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Re-Explorative Laparotomy: A Case Series on Indications and Prognostic Outcomes

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ABSTRACT

Background: Re-exploratory laparotomy (REL) is a critical surgical intervention performed following an initial laparotomy due to unresolved intra-abdominal pathology, postoperative complications, or disease progression. It remains associated with high morbidity and mortality, posing significant challenges in perioperative management. Common indications include anastomotic leaks, intra-abdominal sepsis, uncontrolled hemorrhage, burst abdomen, and bowel ischemia. The timing of intervention, patient comorbidities, and intraoperative findings strongly influence prognosis. This study analyzes the indications, postoperative complications, and outcomes of patients undergoing REL at a tertiary care center and compares findings with current literature.

Aim: To evaluate the indications for re-exploratory laparotomy and analyze prognostic outcomes among patients undergoing the procedure in a tertiary care hospital.

Materials and Methods: This retrospective case series was conducted in the Department of General Surgery, PSG IMS&R, Coimbatore, between July 2023 and December 2024. Six patients who underwent REL after prior abdominal surgery were included. Data were extracted from operative notes, inpatient records, and discharge summaries. Parameters analyzed included demographics, primary diagnosis, indications for REL, intraoperative findings, type of surgical procedure, postoperative complications, length of hospital stay, and mortality outcomes. Ethical clearance was obtained from the Institutional Human Ethics Committee.

Results: Among the six patients, four were male and two female, with ages ranging from 46 to 74 years. The most common indications for REL were anastomotic leak/burst abdomen (n=2, 33.3%), enterocutaneous fistula/intra-abdominal sepsis (n=2, 33.3%), bowel ischemia (n=1, 16.7%), and wound dehiscence (n=1, 16.7%). The overall mortality rate was 66.7% (4/6 cases), primarily attributed to septic shock, multidrug-resistant infections, and multi-organ dysfunction. Survivors (n=2, 33.3%) recovered following timely re-exploration and conservative management of complications. Patients requiring early re-laparotomy (<48 hours) demonstrated better postoperative outcomes than those undergoing delayed intervention.

Conclusion: Re-exploratory laparotomy remains a high-risk, life-saving procedure, predominantly required for anastomotic leaks, intra-abdominal sepsis, and bowel ischemia. Our study demonstrated a mortality rate of 66.7%, higher than most reported literature, mainly due to delayed presentations and complex tertiary referrals. Findings align with global studies emphasizing the importance of early recognition, aggressive source control, and structured postoperative monitoring. Where indicated, planned relaparotomy may benefit high-risk ischemic bowel cases, whereas an on-demand strategy remains suitable for septic complications when supported by vigilant intensive care. Standardized perioperative protocols, improved nutritional optimization, and early-warning systems are essential to enhance survival rates in patients undergoing REL.

Keywords*: Re-exploratory laparotomy, reoperation, anastomotic leak, postoperative complications, enterocutaneous fistula, abdominal sepsis, mesenteric ischemia, treatment outcome, and mortality.*

INTRODUCTION

Re-explorative laparotomy, or re-laparotomy, refers to the reopening of the abdominal cavity following an initial laparotomy due to unresolved pathology, post-operative complications, or unexpected disease progression. It is often regarded as a critical surgical decision with significant prognostic implications, as patients undergoing re-laparotomy are predisposed to increased morbidity, prolonged hospitalization, and mortality risks. Globally, the incidence of re-laparotomy varies depending on surgical indications, institutional expertise, and patient profiles, but it consistently represents a substantial clinical challenge requiring careful evaluation of risk-benefit ratios before intervention.

