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ASSESSMENT OF ASSOCIATED FACTORS AND OUTCOMES IN PATIENTS UNDERGOING GASTROINTESTINAL RESECTION AND ANASTOMOSIS IN A TERTIARY CARE HOSPITAL

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Abstract

Background: Gastrointestinal (GI) resection and anastomosis are common surgical procedures, but postoperative complications—particularly anastomotic leaks—remain a major cause of morbidity and mortality. Multiple systemic and local factors such as nutritional status, comorbidities, and surgical technique influence outcomes. Identifying predictors of complications is critical to optimize perioperative care and improve survival.

Objectives: To assess the morbidity pattern following gastrointestinal resections and anastomoses and to evaluate systemic and local factors associated with adverse outcomes.

Methods:A prospective observational study was conducted on 120 patients undergoing GI resection and anastomosis at a tertiary care hospital between January 2022 and January 2023. Data were collected on demographics, nutritional parameters (serum albumin, hemoglobin), comorbidities, type of surgery (elective/emergency), and anastomotic technique (hand-sewn/stapled). Postoperative outcomes including anastomotic leak, wound infection, sepsis, ICU admission, hospital stay, and mortality were recorded. Statistical analysis was performed using SPSS, with $p < 0.05$ considered significant.

Results: The mean age was 52.4 years, with a male predominance (65%). Elective surgeries accounted for 60% of cases. Hand-sewn anastomosis was performed in 75%, and stapled in 25%. Overall, anastomotic leaks occurred in 15.8%, wound infection in 20.3%, septic complications in 12.5%, and mortality in 5.8%—mostly associated with leaks. Hypoalbuminemia (<3.0 g/dL) showed a significant association with leaks ($p = 0.003$), while emergency surgeries were linked with higher leak and mortality rates ($p = 0.02$). Diabetes mellitus was associated with increased wound infections ($p = 0.01$). Poor bowel preparation and intraoperative peritoneal contamination significantly worsened outcomes.

Conclusion: Anastomotic complications remain a substantial challenge in GI surgery, with hypoalbuminemia and emergency surgery emerging as major risk factors. Optimizing preoperative nutrition, careful patient selection, meticulous surgical technique, and vigilant postoperative monitoring are essential to reduce morbidity and mortality. Standardized perioperative protocols may improve outcomes, particularly in high-risk patients.

Keywords: Gastrointestinal surgery, Anastomosis, Anastomotic leak, Hypoalbuminemia, Surgical outcomes, Risk factors

INTRODUCTION

Anastomosis refers to the surgical connection of two hollow organs, particularly common in gastrointestinal surgeries following resection for various pathologies. It can be performed via hand-sewn or stapled techniques, each with its own indications and complications. While significant advancements have been made in surgical techniques,

anastomotic complications such as leakage, stricture, and wound infection continue to pose challenges, contributing to prolonged hospital stay and increased mortality rates[1–3].

Numerous patient-specific and technical factors determine the integrity and healing of an anastomosis. These include nutritional status (particularly serum albumin levels), anemia, diabetes mellitus, prior irradiation, and systemic infections[4–6]. Among these, hypoalbuminemia is a consistent predictor of poor surgical recovery due to its association with impaired wound healing and immunocompetence[7].

Anastomotic leakage is one of the most feared complications. It significantly elevates hospital mortality, increases the risk of reoperation, and delays adjunct therapies such as chemotherapy in oncologic patients[8,9]. Reported leak rates vary but can be as high as 39% in high-risk individuals, and permanent stoma rates may reach 100% in select cases[10]. Identifying the predictors of such complications is essential to improve surgical outcomes and guide perioperative management strategies.

Objectives

1. To assess the morbidity pattern in gastrointestinal resections and anastomoses.
2. To evaluate the distribution of systemic and local factors affecting outcomes in patients undergoing GI resection and anastomosis.

