Early detection and the prevention of serious complications of anastomotic leakage in rectal cancer surgery

M. Ellebæk · N. Qvist

Received: 5 April 2013 / Accepted: 21 April 2013 / Published online: 30 April 2013
© Springer-Verlag Italia 2013

Anastomotic leakage (AL) after low anterior resection for rectal cancer is a challenging complication in rectal cancer surgery. The reported frequency is 10–20 % in most publications, irrespective of the creation of a diverting stoma. AL has both immediate and long-term consequences that affect morbidity, mortality, functional and oncological outcome.

The oncological impact of AL is still under discussion. Several studies have demonstrated an increase in local recurrence rate and a decreased overall survival, while other studies have failed to demonstrate this connection. A recent study showed that AL, which required reoperation, was associated with a significantly higher local recurrence and lower overall survival rate [1].

In most cases, the clinical presentation of AL is insidious with vague and uncharacteristic abdominal symptoms, which may be masked by the use of epidural analgesia. Some cases may present with extraintestinal manifestations such as atrial fibrillation or mental confusion. Thus, AL is typically not recognized until postoperative day 5–7, which in many cases means there is significant delay in diagnosis. Another explanation of delayed diagnosis might be the low diagnostic sensitivity and specificity of common clinical tests such as body temperature, C-reactive protein (CRP) concentration and leukocyte count in peripheral blood, which moreover may be obscured by other inflammatory conditions such as pneumonia, urinary tract infections and surgical site infections. The same may apply to other inflammatory parameters such as cytokines. A recent pilot study conducted by our group using a panel of 10 cytokines

and 2 complement factors in patients with and without AL found that only combined changes in IL-4, IL-6 and IL-10 could accurately predict leak (submitted for publication). A study on postoperative CRP in elective abdominal surgery, published in the present issue, showed that patients with CRP < 135 mg/L on postoperative day 3 were unlikely to develop AL. However, the sensitivity and specificity for AL of elevated values were dependent upon the duration of the elevation in the CRP concentration [2]. Regular computed tomography (CT) scan and endoscopy are other possible but less attractive investigations due to irradiation and the risk of iatrogenic anastomotic dehiscence.

Early diagnosis of AL is important to reduce the negative effects on the patient's health and to increase the success rate of treatment without reoperation. Therefore, new tests for early diagnosis of AL, before the development of overt symptoms, are warranted. The problem is that the complete pathophysiological background of AL is unknown. Several factors such as ischemia, inflammation, surgical techniques, comorbidity and preoperative radiochemotherapy may be involved.

It is well documented that a diverting loop ileostomy reduces the risk of serious complications due to AL such as fecal peritonitis, reoperation, prolonged morbidity, permanent stoma and death. However, a diverting loop ileostomy is not without consequences and discomfort for the patient. In patients without AL, it has been demonstrated that a diverting stoma is associated with a higher long-term mortality rate than in patients without a stoma, due to stoma-related complications, missed adjuvant chemotherapy and complications of stoma closure. The use of "ghost" ileostomy, which allows selective loop ileostomy formation or early closure of the stoma before postoperative day 8–14, may be an alternative [3, 4]. The use of a transanal tube is dubious [5, 6]. Intraoperative laser

M. Ellebæk (✉) · N. Qvist
Odense University Hospital, Sdr. Boulevard 29,
5000 Odense C, Denmark
e-mail: markep01@gmail.com

fluorescence angiography has been shown to reduce the risk of revision due to AL and reduce length of hospital stay in colorectal surgery [7].

Treatment for AL depends on the time of presentation and the type of leak. Patients with peritonitis and sepsis need relaparotomy or relaparoscopy with the construction of a diverting stoma if not already performed, peritoneal cleaning and drainage and ultimately breakdown of the anastomosis. The confined inflammation with presacral or pelvic abscess formation without peritonitis can often be treated conservatively with antibiotics, transrectal rinsing and/or CT-guided percutaneous drainage. Transrectal vacuum-assisted closure has demonstrated promising results [8].

Peritoneal microdialysis allows local and continuous monitoring of ischemia as well as inflammation, which may have the potential to diagnose AL before clinical symptoms develop. The traditional parameters measured are glucose, glycerol, pyruvate and lactate. The present issue includes a study by Daams et al. [9] on peritoneal microdialysis which shows significant changes in peritoneal lactate concentration in patients with symptomatic AL. Similar results have been demonstrated in other studies [10, 11]. However, additional, larger clinical trials are needed to specify the cut-off values for the parameters measured, and investigations of other inflammatory parameters collected with microdialysis must also be evaluated. Another important issue is investigations of the possible clinical benefits from early diagnosis of AL.

Conflict of interest None.

References

1. Mantzoros I (2010) Oncologic impact of anastomotic leakage after low anterior resection for rectal cancer. *Tech Coloproctol* 14:S39–S41
2. Scepanovic MS, Kovacevic B, Cijan V et al (2013) C-reactive protein as an early predictor for anastomotic leakage in elective abdominal surgery. *Tech Coloproctol*. doi:[10.1007/s10151-013-1013-z](https://doi.org/10.1007/s10151-013-1013-z)
3. Cerroni M, Cirocchi R, Morelli U (2011) Ghost ileostomy with or without abdominal parietal split. *World J Surg Oncol* 9:92
4. Alves A, Panis Y, Lelong B (2008) Randomized clinical trial of early versus delayed temporary stoma closure after proctectomy. *Br J Surg* 95:693–698
5. Xiao L, Zhang W, Jiang P et al (2011) Can transanal tube placement after anterior resection for rectal carcinoma reduce anastomotic leakage rate? A single-institution prospective randomized study. *World J Surg* 35:1367–1377
6. Montemurro S, De Luca R, Caliendo C et al (2012) Transanal tube NO COIL® after rectal cancer proctectomy. The “G. Paolo II” Cancer Centre experience. *Tumori* 98:607–614
7. Kudsus S, Roesel C, Schachtrupp A, Höer JJ (2010) Intraoperative laser fluorescence angiography in colorectal surgery: a noninvasive analysis to reduce the rate of anastomotic leakage. *Langenbecks Arch Surg* 395:1025–1030
8. Bemelman WA (2009) Vacuum assisted closure in coloproctology. *Tech Coloproctol* 13:261–263
9. Daams F, Wu Z, Cakir H, Karsten TM, Lange JF (2013) Identification of anastomotic leakage after colorectal surgery using microdialysis of the peritoneal cavity. *Tech Coloproctol*. doi:[10.1007/s10151-013-1020-0](https://doi.org/10.1007/s10151-013-1020-0)
10. Ellebaek M, Qvist N, Bisgaard C et al (2009) Peritoneal microdialysis. Early diagnosis of anastomotic leakage after low anterior resection for rectosigmoid cancer. *Scand J Surg* 98:148–154
11. Matthiessen P, Strand I, Jansson K et al (2007) Is early detection of anastomotic leakage possible by intraperitoneal microdialysis and intraperitoneal cytokines after anterior resection of the rectum for cancer? *Dis Colon Rectum* 50:1918–1927