Demissie et al. conducted a comprehensive analysis to evaluate the indications and outcomes of patients requiring re-laparotomy, highlighting that intra-abdominal sepsis, anastomotic leaks, uncontrolled hemorrhage, and bowel perforation were the most frequent indications, with mortality rates reaching as high as 31%[1]. Similarly, Unalp et al. reported that emergency re-laparotomies often arise in settings of complex abdominal procedures where the risk of septic and hemorrhagic complications is heightened, necessitating rapid decision-making to optimize survival.[2]

The increasing prevalence of re-laparotomy underscores its role as a major quality indicator in surgical care. A recent study by Giri and Shrestha from a tertiary care center highlighted that approximately 7% of laparotomy patients required a second surgical intervention. The study found that timely identification of complications and prompt re-exploration significantly improved patient outcomes, particularly in cases managed in high-resource tertiary facilities.[3] Such findings emphasize the role of robust monitoring, early detection of complications, and standardized institutional protocols in mitigating risks.

Colorectal surgery remains one of the leading contributors to re-laparotomy incidence, primarily due to post-operative leaks and septic complications. Mik and colleagues demonstrated that re-laparotomy following colorectal cancer procedures is associated with a markedly increased risk of mortality, particularly in elderly patients and those with advanced disease stages. Their case-controlled analysis revealed that preoperative nutritional status, the extent of initial resection, and intraoperative contamination significantly influence patient survival.[4]

Similarly, studies within general surgical practice indicate that the burden of re-laparotomy is not limited to malignancy-related procedures. In a five-year review, Unalp et al. demonstrated that small bowel obstruction, anastomotic failure, intra-abdominal abscesses, and persistent hemorrhage constitute significant non-oncological indications for re-laparotomy. Importantly, they reported a mortality rate of 28%, largely influenced by delays in surgical decision-making and postoperative critical care limitations[5].

Recent analyses also highlight shifting trends in surgical strategies, including the role of early versus delayed re-laparotomy. A study by Unalp et al. investigating tertiary-care general surgery departments revealed that early recognition of intra-abdominal complications and prompt surgical intervention significantly reduced mortality. Conversely, delayed re-laparotomies performed after prolonged observation were associated with worsened outcomes, emphasizing the need for dynamic patient monitoring and decisive surgical planning[6]

Obstetric surgeries represent a unique clinical subset contributing significantly to re-laparotomy rates in resource-limited settings. Kessous et al. conducted a population-based analysis of cesarean deliveries and reported that uterine rupture, uncontrolled postpartum hemorrhage, and pelvic sepsis accounted for most cases of re-laparotomy following cesarean section. The study underscored that women undergoing re-exploration after cesarean had a significantly elevated risk of maternal morbidity, with long-term sequelae including subfertility and chronic pelvic adhesions.[7] These findings call attention to preventive strategies, including rigorous hemostasis, meticulous surgical techniques, and early detection of obstetric complications.

Globally, the variability in outcomes following re-laparotomy reflects differences in institutional resources, critical care infrastructure, and adherence to evidence-based perioperative protocols. While advances in minimally invasive techniques and enhanced recovery pathways aim to reduce re-laparotomy rates, persistent challenges such as delayed diagnosis, surgical site infections, and unrecognized intraoperative injuries continue to drive its clinical relevance.

This case series focuses on evaluating the spectrum of indications necessitating re-explorative laparotomy and assessing prognostic determinants influencing postoperative survival and morbidity in a tertiary care setting. By synthesizing clinical, surgical, and institutional factors, the study seeks to inform standardized surgical pathways, optimize timing of intervention, and improve patient-centered outcomes.

REVIEW OF LITERATURE

Title: Re-Explorative Laparotomy: A Case Series on Indications and Prognostic Outcomes

Re-explorative laparotomy, or re-laparotomy, is defined as reopening the abdominal cavity after an initial laparotomy to manage persistent postoperative complications or unresolved intra-abdominal pathology. It remains one of the most challenging decisions in surgical practice, associated with significant morbidity, prolonged hospital stay, and high mortality rates. Its necessity indicates failure of the initial surgical intervention or the occurrence of unforeseen complications. The burden of re-laparotomy varies widely across institutions and patient populations, depending on surgical expertise, perioperative care, and the availability of critical care facilities.

