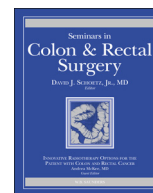




Contents lists available at ScienceDirect

Seminars in Colon and Rectal Surgery

journal homepage: www.elsevier.com/locate/yjscr

Predicting anastomotic leak: Can we?

Jennifer K. Lee, MD^a, Nitin Mishra, MD^{a,b,*}^aDepartment of Surgery, Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ^bAtlantic Health System, Edison, NJ

A B S T R A C T

Anastomotic leaks remain a feared complication in colorectal surgery. A myriad of variables have been evaluated, but the variability among those studies provides little consensus on absolute risk factors and clinical application. Nevertheless, identifying these risk factors may assist the surgeon in mitigation of risk with preoperative optimization, intraoperative decision-making for diversion, and heightened postoperative vigilance for anastomotic leak. These risk factors can be organized into surgeon-, patient-, and pathology-related categories.

© 2014 Elsevier Inc. All rights reserved.

Introduction

With prevalence ranging from 0.5% to 21%, anastomotic leaks remain one of the most serious complications in colorectal surgery.^{1,2} Clinically significant leaks can occur in up to 14% of low anastomoses. Leaks lend themselves to increased morbidity and mortality, with the latter reported up to 27% in some studies.^{3,4} Along with clinical consequences, anastomotic leaks lead to longer hospital stays, multiple interventions, and overall increased health care costs when compared to patients without a leak.

The underlying pathogenesis leading to anastomotic leaks is not entirely understood but is attributed to several factors affecting the integrity of the anastomosis. These factors are related to the surgeon, the patient, and the pathology.^{5–7} Several retrospective and prospective studies have been performed to identify these factors. However, interpretation of the data is restricted by the wide breadth of diseases, patient populations, techniques, and an assortment of definitions for anastomotic leak among the literature.⁸ Anastomotic leak can present both within the immediate postoperative period and after discharge from the hospital, suggesting a multi-factorial pathogenesis leading to anastomotic dehiscence.

Provided with predictors of anastomotic leak, the surgeon may be able to modify preoperative risk factors as well as adjust perioperative decision-making and increase postoperative vigilance in those with risk factors. Even with optimization of the patient and improving technique, the rate of anastomotic leak has

not significantly decreased over time. This reveals that there is more to the underlining pathology than is understood at this time.

Surgeon-related factors

The essential principles of a successful intestinal anastomosis include perfect technique joining two healthy ends of bowel without tension. Adequate blood supply and thus adequate oxygen delivery sustain the integrity. Various studies have explored the weight of these factors and practical ways in which they can be measured in order to determine whether an anastomosis will heal completely. These factors include blood supply, tension, hypoxia, resuscitation, blood loss, and operative time. In addition to these factors, surgical technique, use of mechanical bowel preparation, experience of the surgeon, and training/certification have also been considered as potential variables that may affect outcomes.

Blood supply/hypoxia

Oxygen tension measurements of bowel both before resection and after anastomosis have been evaluated in both animal and human models.^{9,10} These studies have demonstrated a large drop in the oxygen tension after resection, but the effect this drop had on the viability of the anastomosis was less clear. One study measured Doppler flow to measure microperfusion to a rectal stump.¹¹ Flow reduction of 6.2% was evident in those without a leak compared to 16% in those with a leak ($p < 0.001$)—a significant finding supporting the understanding that blood supply is crucial. There is, however, no practical application of these measurements. For now, surgeons intraoperatively evaluate viability by mucosa color and bleeding edges. Should there be a lack

* Correspondence address: 3900 Park Avenue, Edison, NJ 08820. Tel.: +1 732 494 6640; fax: +1 732 549 8204.

E-mail address: mishranitin@hotmail.com (N. Mishra).

of bleeding or concern of poor blood supply to either the proximal or distal end of the intestine, an alternate site of fusion should be considered.

Tension

Tension on the anastomosis is generally considered to be unacceptable given the mechanical stress theoretically applied to the two ends of bowel. Nevertheless, measurements of tension are poorly studied. A 1986 study compared the tension tolerated by small bowel to small bowel anastomoses as compared to colonic anastomosis.¹² This showed that the small bowel tolerated tension better than the colon. It appears that this was directly related to the laxity of the mesentery and thus the blood supply to the anastomosis itself. In general, any indication of tension should prompt further mobilization to lengthen the conduit.

Resuscitation

Restricted fluid strategies have shown to reduce postoperative complication rates in randomized controlled studies.^{13–15} The goal is to maintain baseline weight. In contrast, one study demonstrated an increase in overall complication rates with restricted fluid management, thereby making the role of restricted fluid resuscitation unclear when it comes to the specific effect on anastomotic leak rates.

