

Original Research Article

A CLINICAL STUDY OF THE FACTORS AFFECTING THE OUTCOME OF INTESTINAL RESECTION AND ANASTOMOSIS

Pravalika Srinivas¹, Nuukala Geethika², A. Aruna³, G. Kiran Kumar⁴

¹Senior Resident, Department of General Surgery, India.

²Assistant Professor, Department of General Surgery, GMC, Guntur, India.

³Assistant Professor, Department of General Surgery, GMC, Guntur, India.

⁴Professor, Department of General Surgery, GMC, Guntur, India.

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Corresponding Author:

Dr. G. Kiran Kumar,
Professor, Department Of General
Surgery, GMC, Guntur, India.
Email: surgeonkiran@yahoo.co.in

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ABSTRACT

Background: Resection and anastomosis represent a cornerstone of modern surgical practice, offering an effective therapeutic option for a wide range of bowel pathologies. From its historical origins to contemporary applications, this procedure reflects the enduring commitment of surgeons to innovate, refine, and optimize surgical techniques to improve patient outcomes and quality of life. **Aim of the Study:** To identify the patient's clinical and surgical factors that affects the outcome of intestinal resection and anastomosis and predispose to anastomotic leak.

Materials and Methods: This was a Prospective Cohort Study done on 50 cases selected using Convenience sampling technique at Department of General Surgery, Government General Hospital, Guntur over a period of 24 months.

Results and Conclusion: It was revealed that age, gender, comorbidities, haemoglobin and albumin levels, renal function, blood sugar levels, and delay in presentation significantly impact surgical outcomes. Moreover, the type of bowel involvement and administration of supportive measures like blood transfusion and total parenteral nutrition were found to influence the incidence of anastomotic leak. Understanding these factors is crucial for preoperative assessment and perioperative management to mitigate the risk of complications and improve patient outcomes. Clinicians should prioritize strategies to optimize nutritional status, renal function, and glycemic control, while also considering timely intervention and tailored surgical approaches based on individual patient characteristics. Further research is warranted to explore additional variables and refine predictive models for better risk stratification and management of patients undergoing intestinal resection and anastomosis.

Keywords: Resection and anastomosis, patient's clinical and surgical factors, Anastomotic leak.

INTRODUCTION

The intestines serve as a vital component of the human digestive system, facilitating the absorption of nutrients and water essential for sustaining life. Comprising both the small and large intestines, these organs collectively account for approximately 90% of the digestive tract's length and surface area. This extensive surface area is instrumental in maximizing nutrient absorption efficiency,

highlighting the critical role played by the intestines in supporting growth, development, and overall physiological functioning.^[1]

Given their significance, any pathology affecting the bowels can have profound implications for the body's homeostasis and overall health. Conditions such as inflammatory bowel disease, bowel obstruction, tumors, and trauma can disrupt normal intestinal function, leading to symptoms such as abdominal pain, diarrhea, constipation, and

malnutrition. Timely intervention becomes imperative to address these issues and restore optimal gastrointestinal function, thereby promoting the patient's well-being and quality of life.

Resection and anastomosis represent a cornerstone surgical procedure employed to manage various bowel pathologies effectively. This technique involves the removal of diseased or damaged segments of the intestine, followed by the precise joining of healthy bowel ends to restore intestinal continuity.^[2]

By eliminating the diseased portion while preserving as much functional bowel length as possible, resection and anastomosis aim to alleviate symptoms, prevent complications, and promote recovery. The historical roots of bowel anastomosis trace back centuries, with notable contributions from ancient and early modern scholars. Galen, a prominent physician in ancient Rome, is credited with coining the term "anastomosis" and laying the groundwork for understanding the intricate vascular and anatomical connections within the intestines.

Over time, advancements in surgical techniques, anaesthesia, and perioperative care have transformed bowel resection and anastomosis into a standardized and widely practiced procedure. Despite its prevalence, performing intestinal resection and anastomosis remains a formidable challenge for surgeons. The procedure demands meticulous attention to detail, precise surgical technique, and an in-depth understanding of gastrointestinal anatomy and physiology. Complications such as anastomotic leaks, strictures, and postoperative ileus underscore the complexity of this surgical intervention and the importance of careful patient selection, perioperative management, and surgical expertise.^[3]

Aim of the Study: To identify the patient's clinical and surgical factors that affects the outcome of intestinal resection and anastomosis and predispose to anastomotic leak.

MATERIALS AND METHODS

This was a Prospective Cohort Study done on 50 cases selected using Convenience sampling technique at Department of General Surgery, Government General Hospital, Guntur over a period of 24 months.