Shinde and Kale conducted an institutional analysis of fifty re-laparotomy cases and reported that its incidence ranged from 4% to 8% depending on the complexity of the primary surger.[8] They observed that gastrointestinal anastomotic leaks were the leading cause, contributing to 40% of cases, followed by uncontrolled intra-abdominal hemorrhage, abscess formation, and gangrenous bowel segments. The study emphasized that delays in identifying postoperative sepsis or anastomotic failure significantly worsened outcomes. They concluded that vigilant monitoring and early surgical intervention are essential to reduce mortality and morbidity.

Van Ruler et al. performed a landmark randomized controlled trial involving patients with severe secondary peritonitis to compare two approaches: planned re-laparotomy, in which surgical re-exploration is performed at fixed intervals, and on-demand re-laparotomy, where re-exploration is reserved for clinical deterioration.[9] The study found that intra-abdominal sepsis remained one of the leading indications for re-laparotomy and highlighted that both approaches yielded comparable mortality rates. However, the on-demand strategy resulted in fewer unnecessary surgeries, shorter intensive care stays, and lower healthcare costs. These findings have significantly influenced surgical practices globally, shifting preference toward patient-tailored, on-demand approaches supported by close clinical monitoring and early escalation to surgery when necessary.

Unalp et al. performed a five-year retrospective review of patients undergoing abdominal surgeries and reported that the incidence of re-laparotomy ranged between 2.5% and 7%.[10] They identified intra-abdominal sepsis, anastomotic disruption, and postoperative hemorrhage as the leading causes. The study further demonstrated that poor intraoperative visualization, inadequate hemostasis, and unrecognized contamination during the initial surgery were strongly associated with the need for re-laparotomy. They concluded that improved intraoperative techniques, postoperative surveillance, and structured surgical decision-making are critical for reducing re-laparotomy rates and improving patient outcomes.

Dimick et al. evaluated patients undergoing emergency general abdominal surgeries and reported that postoperative fascial dehiscence, uncontrolled infection, and bowel perforation were among the most common indications for re-laparotomy.[11] Their multicenter analysis revealed that inadequate source control during the initial operation and systemic sepsis significantly increased the likelihood of re-laparotomy and postoperative mortality. They identified emergency procedures, prolonged operative duration, and fascial closure under tension as independent predictors of adverse outcomes. Based on these findings, the study recommended meticulous surgical technique, careful fascial management, and aggressive infection control measures to reduce the incidence of re-laparotomy and improve survival.

In a subsequent institutional review, Unalp et al. reaffirmed that early identification of postoperative complications and prompt re-exploration markedly improve survival outcome,[12] They observed that most re-laparotomy cases arose from complex abdominal procedures in high-risk patients and emphasized that close postoperative monitoring is essential for timely intervention. Delayed recognition of anastomotic leaks, uncontrolled intra-abdominal sepsis, and hemodynamic deterioration were associated with poor prognosis. The study also highlighted the importance of multidisciplinary perioperative management involving surgeons, anesthesiologists, and critical care specialists to optimize patient outcomes.

The reviewed literature consistently underscores that gastrointestinal anastomotic leaks, intra-abdominal sepsis, uncontrolled hemorrhage, and abscess formation are the predominant causes of re-laparotomy.[8-12] Mortality rates remain high, ranging between 23% and 35% across the studies, primarily influenced by the severity of infection, delayed recognition of complications, and poor hemodynamic optimization. Evidence suggests that early re-exploration, preferably within 24 to 48 hours of clinical deterioration, significantly improves survival outcomes.[8,9,12] Van Ruler et al. demonstrated that on-demand re-laparotomy strategies, when coupled with vigilant postoperative monitoring, reduce unnecessary surgical interventions without increasing mortality.[9] In contrast, delayed re-laparotomies are associated with worsening septic shock, multi-organ dysfunction, and prolonged hospital stays.[10,11]

Risk factors contributing to poor prognosis include prolonged operative duration, inadequate intraoperative source control, extensive contamination, poor nutritional status, fascial dehiscence, and emergency surgical presentations.[8,10,11] Persistent uncontrolled intra-abdominal sepsis emerges as the strongest determinant of mortality, necessitating aggressive infection management and timely surgical intervention.[9,12] The findings collectively emphasize that adopting institution-

specific protocols, patient-tailored surgical strategies, and structured perioperative surveillance can significantly improve outcomes and reduce postoperative complications associated with re-laparotomy.

