Reoperation for Anastomotic Failure

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ABSTRACT

Anastomotic leak is a dreaded complication of colorectal surgery, with many potential causes. This complication carries with it a reported mortality ranging from 6 to 39%. Early diagnosis is key for the prevention of mortality. Here, we discuss the causes of an anastomotic leak and its signs and symptoms. Moreover, we explore the various modalities of diagnosis and treatment options. Most important, we discuss when a patient needs to be taken to the operating room and what procedure should be performed given various intraoperative findings.

KEYWORDS: Anastomotic leak, anastomosis, anastomotic leak review

Objectives: Upon completion of this article, the reader should be able to articulate the causes of anastomotic leaks, the treatment of anastomotic leaks, and the intraoperative management of patients with severe anastomotic leaks.

Anastomotic leak (AL) is one of the most dreaded complications following colorectal surgery, with reported rates ranging from 3 to 26%.¹⁻³ The concern over this complication is for good reason as it is associated with a mortality ranging from 6 to 39%.^{1,4,5} Many studies have looked at the potential causative factors of AL, and although male sex, poor nutritional status, obesity, and an increased number of blood transfusions may be risk factors, the level of the anastomosis is the most consistent risk factor for an AL.^{1,4-6} There appears to be an increased leak rate at the anastomotic site if done at or below 7 cm from the anal verge.^{1,4,7}

Early diagnosis of an AL is crucial for the prevention of mortality.^{1,3-7} The signs and symptoms can be subtle or obvious and include the presence of fever, oliguria, ileus, diarrhea, leukocytosis, and peritonitis. Once suspicion is raised, if the anastomosis is in the low pelvis, one can consider a digital rectal examination with the intent of feeling any defect or a mass. Otherwise, physical examination is generally nonspecific except in the setting of enteric contents draining from the wound or a drain. Water-soluble contrast enema, traditionally the first test used to evaluate a

higher anastomosis, has been largely supplanted by a computed tomographic (CT) scan. A CT scan of the abdomen and pelvis can be done with intravenous, oral, or rectal contrast material and is particularly useful if a concomitant abscess is suspected. This can be not only diagnostic but also therapeutic, as if an abscess is found, it can often be drained percutaneously.

Clearly, the best time to detect and even prevent a possible AL is at the time of its creation while still in the operating room. Beard et al⁸ performed a randomized, prospective study looking at intraoperative air testing versus not testing anastomoses for leaks. A patient's pelvis was filled with saline and air was introduced through a proctoscope, and if air bubbles were seen in the fluid an air leak was obviously present. If the site of leakage was found, sutures were placed to repair the site of leakage. Beard et al⁸ found a higher clinical leak rate (14% versus 4%) in the patients who were not air tested. In addition, the radiographic leak rates in patients who were not air tested were significantly higher (29% versus 11%). Thus, air testing of the anastomosis is recommended intraoperatively. However, it is notable that even with testing and repair, this

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did not completely prevent an AL. An alternative to air testing is to use intraluminal instillation of a dilute solution of povidone-iodine.⁹ After the bowel is occluded above the anastomosis with finger pressure, the testing solution is instilled gently with a bulb syringe inserted into the anus. Any leakage is readily apparent. Irrigation with this dilute povidone-iodine solution also provides antimicrobial and tumoricidal activity. An advantage of this method is avoidance of the difficulty in identifying the site of small leaks under saline that is often mixed with blood. Also, the larger volume of saline must be removed before any identified leak can be repaired.

Creating a healthy and safe colorectal anastomosis requires a good blood supply, two ends of healthy bowel to be joined, and good apposition of bowel to be joined.¹⁰ Bowel anastomosis can be configured in numerous ways. These include end to end, side to side, side to end, and end to side. The end-to-end anastomosis has most often been used in colorectal surgery, at least until fairly recently, as it is thought to be more physiologic and is useful for placing bowel of the same diameter together.¹⁰ This anastomosis may be done in a hand-sewn or a stapled manner. MacRae and McLeod, in a meta-analysis of 13 trials that compared hand-sewn with stapled anastomosis, showed similar mortality and leak rates.¹¹ It has been shown that a stapled anastomosis can be done faster,¹² perhaps the reason they are currently favored. Vignali et al,¹³ in one of the largest series evaluating AL, considered 1014 patients undergoing colorectal anastomosis using the circular stapler and found a clinical AL rate of just 2.9%. Thus, the decision of which type of anastomosis to perform and the technique used, whether stapled or hand-sewn, should be based on the technical comfort level and preference of the surgeon. Many technical aspects of anastomosis and intraoperative methods of repair have been previously published.⁹