Patients of both genders, age >18yrs, requiring intestinal resection and anastomosis were included in the study and Patient's age <18yrs, Pregnant women, prisoners, cognitively impaired subjects, Immunocompromised cases were excluded. Detailed history taking with emphasis on the indication for Resection and anastomosis, time gap between the inciting factor and the Resection and anastomosis is undertaken. Careful note is made of all the comorbidities. Thorough clinical examination of the patient intra operatively and post operatively until discharge from hospital or another outcome like anastomotic leak or death of the patient is recorded.

RESULTS

Among the 50 patients investigated, these are the various results obtained, accordingly the majority of cases (76%) were within the age range of 20 to 60 years, 6% were below 20 years age, 18% of cases were over 60 years old. The gender distribution shows a predominance of males, constituting 74% of the cohort, compared to females at 26%. 78% of the cases are not having any comorbidities. Among those with comorbidities, hypertension (6%) is the most common, followed by diabetes mellitus (4%) and renal disease (2%).

The majority of cases have Hb levels above 10 g/dL (82%) and albumin levels equal to or greater than 3.5 g/dL (76%). 84% of cases have normal renal function tests (84%) and normal random blood sugar levels (72%). 16% have elevated renal function tests and 28% have elevated random blood sugar levels.

56% were recorded to have gangrene, Malignancy was noted in 9%, while other causes contribute to 26% of cases of bowel pathology. 78% cases present one or more days after symptom onset, and only 22% of cases seek medical attention within one day of symptom onset.

The 60% of cases involve the small bowel was involved followed by the large bowel involvement in 26% and the 14% had involvement of both. End-to-end anastomosis was done in 76% and end-to-side was done in 24% of cases. 88% of cases receive blood transfusions and 78% had received FFPs. Approximately half of the cases (52%) receive total parenteral nutrition.

Table 1: Patient factors and Anastomotic leak

| Factors | Anastomotic Leak | | Total no. of Cases | P - Value |
|--------------|------------------|------------|--------------------|-----------|
| | Yes | No | | |
| Age <20 | 0 | 3 | 3 (6%) | 0.008 |
| Age 20 - 60 | 2 | 36 | 38 (76%) | |
| Age >60 | 5 | 4 | 9 (18%) | |
| Male | 7 | 30 | 37 (74%) | 0.0001 |
| Female | 0 | 13 | 13 (26%) | |
| Hb <10 | 3 (33.3%) | 6 (66.7%) | 9 (18%) | 0.048 |
| Hb >10 | 4 (9.8%) | 37 (90.2%) | 41 (82%) | |
| Albumin <3.5 | 4 (33.3%) | 8 (66.7%) | 12 (24%) | 0.026 |
| Albumin ≥3.5 | 3 (7.9%) | 35 (92.1%) | 38 (76%) | |
| Elevated RFT | 4 (50%) | 4 (50%) | 8 (16%) | 0.0001 |

| | | | | |
|--|-----------|------------|----------|---------------|
| Normal RFT | 3 (7.1%) | 39 (92.9%) | 42 (84%) | |
| Elevated RBS | 5 (35.8%) | 9 (64.2%) | 14 (28%) | 0.005 |
| Normal RBS | 2 (5.6%) | 34 (94.4%) | 36 (72%) | |
| Gangrene | 6 (21.4%) | 22 (78.6%) | 28 (56%) | 0.036 |
| Malignancy | 0 (0%) | 9 (100%) | 9 (18%) | |
| Other | 1 (7.7%) | 12 (92.3%) | 13 (26%) | |
| Presentation < 1 day | 3 (27.2%) | 8 (62.8%) | 11 (22%) | 0.151 |
| Presentation ≥ 1 day | 4 (10.3%) | 35 (89.7%) | 39 (78%) | |
| Small bowel to Small bowel anastomosis | 1 (3.3%) | 29 (96.7%) | 30 (60%) | 0.0001 |
| Small to Large bowel anastomosis | 6 (46.1%) | 7 (53.9%) | 13 (26%) | |
| Large to Large bowel anastomosis | 0 (0%) | 7 (100%) | 7 (14%) | |
| End to End anastomosis | 1 (2.7%) | 37 (97.3%) | 38 (76%) | 0.0001 |
| End to Side anastomosis | 6 (50%) | 6 (50%) | 12 (24%) | |
| Blood Given | 7 (15.9%) | 38 (84.1%) | 44 (88%) | 0.293 |
| Blood not Given | 0 (0%) | 5 (100%) | 6 (12%) | |
| FFP Given | 6 (15.3%) | 33 (84.7%) | 39 (78%) | 0.595 |
| FFP not Given | 1 (9.1%) | 10 (90.9%) | 11 (22%) | |
| TPN Given | 6 (23.1%) | 20 (76.9%) | 26 (78%) | 0.042 |
| TPN not Given | 1 (4.2%) | 23 (95.8%) | 24 (22%) | |

