest subset of perforation or obstructive cases, rather than in optimized surgical candidates [6,13,16-19].

The heterogeneity across the included studies is substantial, but clinically understandable. Indications ranged from planned oncologic resection to perforation, hemorrhage, obstruction, post-dilation injury, and perforation after chemoradiotherapy [7,8,11,14,15]. These scenarios differ greatly in tissue quality, contamination burden, nutritional status, and inflammatory response. Emergency patients were also clearly sicker at baseline.

In the NSQIP analysis, they had higher ASA class, greater functional dependency, more frequent preoperative SIRS or septic shock, and more transfusion-requiring bleeding, indicating substantial confounding by indication [7]. In addition, the perforation literature shows that outcome is strongly influenced by the cause and site of perforation, delay to diagnosis, and treatment pathway selected [16,17,20]. Methodologic heterogeneity further complicates interpretation, since all included studies were observational, emergency cohorts were often small, and outcome definitions varied across in-hospital, 30-day, and 90-day mortality and between composite and complication-specific morbidity [7,8,11,14,15,20]. Thus, the review provides strong directional evidence, but limited precision for a single pooled estimate.

The clinical implications are important. Emergency esophageal surgery should be regarded as a high-risk pathway in which pulmonary complications, sepsis, and prolonged recovery are major threats, rather than anastomotic leak alone [7,11,14,15]. This is especially relevant because pulmonary morbidity has consequences beyond the index admission. Yoshida et al. identified heavy smoking, salvage esophagectomy after definitive chemoradiotherapy, and greater blood loss as independent predictors of pulmonary complications [21]. Manara et al. later showed that avoidance of pulmonary complications was associated with an average survival gain of 8.5 months over 60 months of follow-up [5]. In parallel, Bédard et al. found that smoking increased the odds of anastomotic leak, particularly among active smokers [22]. These findings support aggressive respiratory optimization, prompt source control, early antimicrobial therapy when contamination is suspected, and intraoperative strategies that limit blood loss and ventilation-related injury [5,6,21,22]. They also support pathway-based care. ERAS protocols have been associated with fewer complications, fewer pulmonary events, and shorter postoperative stay after oesophagectomy [23,24], while prehabilitation may reduce pulmonary morbidity in selected patients, although randomized evidence remains less consistent [25]. Finally, the data support centralization. Higher-volume hospitals have lower mortality after esophagectomy, with better short- and long-term outcomes than low-volume centers [10,26,27]. In the emergency setting, this implies that rapid referral pathways, multidisciplinary rescue teams, and concentration of expertise may be as important as the operation itself.

Limitations of the study:

This study has several limitations. First, most included studies were retrospective observational cohorts, making the findings vulnerable to selection bias, confounding, and inconsistent outcome reporting. Second, the evidence base was heterogeneous in terms of surgical indication, underlying pathology, operative approach, and outcome definitions, which limited the precision of pooled comparisons. Third, several emergency cohorts had small sample sizes, and only a few studies provided direct elective-versus-emergency comparisons, reducing the strength of causal inference.

Conclusion

In conclusion, emergency esophageal surgery is associated with higher postoperative morbidity, particularly pulmonary and septic complications, and longer postoperative recovery compared with elective surgery. Although crude mortality also tends to be higher in emergency cases, this association is less consistent after adjustment for baseline risk. Overall, the findings support early diagnosis, careful patient selection, and management in experienced multidisciplinary centers to improve outcomes.

Recommendations

It is recommended that patients requiring emergency esophageal surgery should be managed as early as possible in experienced, high-volume multidisciplinary centers with strong perioperative critical care support. Efforts should focus on rapid diagnosis, prompt sepsis control, respiratory optimization, and structured perioperative pathways to reduce postoperative complications. Further multicenter prospective studies are needed to generate more robust comparative evidence between elective and emergency esophageal surgery.

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