

Anastomotic leakage after laparoscopic single-port sigmoid resection: combined transanal and transabdominal minimal invasive management

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Abstract

Background Laparoscopic colorectal surgery has become the gold standard in the therapy of benign and malignant colorectal pathologies. Anastomotic leakage is still a reason for laparotomy; applying a diverting stoma or performing a Hartman's procedure is common [1, 2]. Laparoscopic treatment of an early-detected anastomotic leakage is suggested from other authors [3, 4]. In our video we demonstrate a combined minimal invasive transabdominal and transanal treatment concept in patients with early-detected anastomotic leakage.

Methods Two consecutive patients developing an anastomotic leakage after single-port laparoscopic sigmoid resection for stage II/III diverticulitis (Hanson & Stock) were treated with a combined minimal invasive approach. Anastomotic leakage was diagnosed by triple contrast

computed tomography on postoperative day 4 in patient one and on postoperative day 7 in patient two. Operative treatment was performed immediately on the same day without delay.

Results In both patients a combined transanal and transabdominal approach was performed. First step was a diagnostic laparoscopy in order to exclude fecal peritonitis. Using a single-port device (SILS™ Port Covidien™), transanal inspection of the anastomosis was also performed: In both patients anastomotic tissue margins were vital, and the leakage affected only a quarter of the anastomotic circumference. Transanal stitches were placed to close the anastomotic leakage. Laparoscopic transabdominal irrigation was performed, and two suction drainages were placed in the pelvis. Postoperative antibiotic treatment and a gradual return to solid food were carried out. Functional result at follow-up of 102 and 112 days (with rectoscopy) showed no residual leak and no stricture of the anastomosis, and both of patients had a normal rectal function.

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Anastomotic leakage after colorectal resection (CAL) is a dreaded complication and is reported to have a significant mortality (6–22 %) [5]. Morbidity is dramatically increased opposed to patients without CAL and leads to radiological interventions, reoperations with ostomy formation and risk of permanent stoma from 12 to 56 % [6, 9, 10]. Although many studies focus on risk factors and detection, studies on the treatment strategy for colorectal anastomotic leakage are scarce and no guidelines are

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available. The choice of rescue procedure is predominantly based on the attending surgeon's personal experience rather than solid evidence. Transanal intraluminal repair for AL has not been reported. In 2008 the International Anastomotic Leak Study Group proposed three interconnected algorithms for the management of anastomotic leak (for intraperitoneal, extraperitoneal low pelvic and anastomosis with proximal diverting stomas), reviewing the literature from 1973 to 2007 [7]. For intraperitoneal leaks, the following algorithm is recommended: Subclinical leaks (defined as A3) are just observed, localized peritonitis (A2) with contained leaks with small abscess <3 cm are aspirated or CT-guided drained if large or multiple abscesses are present. Localized peritonitis with intraperitoneal leaks (A2), anastomotic leaks with generalized peritonitis (A1), as our presented cases are, as well as failure of drainage are operated: either by Hartmann-type procedure, exteriorizing both ends of anastomosis or reanastomosis resp. anastomotic repair with proximal diversion, depending on the size of defect. As they mention primary repair without diversion is rarely performed and not part of the algorithm. Daams et al. [8] published a national questionnaire with 40 % response rate amongst 350 members of the Dutch Society for Gastrointestinal Surgery on the current treatment of colorectal anastomotic leakage. It was shown that more surgeons make an effort to preserve the anastomosis in younger people with low ASA Scores than in elderly. In ASA 1–2 patients <80 years of age, 27 % state that a leaking anastomosis above the level of the promontory (intraperitoneal) should be salvaged; for ASA 3 and/or >80 years of age this percentage is only 7.3 %. For extraperitoneal AL the tendency to preservation is higher, but even in patients after a rectum resection with deviating ileostomy 36 % of the respondents prefer to break down the anastomosis in ASA 1–2 patients with peritonitis and 74 % in ASA 3 and/or >80 years of age. Unfortunately, the questionnaire did not cover the kind of salvage strategy and loop ostomy for intraperitoneal AL. Krarup et al. [9] recently showed the prospective collected nationwide data from two population-based Danish registers with 593 leaks in 9333 patients undergoing colonic cancer surgery: 3.5 % (21 pts.) with CAL died before treatment was initiated, 5.4 % (32 pts.) had grade A leak (no invasive intervention), 5.6 % (33 pts.) had grade B managed by drainage alone and 507 patients had grade C requiring intervention. Takedown of the anastomosis was performed in the majority of the cases (85.4 %). Salvage was tried in 14.6 % (74 pts.), of which 73 % got a loop ostomy. Laparoscopic management was attempted only in 4 patients (0.8 %), 2 of whom were converted to open surgery. Overall the rate of ostomy formation was 96.1 %, with a risk of permanent ostomy of 54.4 % after takedown. Only 20 patients (3.9 %) with CAL grade C were operated without loop