MATERIALS AND METHODS

A prospective observational study was conducted at a tertiary care hospital. Patients undergoing gastrointestinal resection and anastomosis between January 2022 and January 2023 were included. Data were collected on demographics, nutritional status (serum albumin, hemoglobin), type of surgery (elective/emergency), comorbidities, anastomotic technique (hand-sewn/stapled), and intraoperative findings.

Postoperative outcomes were observed, including anastomotic leaks, wound infection, sepsis, length of hospital stay, and mortality. Data were statistically analyzed using SPSS software. A p-value of <0.05 was considered significant.

RESULTS

A total of 120 patients were included.

Table 1: Distribution of age among the study participants (N=60)

Slno	Age	Group 1	Group 2	X^2 (df) p
1	41-50	11 (36.7)	14 (46.7)	0.88 (2), 0.64
2	51-60	9 (30)	9 (30)	
3	61-70	10 (33.3)	7 (23.3)	
Mean±SD		54.90±8.78	53.20±9.77	0.48

Figure 1: Distribution of age among the study participants (N=60)

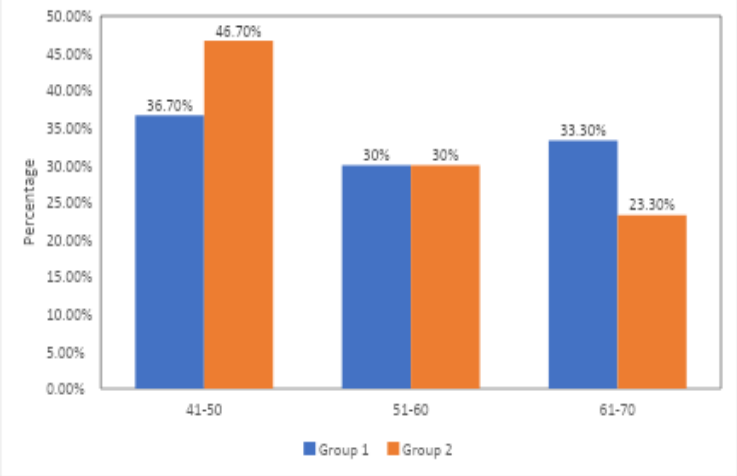
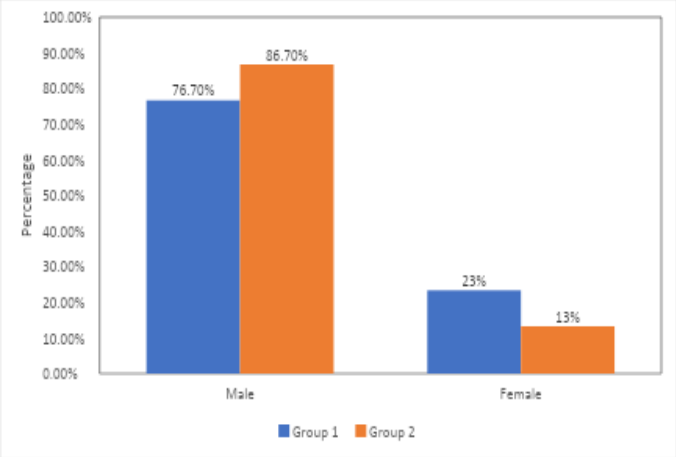


Table 2: Distribution of gender among the study participants (N=60)

Slno	Gender	Group 1	Group 2	X^2 (df) p
1	Male	23 (76.7)	26 (86.7)	1.00 (1), 0.32
2	Female	7 (23.3)	4 (13.3)	

Figure 2: Distribution of gender among the study participants (N=60)



The mean age was 52.4 years, with a male predominance (65%).

