



COMPARATIVE STUDY OF PERIOPERATIVE RISK FACTORS INVOLVED IN BOWEL ANASTOMOTIC LEAKAGE

General Surgery

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KEYWORDS

INTRODUCTION

Anastomotic complications encompass a wide variety of clinical manifestations, ranging from bleeding and stricture to leakage and perforation. Patients may exhibit a broad spectrum of symptoms that can present acutely, in a delayed fashion, or chronically. Anastomotic leakage may present acutely as septic shock or with much less severe symptoms, such as vague discomfort or ileus. It is one of the important complication of resection and anastomosis. They are the main cause of reoperation. There occurrence worsens the prognosis of the patient. Emerging technology has allowed many of the most feared complications of anastomotic surgery, including bleeding and leakage, to be detected early and often to be treated without surgery. For example, frequently anastomotic bleeding can be treated with endoscopic clipping or cauterization when the anastomotic site is within the reach of the endoscope. Yet anastomotic complications can be severe and can lead to disability and occasionally death. To understand how to prevent anastomotic complications, an evidence based approach grounded on an understanding of the pathophysiology and on clinical trials that demonstrate efficacy is needed. Factors which may help to reduce anastomotic leakage are diverting stoma, transrectal drain for rectal anastomosis decompression. Surgeons have evaluated multiple technical aspects of anastomotic surgery: everting versus inverting, suture types, 1-layer versus 2-layer techniques, and hand sewing versus stapling. Even well-perfused, well-constructed anastomosis under no tension can develop a leak or stricture. Clinical studies demonstrate that surgeons cannot predict which anastomoses will leak. In the aggregate, studies reveal that although meticulous attention to the tenets of good surgical practice is important and should be rigorously adhered to, some factors that significantly impact anastomotic healing are not fully understood. The intestinal tract is a complex organ made up of epithelial cells, immune cells, stromal cells, and microbial organisms whose number exceeds the total quantity of human cells. Some studies yield conditions generalizable to most complications after surgery, such as poor nutritional status, comorbid diseases, smoking, immunosuppression, advanced tumor grade, hypotension, and blood loss/transfusion. Although numerous potential risk factors may contribute to a leak, the mechanisms by which they contribute and the pathogenesis of an anastomotic leak remain poorly understood and need to be studied properly. Although interventional studies may provide clinically meaningful and statistically significant evidence for potential mechanisms of anastomotic leak, the conclusions of many of these studies are weakened by the lack of a precise definition of an anastomotic leak. One of the identified risk factors for stricture includes anastomotic leak. Conceptually, anastomotic leak is a single entity: the breakdown or insufficiency of the anastomotic line resulting in spillage of intestinal contents outside of the bowel lumen. However, this physical event may have a variety of anatomic consequences that range from a contained abscess that spontaneously resolves to free spillage into the peritoneal cavity. The clinical manifestations mimic this wide variation: no symptoms, ileus, pain, fever, or fatal sepsis. In construction of gastrointestinal anastomoses, it is very important to adhere to the tenets of good surgical practice: optimizing the patient preoperatively, avoiding tension, and ensuring adequate blood supply to the healing anastomosis. A great deal is known about healing of the external skin after injury, but much less is known about intestinal healing. This is owing to the easy accessibility of the skin as it heals as opposed to the intestinal mucosa. The gastrointestinal tract wall is composed of the surrounding serosa, the smooth muscle containing muscularis propria, the collagen-containing submucosa providing tensile strength, and the epithelial mucosa and mucous layer that provide the interface with and

barrier to the luminal contents. Most important, the intestinal mucosa heals in close contact with the intestinal microbiota, the densest biomass in the body. The process of intestinal healing is characterized by the three phases of inflammation, proliferation, and remodeling. The greatest risk to the anastomosis is thought to occur during the inflammatory phase when collagen proteolytic activity is greatest. After 48 hours, colonic anastomoses lose 70% of their initial strength. These strengths increase gradually as fibroblasts and smooth muscle cells synthesize new collagen while the wound is remodeled. Disorders of this process may contribute to the development of anastomotic stricture and anastomotic leak. It is known that local inflammation impairs wound healing by prolonging the inflammatory phase and increasing tissue proteases.

MATERIALS AND METHODS

Study was done in 215 patients in a period from January 2022 to October 2023 in PMCH, Patna

RESULT

Clinical anastomotic leakage was identified in 17 patients (7.9%). Univariate and multivariate analysis showed that longer duration of operation (odds ratio=9.6), wound contamination (odds ratio=8.7), anaemia (odds ratio=7.2) were independently predictive of clinical anastomotic leakage. Although there were no statistical differences in leakage rate between patient with and without diverting stoma, all seven patients requiring reoperation for leakage were without diverting stoma.

CONCLUSION

Anaemia, contamination of operative field, longer duration of operation were independent risk factors for developing clinical anastomotic leakage.

SUMMARY

The development of an anastomotic stricture or leak is a result of the complex interactions of genetics, the microbiome, operative technique, a patient's antecedent health, prior patient exposures, the subsequent hospital course, and exposures ranging from infectious agents to antibiotics. Further research evaluating the relationship and impact these many factors have on the progression of anastomotic healing is needed. To develop a higher resolution pathophysiologic understanding, we need methods to directly and serially examine anastomosis and extract meaningful information. With a further understanding of the dynamic factors that impact healing at the anastomotic site, we will be able to develop more informed and scientifically based interventions and preventive measures. Technological advances are now available to execute these studies in real time and to develop a more complete understanding of the impact of the intestinal ecosystem on anastomotic healing.

REFERENCES

- [1] Amr MA, Alzghari MJ, Polites SF, et al. Endoscopy in the early postoperative setting after primary gastrointestinal anastomosis. *J Gastrointest Surg* 2014;18(11):1911–6.
- [2] Lou Z, Zhang W, Yu E, et al. Colonoscopy is the first choice for early postoperative rectal anastomotic bleeding. *World J Surg Oncol* 2014;12:376.
- [3] Konishi T, Watanabe T, Kishimoto J, et al. Risk factors for anastomotic leakage after surgery for colorectal cancer: results of prospective surveillance. *J Am Coll Surg* 2006;202(3):439–44.
- [4] Chen C. The art of bowel anastomosis. *Scand J Surg* 2012;101(4):238–40.
- [5] Nandakumar G, Stein SL, Michelassi F. Anastomoses of the lower gastrointestinal tract. *Nat Rev Gastroenterol Hepatol* 2009;6(12):709–16.
- [6] Karlczek A, Harlaar NJ, Zeebregts CJ, et al. Surgeons lack predictive accuracy for anastomotic leakage in gastrointestinal surgery. *Int J Colorectal Dis* 2009;24(5):569–76.
- [7] Oines MN, Krarup PM, Jorgensen LN, et al. Pharmacological interventions for improved colonic anastomotic healing: a meta-analysis. *World J Gastroenterol*

2014;20(35): 12637–48.

- [8] Yauw ST, Wever KE, Hoesseini A, et al. Systematic review of experimental studies on intestinal anastomosis. *Br J Surg* 2015;102(7):726–34.
- [9] Thornton FJ, Barbul A. Healing in the gastrointestinal tract. *Surg Clin North Am* 1997;77(3): 549–73. [10] Thompson SK, Chang EY, Jobe BA. Clinical review: healing in gastrointestinal anastomoses, Part I. *Microsurgery* 2006;26(3):131–6.