ostomy by redo (14) or repair (6) of the anastomosis; nevertheless, the 30-day mortality in this small group was 30 %, and salvage therefore not recommended without ostomy. Rickert et al. [10] reported a rate of ostomy formation of 94 % in 67 AL—patients out of 1731 colonic resections. Restoration after takedown was achieved in 88 %. Leakage occurred in 3 (50 %) out of the small subgroup of 6 patients treated with repair of the leak without ileostomy, and mortality was not significant different to patients with ileostomy. No radiological testing of the patients with repair and ileostomy is mentioned. Our cases were both ASA 2 and <80 years old. The anastomoses were both under the promontory (10–12 cm from the anal verge), leaking intraperitoneal for both of the patients. We propose this new treatment for two reasons: First, by laparoscopy, the “real” situation in the abdominal cavity is evaluated, and lavage and proper drainage is performed. Second, by this transanal approach, vitality and condition of the bowel as well as size of the leakage are better visualized and transanal suture is more accurate to the defect, from very low up to about 20 cm possible, and can be performed more effective compared to laparoscopic or open over stitch. Under close clinical observation no diverting stoma was performed in our procedure compared with the current procedures described in the literature. Obviously we need a prospective randomized trial to prove our solution as effective and define the subgroups for a routine approach in the future. Colorectal stent is being used for palliation and as a bridge to surgery in obstructing colorectal neoplasms [11]. Kim et al. [12] and others described successful covering of iatrogenic colon perforations or use in strictures after colorectal resections, in his case after balloon dilatation of anastomotic stenosis under protective loop ileostomy, which is not really comparable. Wang et al. [13] present an experimental study in a porcine model with 30 pigs, 15 with stenting 3 days after creating a leakage, and 15 undergoing conventional colonic anastomosis without making a leakage in both groups. Lamazza et al. [14] published a series of 20 patients undergoing stenting during a 9-year period: 10 with strictures and 10 with stricture and leakage after rectal resection. All patients with leakage were treated with loop ileostomy prior to stenting except in 3 with rectovaginal fistula. In each group 3 stents migrated (all covered), and 5 out of these 6 were expelled spontaneously. Two of the leaks did not heal (20 %), which is worse than reported by other groups with repair and ileostomy. On the other hand, this is not really comparable, since these are leaks with strictures treated around 2 weeks after primary surgery. In our hospital stents were not used for treatment in AL up to now. We are not aware of any literature in early intraperitoneal leaking AL after colorectal resection in human.

Conclusions

Combined minimal invasive transabdominal and transanal treatment of an early-detected small anastomotic leakage without ostomy formation seems feasible and safe. We present a video of the described hybrid procedure.

Disclosures Drs Brunner, Rossetti, Vines, Kalak and Bischofberger have no conflicts of interest or financial ties to disclose.

References

- Schwenk W, Haase O, Neudecker J, Muller JM (2005) Short term benefits for laparoscopic colorectal resection. *Cochrane Database Syst Rev* (3):CD003145. doi:10.1002/14651858.CD003145.pub2
- Sauerland S, Agresta F, Bergamaschi R, Borzellino G, Budzynski A, Champault G, Fingerhut A, Isla A, Johansson M, Lundorff P, Navez B, Saad S, NEugebauer EA (2006) Laparoscopy for abdominal emergencies: evidence-based guidelines of the European Association for Endoscopic Surgery. *Surg Endosc* 20:14–29
- Wind J, Koopman AG, van Berge Henegouwen MI, Slors JF, Gouma DJ, Bemelman WA (2007) Laparoscopic reintervention for anastomotic leakage after primary laparoscopic colorectal surgery. *Br J Surg* 94(12):1562–1566
- O’Riordan JM, Larkin JO, Mehigan BJ, McCormick PH (2013) Re-laparoscopy in the diagnosis and treatment of postoperative complications following laparoscopic colorectal surgery. *Surgeon* 11(4):183–186
- Rullier E, Laurent C, Garrelon JL, Michel P, Saric J, Parneix M (1998) Risk factors for anastomotic leakage after resection of rectal cancer. *Br J Surg* 85:355–358
- Lindgren R, Hallböök O, Rutegård J, Sjødahl R, Matthiessen P (2011) What is the risk for a permanent stoma after low anterior resection of the rectum for cancer? A six-year follow-up of a multicenter trial. *Dis Colon Rectum* 54:41–47
- Phitayakorn R, Delaney CP, Reynolds HL, Champagne BJ, Herriot AG, Neary P, Senagore AJ (2008) Standardized algorithms for management of anastomotic leaks and related abdominal and pelvic abscesses after colorectal surgery. *WJS* 32:1147–1156
- Daams F, Slieker JC, Tedja A, Karsten TM, Lange JF (2012) Treatment of colorectal anastomotic leakage: results of a questionnaire amongst members of the Dutch Society of Gastrointestinal Surgery. *Dig Surg* 29(6):516–521
- Krärup PM, Jorgensen LN, Harling H (2014) Management of anastomotic leakage in a nationwide cohort of colonic cancer patients. *J Am Coll Surg* 218(5):940–949
- Rickert A, Willeke F, Kienle P, Post S (2010) Management of anastomotic leakage after colonic surgery. *Colorectal Dis* 12:e216–e223
- Ghazal AH, El-Shazly WG, Bessa SS, El-Riwini MT, Hussein AM (2013) Colonic endoluminal stenting devices and elective surgery versus emergency subtotal/total colectomy in the management of malignant obstructed left colon carcinoma. *J Gastrointest Surg* 17(6):1123–1129
- Kim SW, Lee WH, Kim JS, Lee SJ (2013) Successful management of colonic perforation with a covered metal stent. *Korean J Intern Med* 28(6):715–717
- Wang Y, Cai X, Liang Y, Huang D, Peng S (2011) Experimental study of primary repair of colonic leakage with a degradable stent in a porcine model. *J Gastrointest Surg* 15(11):1995–2000
- Lamazza A, Fiori E, Schillaci A, Sterpetti AV, Lezoche E (2014) Treatment of anastomotic stenosis and leakage after colorectal resection for cancer with self-expandable metal stents. *Am J Surg* 208(3):465–469