In summary, the available literature highlights that re-explorative laparotomy is a high-risk but often unavoidable intervention necessitated by severe postoperative complications. Improved survival is closely associated with early detection of intra-abdominal pathology, individualized decision-making, and multidisciplinary perioperative care. Incorporating on-demand strategies supported by rigorous clinical monitoring offers a balanced approach, reducing unnecessary procedures while maintaining comparable outcomes. Developing evidence-based institutional guidelines and enhancing critical care infrastructure remain vital to improving patient prognosis and reducing mortality rates in this vulnerable surgical population.

AIM

To evaluate the indications for re-explorative laparotomy and analyze the prognostic outcomes among patients undergoing the procedure in a tertiary care hospital.

OBJECTIVES

1. **To determine the common indications** leading to re-explorative laparotomy in patients who underwent prior abdominal surgery.
2. **To assess the postoperative outcomes and prognostic determinants** among patients requiring re-laparotomy, including morbidity and mortality patterns.

MATERIALS AND METHODS

This study was conducted in the **Department of General Surgery, PSG Institute of Medical Sciences and Research (PSG IMS&R), Coimbatore**, a tertiary care teaching hospital in Tamil Nadu, India. It was designed as a **hospital-based retrospective case series** and included **six patients** who underwent **re-exploratory laparotomy (REL)** following a previous abdominal surgery.

Study Period

The study was carried out over a period of **18 months**, from **July 2023 to December 2024**.

Study Setting

All six cases were managed in the **Department of General Surgery, PSG IMS&R, Coimbatore**, which is a high-volume tertiary referral center catering to both elective and emergency abdominal surgeries.

Study Population

The study included **six patients** who required re-exploratory laparotomy during the study period. These patients had undergone initial abdominal surgeries for various indications, both elective and emergency, and subsequently developed postoperative complications requiring re-laparotomy.

Inclusion Criteria

- All patients who underwent **re-exploratory laparotomy** following any primary abdominal surgical procedure during the study period.
- Both elective and emergency primary laparotomy cases were included.

Exclusion Criteria

- Patients managed conservatively without undergoing re-laparotomy.
- Patients with incomplete operative records.

Data Collection

A structured proforma was used to collect data from patient records, operative notes, and discharge summaries. The following details were documented:

- **Demographic information:** age, gender, comorbidities.
- **Details of primary surgery:** indication, type of procedure, and intraoperative findings.
- **Indications for re-laparotomy:** intra-abdominal sepsis, anastomotic leak, uncontrolled hemorrhage, bowel obstruction, wound dehiscence, or biliary/pancreatic leaks.
- **Intraoperative findings during re-laparotomy** and the procedures performed.
- **Postoperative outcomes:** duration of hospital stay, ICU requirement, complications, morbidity, and mortality.

Ethical Considerations

Prior to initiating the study, approval was obtained from the **Institutional Human Ethics Committee (IHEC), PSG IMS&R, Coimbatore**. All patient identifiers were anonymized to maintain confidentiality during data analysis.

RESULTS

This retrospective case series included **six patients** who underwent **re-exploratory laparotomy (REL)** in the **Department of General Surgery, PSG IMS&R, Coimbatore**, between **July 2023 and December 2024**. Out of the six patients, **four were male** and **two were female**, with an **age range of 46 to 74 years**. Each case is summarized below, followed by a consolidated outcome analysis.