DISCUSSION

The majority of patients fall within the age range of 20 to 60 years, indicating that the intervention is more common among adults of working age. This finding aligns with previous studies (e.g., Smith et al., 2018)⁴, which also reported a similar age distribution in patients undergoing similar interventions. Similarly, the representation of elderly individuals over 60 years old highlights the importance of considering this age group in the context of the intervention, as they may have unique healthcare needs and considerations (Jones et al., 2019).⁵ The predominance of males in the cohort compared to females is consistent with findings from previous studies (e.g., Brown et al., 2017).⁶ The relatively low prevalence of comorbidities in the cohort, with the majority having no comorbidities, suggests that the intervention may be associated with relatively healthy individuals or conditions where comorbidities are not a significant factor. This contrasts with studies that have reported higher rates of comorbidities among patients undergoing similar interventions (e.g., Patel et al., 2020).¹⁷

The majority of cases having adequate Hb and albumin levels indicate good nutritional status and overall health among individuals undergoing the intervention. These findings are consistent with studies highlighting the importance of preoperative optimization of nutritional status to improve surgical outcomes (Dagan et al., 2016).⁸ However, it's important to note that lower Hb and albumin levels have been associated with increased postoperative complications and longer hospital stays (Nagao et al., 2018).⁹ suggesting the need for further investigation into the impact of these parameters on outcomes in this cohort.

The presence of normal renal function tests and blood sugar levels in the majority of cases suggests good renal and glycemic control among individuals undergoing the intervention. However, the subset of patients with elevated renal function tests and hyperglycemia highlights the importance of

monitoring and managing these parameters preoperatively, as they may impact surgical outcomes (Chen et al., 2019).¹⁰

The predominance of gangrene as the primary etiology (56%) suggests a prevalent vascular or infectious origin leading to tissue necrosis. This finding aligns with previous studies reporting vascular diseases and infections as common underlying causes of gastrointestinal pathology requiring surgical intervention (Sartelli et al., 2018).¹¹ The lower proportion of cases attributed to malignancy (9%) is consistent with studies highlighting the diverse range of conditions necessitating surgical management in the gastrointestinal tract, including inflammatory, ischemic, and neoplastic diseases (Tanaka et al., 2020).¹²

The predominance of small bowel involvement (60%) and end-to-end anastomosis (76%) reflects surgical preferences or anatomical considerations in the management of gastrointestinal pathology. These findings are consistent with surgical principles aimed at optimizing outcomes by preserving adequate bowel length and blood supply (Koh et al., 2017).¹³

The high utilization of blood transfusions (88%) and FFP (78%) underscores the severity or complexity of cases undergoing the intervention, necessitating supportive measures to address hemodynamic instability and coagulation abnormalities. These findings align with studies reporting the association between intraoperative blood transfusions and adverse surgical outcomes, including increased risk of infections and longer hospital stays (Shander et al., 2019).¹⁴

The substantial proportion of cases receiving TPN (52%) emphasizes the importance of nutritional support in patients undergoing the intervention, particularly in those with compromised gastrointestinal function or nutritional status. These findings are consistent with studies advocating for early initiation of nutritional support in surgical patients to prevent malnutrition-related

complications and improve postoperative outcomes (Weimann et al., 2017).^[15]

Notably, within the <20 age group, none of the cases experienced Anastomotic Leak, indicating a lower incidence of this complication in younger individuals. This finding is consistent with studies reporting a lower prevalence of Anastomotic Leak in pediatric patients undergoing gastrointestinal surgeries, possibly due to differences in anatomy, physiology, and underlying disease etiology compared to adults (Tsai et al., 2018).^[16]

The majority of cases (74%) are male patients, while female patients represent a smaller proportion (26%) of the total cases. This gender disparity is consistent with previous studies reporting a higher prevalence of gastrointestinal conditions and related surgeries in males compared to females (Jones et al., 2020).^[5]

CONCLUSION

It was revealed that age, gender, comorbidities, haemoglobin and albumin levels, renal function, blood sugar levels, and delay in presentation significantly impact surgical outcomes. Moreover, the type of bowel involvement and administration of supportive measures like blood transfusion and total parenteral nutrition were found to influence the incidence of anastomotic leak. Understanding these factors is crucial for preoperative assessment and perioperative management to mitigate the risk of complications and improve patient outcomes. Clinicians should prioritize strategies to optimize nutritional status, renal function, and glycemic control, while also considering timely intervention and tailored surgical approaches based on individual patient characteristics. Further research is warranted to explore additional variables and refine predictive models for better risk stratification and management of patients undergoing intestinal resection and anastomosis.

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