Many surgeons drain the pelvic space after performing a colorectal or coloanal anastomosis. The goal of drain placement is to evacuate possibly contaminated blood or fluid from the pelvis. Theoretically, if these fluid collections are not drained externally, they may become infected and form an abscess or drain through the fresh anastomosis, or both.¹⁴ Despite reasonable evidence against their use,¹³ the use of drains for prevention of ALs is still a common practice. Vignali et al, in their review of 1014 patients with stapled rectal anastomosis, noticed an increased AL rate in patients who had a presacral drain in place.¹³ Urbach et al, in a meta-analysis, found an increased risk of AL in the patients who had drains placed versus those who did not, although they noted that the data were of poor quality and not conclusive.¹⁵ This study also concluded that drain placement should be abandoned. Thus, drainage of the pelvis after a colorectal or coloanal

anastomosis does not seem to prevent AL and, in fact, may be a risk factor for AL.

The technique of omentoplasty has also been investigated for use in the prevention of AL from a colorectal anastomosis. Radical rectal surgery can leave relatively large dead spaces, which can fill with possibly contaminated fluid and contribute to an anastomotic breakdown. If a pedicled omental flap can be used to fill the dead space and wrap the anastomosis, it may also be able to obliterate the dead space biologically and perhaps seal a small leak. Tocchi et al preformed a prospective, randomized trial in which they assigned 112 patients to undergo an omentoplasty versus no omentoplasty to reinforce their colorectal anastomosis.¹⁶ They concluded that this did not affect the incidence of anastomotic disruption but provided local containment of early leaks. Another randomized study also showed significant benefit, with greater than threefold difference in AL between the groups, favoring the omentoplasty arm.¹⁷ However, a larger study of 712 patients failed to demonstrate any benefit from omentoplasty, shedding doubt on the value of this practice.¹⁸

Proximal diversion has also been studied as a way to prevent ALs. Several studies have shown that patients are not necessarily protected from anastomotic complications if a diverting ostomy is used.^{1,3,4,6,13,19,20} In their review of 1014 patients, Vignali et al found no significant association between the occurrence of a postoperative leak and the use of proximal fecal diversion.¹³ However, some authors recommend diversion to reduce the clinical significance of an AL and the need for surgical intervention after an AL.^{20,21} Thus, although proximal diversion may not prevent an AL, it decreases the morbidity and mortality associated with one.

When an AL has been diagnosed, there are four main treatment options: antibiotics, drainage of the leak or abscess percutaneously or surgically, laparotomy with diversion, and laparotomy with takedown of the anastomosis. If a patient has clinical diffuse peritonitis, a laparotomy should be performed. However, if there is localized sepsis or peritonitis, antibiotics with or without percutaneous drainage can be considered, with the hope of avoiding a reoperation and likely stoma.

Longo et al²² retrospectively studied the treatment of 56 pelvic abscesses after colorectal rectal surgery. They found that 24 of the 56 could be treated either with antibiotics alone (11 of 56) or with antibiotics and percutaneous drainage (13 of 56). Of the 13 patients initially treated with percutaneous drainage, this approach was successful in 11. The authors concluded that if a pelvic abscess is discovered and the patient is hemodynamically stable, with no peritoneal signs, CT-guided percutaneous drainage should be attempted. Patients with AL who cannot be drained or whose symptoms do not resolve after drainage may require a laparotomy.

Makela et al²³ reviewed their 10-year experience with patients who had reoperations for ALs after left-sided colorectal resection. Forty-four cases of leakage treated operatively were identified, including 27 cases of resection of the anastomosis and end colostomy, 11 with proximal colostomy and drainage, 2 with ileostomy and drainage, 2 abdominoperineal resections, 1 total colectomy with ileostomy, and 1 with only drainage. Only six patients ultimately underwent colostomy closure, and two underwent ileostomy closure. They concluded that an increased rate of leakage occurs in low rectal anastomosis, and because of this they recommended a defunctioning stoma in these patients.