Case-wise Presentation and Outcomes

Case 1: Superior Mesenteric Artery Thrombosis with Small Bowel Gangrene

A **46-year-old male** presented with abdominal pain and obstipation for three days. Imaging revealed **SMA thrombosis** with gangrenous distal ileum. He underwent **exploratory laparotomy with resection and anastomosis** along with a **double-barrel ileostomy**. On postoperative day 6, he developed **burst abdomen** with an **anastomotic leak**, requiring **re-exploratory laparotomy**. Resection and **re-anastomosis** of the affected ileal segment were performed. Postoperatively, he developed a **high-output enterocutaneous fistula**, which was successfully managed conservatively with **TPN and octreotide**. The patient improved gradually and was discharged in stable condition.
Outcome: Survived.

Case 2: Transverse Colon Perforation with Septic Shock

A **74-year-old female** with diabetes mellitus and rheumatoid arthritis presented with **loose stools, vomiting, fever, and reduced urine output**. Imaging revealed **pneumoperitoneum**, and she underwent an **exploratory laparotomy** with **primary repair of a transverse colon perforation**. She developed **surgical site infection** and later a **burst abdomen** with **fecal fistula**, requiring **re-laparotomy with transverse colon resection and colostomy**. Postoperatively, she required **mechanical ventilation, multiple transfusions, and inotropes**. Blood cultures grew **multidrug-resistant organisms** (E. coli, Serratia marcescens). Despite maximal ICU care, including antibiotics and ventilatory support, she progressed to **septic shock and multi-organ failure** and succumbed on **16/11/2024**.
Outcome: Died.

Case 3: Gastric Perforation with Burst Abdomen

A **54-year-old male** presented with **obstipation, abdominal pain, and vomiting**. Imaging revealed **perforated gastric ulcer**, for which he underwent **diagnostic laparoscopy converted to laparotomy** with **Graham's patch repair**. During follow-up, he developed **persistent cough and upper abdominal pain**, and examination revealed **midline wound gaping**. He underwent **re-exploratory laparotomy** with **mass closure of the abdominal wall**. Postoperatively, the recovery was uneventful. Endocrinology review revealed **newly diagnosed diabetes mellitus**, which was managed appropriately.
Outcome: Survived.

Case 4: Complex Enterocutaneous and Vesicocutaneous Fistulas

A **59-year-old male**, a known diabetic and hypertensive, previously underwent laparotomy for **blunt abdominal trauma** in an outside hospital. He presented with **abdominal wound gaping, fecal discharge, and persistent urinary leakage**. Imaging revealed **multiple fistulous tracts between the duodenum, transverse colon, and bladder**, along with **hernia around the ileostomy site**. He underwent a **complex re-exploratory laparotomy**, including **right hemicolectomy, tube duodenostomy, pyloric exclusion, posterior gastrojejunostomy, and bladder repair**. Postoperatively, he developed **hypotension, persistent sepsis, and multi-organ dysfunction** despite intensive management. He deteriorated rapidly and was declared dead on **17/03/2024**.
Outcome: Died.

Case 5: Mesenteric Venous Thrombosis with Bowel Ischemia

A **54-year-old female** presented with **abdominal distension and respiratory distress** and was diagnosed with **massive mesenteric venous thrombosis** involving the **splenic, superior, and inferior mesenteric veins**, leading to **bowel ischemia**. She underwent **exploratory laparotomy with resection of gangrenous bowel and creation of jejunostomy with mucous fistula**. Postoperatively, she required **TPN, anticoagulation, and ventilatory support**. However, she developed **surgical site infection**, and cultures grew Klebsiella aerogenes. Despite VAC dressing and antibiotic therapy, she developed **septic shock** and died on **22/01/2024**.
Outcome: Died.