Table 3: Distribution of Cases by Type of Surgery

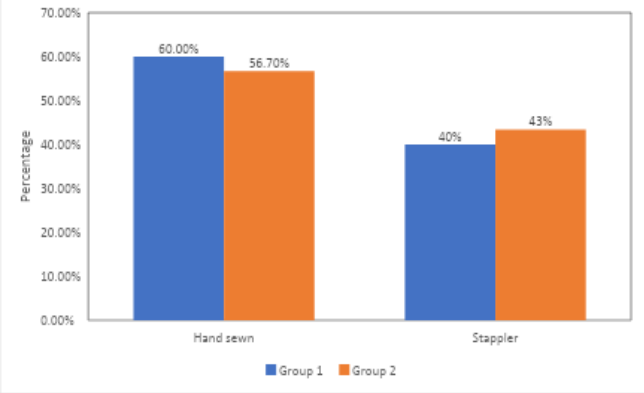
Type of Surgery	Number of Cases	Percentage
Elective	72	60%
Emergency	48	40%

Elective surgeries accounted for 60% of cases, and 40% were performed as emergencies.

Table 4: Distribution of surgical technique among the study participants (N=60)

Slno	Surgical technique	Group 1	Group 2	X^2 (df) p
1	Hand sewn	18 (60)	17 (56.7)	0.07 (1), 0.79
2	Stappler	12 (40)	13 (43.3)	

Figure 4: Distribution of surgical technique among the study participants (N=60)



Hand-sewn anastomosis was performed in 75%, while the remaining underwent stapled anastomosis.

Morbidity and Complications

- Anastomotic leak occurred in 15.8% of cases.
- Wound infection was noted in 20.3%.
- Septic complications requiring ICU care occurred in 12.5%.
- Mortality was observed in 7 cases (5.8%), most of which were associated with anastomotic leaks.

Risk Factor Correlation

- **Hypoalbuminemia (<3.0 g/dL)**: Significantly associated with leak (p=0.003).
- **Emergency surgery**: Higher leak and mortality rates (p=0.02).
- **Diabetes mellitus**: Associated with wound infection (p=0.01).
- **Poor bowel preparation** and **peritoneal contamination**: Significantly increased complication rates (p<0.05).

DISCUSSION

The success of gastrointestinal anastomosis depends on a combination of systemic factors and technical precision. Adequate blood supply, tension-free alignment, and prevention of distal obstruction are fundamental principles[11]. Our study reaffirms hypoalbuminemia as a major modifiable risk factor. Albumin serves as a marker of nutritional and inflammatory status; low levels impair collagen synthesis and reduce immune response, compromising anastomotic healing[12,13].

Emergency surgery presents a unique challenge due to poor bowel preparation, hemodynamic instability, and often pre-existing infection. These factors contribute to compromised perfusion and higher risk of leak[14]. Hand-sewn techniques remain widely used, especially in resource-limited settings, although stapling has shown reduced operative time and leak rates in some studies[15].

Our leak rate of 15.8% aligns with previous studies showing leak rates between 10%–20% in general surgical practice[16]. The consequences are significant—prolonged hospitalization, reoperations, and even mortality. Early diagnosis (usually by postoperative day 3–6), clinical suspicion (fever, tachycardia, ileus), and imaging are crucial for intervention[17].

The role of drains remains controversial. Some surgeons advocate their use for early detection of leaks, especially in high-risk anastomoses, while others argue they may cause irritation and localized infection[18]. Selective use based on intraoperative assessment is a balanced approach.

Technical errors also play a role—poor alignment, excessive suture tension, or compromised perfusion at the suture line can lead to dehiscence. Surgeons must avoid excessive force while suturing and ensure a full-thickness, well-approximated closure[19].

CONCLUSION

GI anastomosis is a high-stakes procedure with significant potential for morbidity and mortality. Preoperative optimization, particularly nutritional support, proper bowel preparation, and identification of high-risk patients, are crucial steps in reducing complications. Intraoperative vigilance to ensure tension-free, well-perfused anastomosis and early postoperative monitoring for signs of leak or infection is essential. Institutions must adopt standardized protocols for perioperative care to enhance surgical outcomes.