Mileski et al³ reviewed 405 cases of low anterior resections and found 16 patients with an AL; 10 patients were treated with loop colostomy and drainage, 1 with tube cecostomy and drainage, 3 with takedown of the anastomosis and proximal end colostomy with closure, and 2 with drainage only. The patients treated with decompressing loop colostomy and drainage had 72% combined morbidity and mortality, and those who underwent anastomotic takedown and fecal diversion plus drainage had 0% combined morbidity and mortality, which approached statistical significance.

Nesbakken et al²⁴ sought to evaluate the late functional results of patients after anastomotic leakage following mesorectal excision for rectal cancer. Over a 5-year period, 14 patients were documented as having a leak, and 11 patients were reoperated. Eight patients underwent open drainage and construction of a diverting colostomy, and three patients had a Hartmann procedure. Secondary to further complications, five patients' stomas were permanent. The authors concluded that a defunctioning stoma did not reduce anastomotic leakage, and anastomotic leakage itself results in a significant proportion of patients requiring a permanent stoma.

Moreover, Law and Chu²⁵ studied 786 patients who underwent anterior resection with a total mesorectal excision for middle and distal rectal cancers and a partial mesorectal excision for those with proximal cancer. They noted that there was a higher AL rate for patients undergoing a total mesorectal excision (8.1% versus 1.3%). Other factors that contributed to this higher leak rate included male gender, increased blood loss, and the absence of a stoma. Despite this higher leak rate, they conclude that because of the high cancer-specific survival rate of 74.5%, mesorectal excision should still be done.

Marusch et al²⁶ studied 482 patients who underwent low anterior resection to determine the value of a protective stoma in rectal cancer. In 334 patients no protective stoma was used, and 148 patients had a stoma. They concluded that although the stoma itself did not decrease the absolute leak rate, it decreased the incidence of leaks requiring reoperation and the severity of an AL.

Thus, when accounting for the data, an intraoperative approach to dealing with an AL can be formulated. If gross peritonitis is found, it would be wise to wash out the abdomen, divert proximally, and drain the anastomotic area. If the patient has peritonitis and there is a low anastomosis with a greater than 50% anastomotic dehiscence, one should take the anastomosis down and divert the patient. However, in the acute postoperative period it is sometimes very difficult to find the anastomosis without completely disrupting it. In this setting, proximal diversion and drainage are a viable option. This approach was the standard of care when dealing with severe diverticulitis and was known as the three-stage approach. Takedown of a leaking anastomosis is a difficult decision as a low anastomosis treated this way is most likely to result in a permanent ostomy for the patient. On the other hand, as with diverticulitis, proximal diversion and drainage may not control sepsis well. If a minor leak with less than 50% disruption is found, primary repair can be attempted in conjunction with washout, drainage, proximal diversion, and, if possible, wrapping the anastomosis with omentum.

After a right colectomy, a localized AL can occasionally be handled in a different way. If a localized leak is found in an ileotransverse anastomosis, this can be taken down, resected, and a new primary anastomosis can be performed away from the area of contamination and inflammation.

ALs continue to be a significant problem in colorectal surgery. Although factors such as high-dose steroids, poor nutrition, and severe critical illness may play a role in anastomotic breakdown, it has been shown in multiple studies that a low anastomosis, less than 7 cm from the anal verge, is a significant risk factor for leakage. The best treatment for ALs is prevention, a goal that has proved elusive. In patients with many risk factors for a leak and a low anastomosis, fecal diversion should be considered. Patients who leak and develop an abscess with local peritonitis can be treated with broad-spectrum antibiotics and, if necessary, CT-guided drainage. If generalized peritonitis develops, a laparotomy should be done. If a small anastomotic defect is found, diversion, drainage, and omental patch or repair, or both, can be considered. However, if a large defect is found, the patients would be better served with an anastomotic takedown, closure of the distal segment, and end colostomy.

DISCLOSURE

The authors have no conflicts to disclose relative to this article.

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