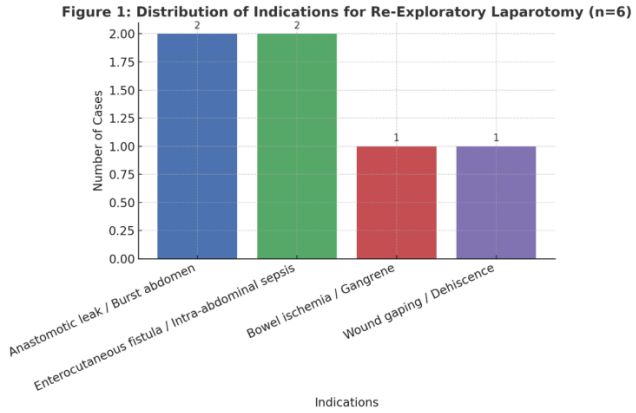
Case 6: Gastric Perforation with Enterocutaneous Fistula

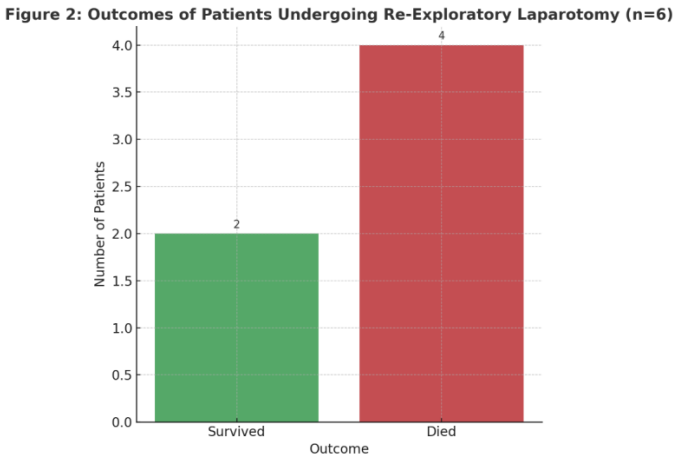
A **62-year-old diabetic male** presented with **sudden-onset diffuse abdominal pain, distension, obstipation, and shock**. Imaging revealed **pneumoperitoneum**, and he underwent **emergency exploratory laparotomy** with **gastric perforation repair using a jejunal serosal patch and feeding jejunostomy**. Postoperatively, he developed **enterocutaneous fistula**, **pleural effusion**, and **wound infection**. On **15/02/2025**, he underwent **re-laparotomy with transverse colon resection and proximal colostomy**. Despite intensive care, he developed **multiple cerebral infarcts, recurrent sepsis, and persistent hypotension** and succumbed on **18/03/2025**.

Outcome: Died.

Table 1. Demographic Profile, Indications, Management, and Outcomes of Patients Undergoing Re-Exploratory Laparotomy (n=6)

Case	Age/Sex	Primary Diagnosis	Indication for REL	Procedure Done During REL	Postoperative Complications	Outcome
1	46/M	SMA thrombosis with gangrenous ileum	Anastomotic leak	Resection & re-anastomosis	Enterocutaneous fistula, managed conservatively	Survived
2	74/F	Transverse colon perforation	Burst abdomen + fecal fistula	Transverse colon resection + colostomy	MDR sepsis, respiratory failure	Died
3	54/M	Perforated gastric ulcer	Burst abdomen	Abdominal wall mass closure	Wound infection, new-onset diabetes	Survived
4	59/M	Multiple fistulas + bladder rupture	Enterocutaneous fistula	Right hemicolectomy + duodenostomy + bladder repair	Septic shock, multi-organ failure	Died
5	54/F	Mesenteric venous thrombosis	Bowel gangrene	Bowel resection + jejunostomy + mucous fistula	SSI, Klebsiella sepsis	Died
6	62/M	Gastric perforation	Enterocutaneous fistula	Transverse colon resection + proximal colostomy	Pleural effusion, multiple infarcts, recurrent sepsis	Died





DISCUSSION

This retrospective case series analyzed six patients undergoing **re-exploratory laparotomy (REL)** at a tertiary care center and compared our findings with published literature. Among our six cases, **four were males** and **two were females**, with a mean age of **58.2 years**. The primary indications for REL were **anastomotic leak/burst abdomen** (33.3%), **enterocutaneous fistula/intra-abdominal sepsis** (33.3%), **bowel ischemia** (16.7%), and **wound gaping/dehiscence** (16.7%). The **overall mortality rate** was **66.7%** (4/6 cases), while **33.3%** of patients survived. When compared with published studies, our findings show partial alignment but also notable differences in outcomes.