Blood loss/OR time

Blood loss and length of operating time have both been shown to increase rates of overall complications. Leichtle et al.¹⁶ measured several variables among 4340 cases in a prospective study and found blood loss of greater than 100 mL ($p = 0.02$, 95% CI: 1.1–2.4) and 300 mL ($p = 0.003$, 95% CI: 1.32–3.76) as significant factors after multivariate regression. Several studies have shown that substantial intraoperative blood loss and postoperative blood transfusions (most likely a marker of substantial intraoperative blood loss) are associated with increased risk for anastomotic leaks.^{1,4,17} As such, increased blood loss should be one of several factors to be considered when assessing the need for diversion in a patient at a high risk for anastomotic leaks. A prospective study of 391 elective colorectal resections identified a significantly higher leak rate when the operative procedure was ≥ 4 h in duration compared with shorter procedures (5.1 vs. 0.5%).¹⁸

The current data is largely difficult to interpret given the various cutoff values for excessive blood loss and the range of reported number of transfusions. In addition, the degree of blood loss and length of operating time are often directly related to the difficulty of the operation.^{17,19}

Technique

(A) Hand-sewn vs. stapled

Several studies, including a 2012 Cochrane review, show no significant difference in outcomes, including leak rate, between hand-sewn and stapled colon anastomoses. There was also no significant difference found between single- and double-layer closures.^{20–22} However, a meta-analysis of six trials with 955 participants with benign and malignant disease revealed that hand-sewn ileocolic anastomoses were associated with a significantly higher rate of anastomotic leaks compared with stapled ileocolic anastomoses (6.0 vs. 1.4%).^{23,24}

(B) Laparoscopic vs. open

Laparoscopic resection has been shown to have no significant

difference in outcomes compared to open resection in benign and cancer cases.^{25–27}

(C) Level of inferior mesenteric artery (IMA) ligation

The level at which the IMA ligation occurs may play a role in anastomotic leak rates. A study by Trencheva et al. demonstrated that high ligation of the inferior mesenteric artery had 3.8 times higher chance of leaking compared to low ligation. This outcome may be related to the fact that the proximal part of the anastomosis relies on marginal artery blood flow from middle colic vessels when high ligation is performed. Without compromising the needed number of lymph nodes, the study recommends careful consideration of the level of ligation in patients with risk factors for poor mesenteric blood flow.²⁸ Nevertheless, a 2012 systematic review of the literature showed no significant difference in short-term outcomes, including anastomotic leak, between high and low ligation among 8666 patients.²⁹

(D) Leak test for anastomoses

After construction of the anastomosis, many will test the connection with insufflation of air, normal saline, or povidone-iodine. This is proposed to identify any disruption that may lend itself to anastomotic leak if missed. This provides a simple and reproducible method of predicting anastomotic leak. Most studies supporting air leak tests are small in size.³⁰ A 2009 retrospective study performed by the Lahey Clinic investigated 998 left-sided colorectal anastomoses without diversion, 90% of which were stapled. Air leaks were noted in 7.9% during the air leak test. Of these, 7.7% clinical leaks were later diagnosed. Comparably, 3.8% of those with negative air leak tests had clinical leaks, as well as 8.1% of untested anastomoses ($p < 0.03$). When comparing repairs after a positive air leak test, suture repair alone had higher clinical leak rate compared to recreated anastomoses and diversion (12% vs. 0%). The data from this study favors air leak testing of all left-sided anastomoses, whether stapled or hand-sewn.³¹

(E) Use of drains

A randomized trial found no increase in anastomotic leaks with drains in patients undergoing elective colonic resection, while a large observational study found a significant increase in anastomotic leaks with drains in patients undergoing a low anterior resection for rectal cancer.^{32,33} The use of prophylactic drains in intraperitoneal colonic surgery is not supported by current data. Prophylactic drainage of the pelvis after complex pelvic surgery may decrease the development of pelvic collections; however, it is not clear whether drains influence the rates of anastomotic leak.³⁴

Experience and certification

Another variable closely related to technique among studies examining anastomotic leak rates is the experience and certification of the surgeons performing the surgery. A retrospective study of 514 surgeons performing 15,427 colectomies between 1994 and 1997 showed improved outcomes with more experience and volume of cases. While anastomotic leak was not specifically investigated, the study concluded surgeons without American Board of Surgery certification had significantly higher complication rates.³⁵ Although colorectal surgery subspecialty certification did not significantly affect outcomes in this study, a 1998 study suggested otherwise. In the setting of rectal cancer and complications like recurrence,³⁶ Newman et al. reported on 683 patients involving 52 surgeons, 5 of which were colorectal surgeons who performed 109 (16%) of the operations. Multivariate analysis showed that the risk of local failure was increased and disease-

Download English Version:

<https://daneshyari.com/en/article/3319360>

Download Persian Version:

<https://daneshyari.com/article/3319360>

[Daneshyari.com](https://daneshyari.com)