Dealing with Complications of Colorectal Surgery Using the Transanal Approach—When and How?

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Abstract

The transanal approach is a new and exciting addition to the surgeons' repertoire to deal with complications after colorectal surgery. Improved exposure, accessibility, and visibility greatly facilitate adequate dissection of the affected area with potential increase in effectiveness and reduced morbidity. An essential component in salvaging anastomotic leaks of low colorectal, coloanal, or ileoanal anastomoses is early diagnosis and early treatment, especially when starting with endoscopic vacuum therapy, followed by early surgical closure (endoscopic vacuum-assisted surgical closure). Redo surgery using a transanal minimally invasive surgery platform for chronic leaks after total mesorectal excision surgery or surgical causes of pouch failure successfully mitigates limited visibility and exposure by using a bottom-up approach.

Keywords

- transanal minimally invasive surgery
- complications
- anastomotic leakage
- colorectal surgery

Resectional surgery of the rectum for various diseases is associated with a certain risk of pelvic complications that might result in presacral abscess and fistula formation. Most common underlying diseases are rectal cancer, inflammatory bowel disease (IBD), polyposis syndromes, and other pelvic malignancies. Both restorative and nonrestorative sphincter-sparing rectal resections are performed in the treatment of these diseases. These procedures can lead to anastomotic leakage (AL) or pelvic abscess on top of a rectal stump, respectively.

The transanal approach can be used for early treatment of infectious pelvic complications, as well as for salvage surgery for chronic septic complications. It should be emphasized that there is a paucity of literature on this topic, with mostly small cohort studies. There are no good quality comparative studies, neither randomized nor nonrandomized, for which reason we do not know the optimal treatment of leakage of low pelvic anastomoses. This article is largely based on the experiences of a national referral center for anastomotic failure, and most of the recommendations are based on expert opinions.

Leakage of Colorectal, Coloanal, and Ileoanal Anastomoses

AL remains one of the most feared complications. It leads to significant impairment of quality of life and functional outcomes, additional reinterventions and reoperations, worse oncological outcomes, increased health care costs, and permanent stomas.[1–3]

Reported AL rates after rectal cancer surgery are highly variable. The German, Swedish, and TaTME registries found leakage rates of 10.8, 11.9, and 15.7%.[4–6] A substantial amount of false-negative (29%) and false-positive (1.3%) diagnoses were found after chart review in the Swedish

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registry. Retrospective chart review in the Dutch national cross-sectional Snapshot study revealed a much higher leakage rate within 30 days than initially reported in the national audit (13.4 vs. 8.2%), and this increased to 20% after 4 years of follow-up, due to late detection of leakage and chronic sinus.[7] The main contributing factor to late leakages is the silent course, due to the presence of a diverting stoma, and even if a diverted anastomosis appears intact, an occult leakage can become symptomatic once the stoma is reversed.

Despite the high prevalence of AL after rectal cancer surgery, there is very little literature available how to manage this complication. It is generally accepted that as first step, the leak should be defunctioned if not done so before. However, there is no consensus how to drain and manage the septic cavity. Options are surgical drainage, radiological drainage (either transabdominal, transgluteal, or transperineal), and transanal drainage with passive drains or vacuum systems.[7–9] In the previously mentioned Dutch Snapshot study with long-term follow-up, the management of the leak showed to be very dissatisfactory because a chronic sinus remained in half of patients.[7] The pelvis has often been irradiated before surgery, producing a scarred and fibrotic surgical field with reduced pliability of the neorectum and healing capacity of the chronic sinus.

The treatment of AL itself might also lead to secondary complications. After the removal of a transgluteal drain, fistulae can develop along the old drain tract. These fistulae can subsequently lead to the formation of new abscesses and even to life-threatening complications such as necrotizing fasciitis.[10]

Proctocolectomy with ileal pouch–anal anastomosis (IPAA) is one of the main treatment modalities in therapy refractory patients with ulcerative colitis and familiarly adenomatous polyposis (FAP), as well as selected patients with Crohn's disease and some rare other diseases. Reported AL rates after pouch surgery are also highly variable.[11–13] One of the explanations is, again, the unrecognized asymptomatic leak, especially in the presence of a diverting stoma. Similar to low colonic anastomoses, occult ileoanal anastomotic leaks might become clinically apparent later on, and late anastomotic failures can be misdiagnosed as Crohn's disease in the pouch or refractory pouchitis.[14] It is quite obvious that these leaks are not accounted for in 30 days or in hospital leak rates.

Proactive Approach of Anastomotic Leakage

Traditionally, a passive approach is used in the treatment of AL. A diverting stoma is created, if not created primarily, and abscesses are drained either transanally or radiologically. From here, watchful waiting is applied in the hope that the anastomosis will heal in time. Taking down a low pelvic anastomosis is not recommended because of future difficulties to reconnect and should therefore only be performed in a specific cases, mostly because of ischemia, major dehiscence, or uncontrollable pelvic sepsis.