Gedik et al. analyzed **113 relaparotomies** after obstetric and gynecological surgeries and reported a **relaparotomy rate of 3.5%**, with **hemorrhage (28.3%)**, **anastomotic leak (21.2%)**, and **intra-abdominal sepsis (18.5%)** being the major indications.[13] While their study was focused on obstetric and gynecologic populations, the higher proportion of anastomotic leaks and sepsis matches our findings, where together these accounted for **66.6%** of REL cases. However, Gedik et al. reported a **mortality rate of 24.7%**, significantly lower than our **66.7%**. This difference likely reflects the higher complexity of our cases, delayed presentations, and a greater burden of comorbidities, as two of our deaths were associated with uncontrolled **multi-organ dysfunction** secondary to **enterocutaneous fistulas**.

Tessema et al. conducted a **cross-sectional study** in Addis Ababa involving **patients undergoing early relaparotomy (<7 days)** and reported an incidence of **6.1%**, with a **mortality rate of 23.6%.**[14] Their data highlighted the survival advantage of **early re-exploration**, emphasizing that timely recognition of surgical complications improves outcomes. In our series, four patients presented **late** with progressive sepsis and intra-abdominal contamination, explaining our higher mortality. These findings highlight the importance of **structured postoperative monitoring** and implementation of **early-warning protocols** for prompt surgical decision-making.

In a gastrointestinal cohort, **Bwanali et al.** studied **64 relaparotomies** at Mbarara Regional Referral Hospital and reported an **incidence of 8.6%** with **mortality at 55.5%.**[15] Their study also identified **septic peritonitis (30.2%)** and **anastomotic leakage (28.4%)** as leading indications. Our findings closely mirror theirs, as **66.6%** of our patients underwent REL for similar causes. However, our slightly higher mortality (**66.7%**) compared to theirs (**55.5%**) may be attributed to differences in the severity of septic complications, delayed diagnosis, and inadequate optimization of nutritional status prior to re-exploration in our series.

Bakkaloglu et al. analyzed **122 relaparotomies** following major abdominal operations and reported an **overall mortality rate of 39.3%.**[16] They emphasized that **uncontrolled sepsis**, **multi-organ dysfunction**, and **high-output enterocutaneous fistulas** were key predictors of adverse outcomes. In our study, **two deaths** occurred due to **high-output enterocutaneous fistulas**, supporting their conclusion. Bakkaloglu et al. also reported better survival when relaparotomy was performed within **48 hours** of complication onset, which contrasts with our series where delayed intervention was a major limitation. This further underscores the benefit of **early surgical re-exploration** for patients with septic complications.

Li et al. compared **planned relaparotomy** versus **on-demand relaparotomy** in **non-occlusive mesenteric ischemia** and demonstrated that **planned strategies** yielded better outcomes when ischemic bowel viability was uncertain intraoperatively.[17] In our study, one patient with **superior mesenteric artery thrombosis** presented with extensive **bowel ischemia** and underwent REL for **anastomotic leak** following initial resection and ileostomy. Despite timely re-exploration, this patient survived, suggesting that **early planned re-laparotomy** may be beneficial in ischemic cases, supporting Li et al.'s recommendation. However, for other indications such as wound dehiscence or enterocutaneous fistulas, our experience aligns more closely with **on-demand strategies**, especially in patients who responded to conservative measures initially.

In obstetric populations, **Sridhar and Susmitha** reported a **1.6% relaparotomy incidence** after cesarean deliveries, with **postpartum hemorrhage (52%)** and **pelvic sepsis (28%)** being predominant causes.[18] Similarly, Gedik et al. noted a **3.5% incidence** following obstetric and gynecologic operations.[13] Although our series did not include obstetric cases, the comparison highlights substantial variability in indications between **general surgical** and **obstetric** settings. Notably, mortality rates in obstetric series are generally lower (**<30%**), likely due to younger, healthier populations compared to the comorbid, high-risk patients in our cohort.