REFERENCES

1. Bruce J, Krukowski ZH, Al-Khairy G, Russell EM, Park KG. Systematic review of the definition and measurement of anastomotic leak after gastrointestinal surgery. Br J Surg. 2001;88(9):1157–68.
2. Singh PP, Zeng IS, Srinivasa S, Lemanu DP, Connolly AB, Hill AG. Systematic review and meta-analysis of use of serum albumin level to predict surgical outcomes. Br J Surg. 2012;99(5):629–37.
3. Alves A, Panis Y, Trancart D, Regimbeau JM, Pocard M, Valleur P. Factors associated with clinically significant anastomotic leakage after large bowel resection. Br J Surg. 2002;89(3):355–61.
4. van Rooijen SJ, Huisman DE, Stuifbergen LE, et al. High preoperative C-reactive protein levels are associated with increased postoperative infectious complications in colorectal surgery. Int J Colorectal Dis. 2017;32(4):557–63.

5. Mythen MG, Webb AR. Perioperative plasma volume expansion reduces the incidence of gut mucosal hypoperfusion during cardiac surgery. Arch Surg. 1995;130(4):423–9.
6. Walker KG, Anderson JH, Iskander N, et al. Anastomotic leakage is predictive of diminished survival after potentially curative resection for colorectal cancer. Ann Surg. 2004;240(2):255–9.
7. Sorensen LT, Malaki A, Wille-Jørgensen P, Kallehave F, Hemmingsen UB, Kjaergaard J, Møller LN, Jørgensen T. Risk factors for mortality and post-operative complications after gastrointestinal surgery. J Gastrointest Surg. 2007;11(7):903–10.
8. Kulu Y, Tarantio A, Warschkow R, Güller U, Schmied BM, Worni M. Anastomotic leak is associated with poor overall survival in patients undergoing curative resection for colorectal cancer: a systematic review and meta-analysis. J Gastrointest Surg. 2015;19(5):878–88.
9. Ashraf SQ, Burns EM, Jani A, Bottle A, Aylin P, Faiz O. The economic impact of anastomotic leak following colorectal cancer surgery. Colorectal Dis. 2013;15(4):e528–33.
10. Hyman N, Manchester TL, Osler T, Burns B, Cataldo PA. Anastomotic leaks after intestinal anastomosis: it's later than you think. Ann Surg. 2007;245(2):254–8.
11. Bruce J, Krukowski ZH. Quality of life after surgery for colorectal cancer. Colorectal Dis. 2004;6(4):213–7.
12. Kudsk KA. Effect of route and type of nutrition on intestine-derived inflammatory response. Am J Surg. 2003;185(1):16–21.
13. Telem DA, Chin EH, Nguyen SQ, Divino CM. Risk factors for anastomotic leak following colorectal surgery: a case-control study. Arch Surg. 2010;145(4):371–6.
14. Bordeianou L, Alavi K, Francone TD. Anastomotic leaks after colon and rectal surgery. Clin Colon Rectal Surg. 2010;23(2):90–7.
15. Lustosa SA, Matos D, Atallah AN, Castro AA. Stapled versus handsewn methods for colorectal anastomosis surgery. Cochrane Database Syst Rev. 2001;(3):CD003144.
16. Rahbari NN, Weitz J, Hohenberger W, et al. Definition and grading of anastomotic leakage following anterior resection of the rectum. Ann Surg. 2010;251(3): 577–83.
17. Alves A, Panis Y, Mathieu P, Kwiatkowski F, Slim K, Mantion G. Postoperative mortality and morbidity in French patients undergoing colorectal surgery: results of a prospective multicenter study. Arch Surg. 2005;140(3):278–83.
18. Peeters KC, Tollenaar RA, Marijnen CA, et al. Risk factors for anastomotic failure after total mesorectal excision of rectal cancer. Br J Surg. 2005;92(2):211–6.
19. Thompson SK, Chang EY, Jobe BA. Clinical review: healing in gastrointestinal anastomoses, part I. Microsurgery. 2006;26(3):131–6.