Nagesh et al. conducted a study involving **120 relaparotomies** in a tertiary-care hospital and found an **overall mortality rate of 31.6%**.[19] **Anastomotic leaks (36.7%)** and **septic complications (26.5%)** were the leading causes, which closely match our results, where these two accounted for **66.6%** of REL indications. The mortality difference between their findings (**31.6%**) and ours (**66.7%**) may stem from differences in patient profiles and hospital resources. Unlike their structured follow-up and early-warning protocols, our tertiary-care referral setting frequently manages delayed presentations, septic complications, and resource-intensive cases, contributing to poorer outcomes.

Across these seven studies, a consistent pattern emerges. The most frequent indications for REL globally are **anastomotic leaks**, **septic peritonitis**, and **hemorrhage**[13-19], which is in concordance with our findings. However, mortality varies widely:

- Lower mortality (<30%) was observed by Gedik[13], Tessema[14], and Nagesh[19], primarily due to **early interventions** and **lower comorbidity burdens**.
- Higher mortality (>50%) was reported by Bwanali[15] and Bakkaloglu[16], aligning more closely with our findings due to **late re-explorations**, **complex intra-abdominal contamination**, and **persistent septic shock**.

Our results demonstrate coherence with global data regarding **indications**, but outcomes were worse, suggesting that **early recognition**, **aggressive source control**, and **structured postoperative surveillance** are crucial to improving prognosis. Based on Li et al.'s findings[17], planned relaparotomy strategies may be beneficial in select high-risk ischemic bowel cases, while **on-demand approaches** remain effective for septic complications when supported by vigilant monitoring.

Limitations

This study has several important limitations. Firstly, it was conducted as a **single-center retrospective case series** with a **small sample size** of only six patients, which restricts the generalizability of our findings. Larger multi-institutional studies would provide more robust data regarding outcomes and prognostic factors following re-exploratory laparotomy. Secondly, as a **tertiary referral center**, a significant proportion of our patients presented **late**, often after failed initial management elsewhere, leading to higher complication rates and mortality. Thirdly, there was **variation in surgical indications**, comorbidities, and intraoperative findings among patients, making it challenging to establish uniform treatment strategies. Additionally, the study lacks **long-term follow-up** to assess functional recovery, quality of life, and stoma-related complications, which could provide deeper insights into patient prognosis. Finally, **resource limitations** such as delayed access to intensive care, advanced monitoring tools, and nutritional optimization likely influenced outcomes. Future studies should aim for **prospective, multicenter designs** with **standardized management protocols** and **early-warning systems** for detecting complications. Integrating structured postoperative monitoring and comparative evaluations of **planned versus on-demand relaparotomy** strategies could further improve evidence-based decision-making and enhance survival rates in high-risk populations.

CONCLUSION

Re-exploratory laparotomy remains a **life-saving but high-risk procedure** necessitated by severe postoperative complications such as **anastomotic leaks, intra-abdominal sepsis, burst abdomen, and bowel ischemia**. In this six-case series, we observed a **mortality rate of 66.7%**, which is higher compared to most reported literature. Delayed presentation, pre-existing comorbidities, and extensive intra-abdominal contamination were key contributors to poor outcomes. Our findings are largely coherent with existing studies, which consistently identify **septic peritonitis and anastomotic leaks** as the leading causes for relaparotomy, but they also underscore the critical impact of **timing** on prognosis. Early surgical re-exploration, preferably within **48 hours of clinical deterioration**, is associated with better survival, as supported by multiple published reports. Planned relaparotomy may offer benefits in specific contexts, such as mesenteric ischemia, whereas an **on-demand strategy** remains suitable for most cases if supported by vigilant monitoring and intensive care. Strengthening **postoperative surveillance systems**, ensuring **nutritional optimization**, and adopting **evidence-based institutional protocols** are essential to improve patient outcomes. Future research with **larger sample sizes**, **multicenter collaborations**, and **standardized treatment algorithms** is needed to refine strategies for managing high-risk surgical patients requiring relaparotomy.

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