In the last decade, the paradigm of treating a pelvic anastomosis has shifted toward a proactive approach with early treatment after early diagnosis. Several reviews showed that postoperative C-reactive protein (CRP) measurement can effectively indicate the presence of infectious complications including AL as early as day 3.[15] When CRP is elevated above a certain threshold (e.g., >172 on day 3), a computed tomography (CT) scan with rectal contrast can be made to determine if an anastomosis is leaking. Also, clinical signs of leakage and/or repeated CRP measurements showing a certain trend can help in guiding the need for additional imaging or endoscopy to check the integrity of the anastomosis. Such diagnostic strategies are all intended to detect any leaking anastomosis as early as possible, no matter whether it is symptomatic or not, to immediately start treatment that aims for preservation of anastomotic integrity.

The omission of a diverting stoma during primary surgery is critical in early diagnosis of AL because a nondiverted leak is rarely asymptomatic. Traditionally, a stoma is created to allow the anastomosis to heal before the fecal stream is restored. However, long-term leakage rates are similar irrespective of fecal diversion. Omission of a diverting stoma at primary surgery appears safe, under the condition that there is a strict institutional protocol for early diagnosis of AL, and routine diversion leads to many unintended permanent stomas, besides other disadvantages.[16–18]

Early and active treatment appears to be vital in the management of AL. First, this prevents clinical deterioration of the patient's condition, which is especially important in the absence of fecal diversion. Second, early treatment might preserve the integrity of the bowel preventing that the bowel at the anastomotic site becomes fibrotic resulting in a chronic leak. Without any or only limited abdominal contamination and in the absence of ileus, a laparoscopic reintervention is still possible for creating the diverting ileostomy if not present. A minimally invasive reintervention has shown to be beneficial for the patient as compared with an open approach.[19] Third, it allows for early interference with cascades that rapidly worsen the local pelvic conditions. The resting tone of the anal sphincters prevents effective drainage of the bowel and the adjacent septic cavity. Accumulation of gas, feces, and mucous in the neorectum and presacral septic cavity cannot be prevented, thereby hampering healing of the leak.

Transanal Surgery for Acute Leaks

When an AL has been diagnosed, the first priority is to control pelvic sepsis by creating a diverting stoma (if not created primarily) and washout of the colon in case of a colorectal anastomosis. If the afferent bowel is vital, it is advised not to explore an ileoanal or coloanal anastomosis from the abdominal side because visibility is very limited and inadvertent traction on the afferent bowel loop might enlarge the anastomotic defect. Transanal or endoscopic inspection can ascertain the viability of the bowel (ischemic or not), the location of an anastomotic defect (circular anastomosis, top of a blind loop), the size of the defect (partial, complete dehiscence), whether a sinus/cavity is visible, and the size and content of the cavity. In

women, the vagina has occasionally been incorporated into the stapled anastomosis, or a leak is decompressed via a weak spot in the vagina. Under these circumstances, air or stool evacuates per vaginam.

One of the important modalities in transanal management of acute leaks is the endoscopic vacuum therapy (EVT), in which a polyurethane sponge is placed in the abscess cavity, and subsequently connected to a negative pressure suction device (Endo-SPONGE, B. Braun Medical B.V., Melsungen, Germany).[20] This allows for active and continuous drainage and the sponge itself allows for uniform contact with the cavity wall, producing a healthy granulating cavity over time. The sponges are changed in an outpatient setting every 3 to 4 days in the endoscopy room. EVT works best in combination with diversion, although it has been applied successfully without a diverting stoma in selected cases. In the absence of a diverting stoma, it is quite likely that the vacuum system loses its vacuum due to the intact transit of stool and feces being sucked into the vacuum system.[21,22]

The indication for starting EVT depends on the first visual inspection of the anastomosis. In our opinion, starting EVT is always a good option as initial step in the management of a leak, especially if the leak has been diagnosed early. In nondiverted patients with early diagnosed leakage of a coloanal or ileoanal anastomosis, EVT can start within 4 to 6 days after the index operation. In case of diversion, routine endoscopic evaluation should be done within 10 to 14 days, enabling immediate start of EVT after diagnosis of the leak. Early initiation of EVT showed to be more effective in anastomotic salvage.[9,23,24] Even if there is a very small defect, this should be dilatated endoscopically to facilitate the tube for EVT. This might feel counterintuitive, but further dehiscence does not worsen the outcome in such cases later on because the alignment of the bowel ends will be preserved. In case of an abdominal drain, it is sometimes necessary to withdraw the drain to allow for collapse of the top of the cavity during EVT, by which the presacral cavity will be sealed off at the pelvic inlet and separated from the abdominal cavity.

The EVT therapy with the Endo-SPONGE system was first described by Weidenhagen et al in 2008, and they used this as a single treatment modality with tapering of the sponge during each exchange.[20] This resulted in gradual collapse of the cavity behind the anastomotic defect, and EVT was stopped when only a small sinus remained. At the Amsterdam UMC, location AMC, we modified this active treatment approach and introduced the endoscopic vacuum-assisted surgical closure (EVASC) of the anastomotic defect.[25] The reasons were that complete healing of the anastomosis by EVT alone required numerous exchanges during an intensive treatment period for both patients and doctors. Furthermore, there is a chance of retraction of the afferent bowel with increasing dehiscence. The neorectum can become rigid because of the secondary healing process with fibrosis, especially during lengthy EVT treatments. Finally, a small remaining sinus can become the route of least resistance with reactivation of the leak once bowel continuity has been restored. Therefore, we hypothesized that primary closure of the anastomotic defect, as soon as a granulating aspect of the cavity behind is found, can speed up the process of healing, thereby also preserving alignment of bowel ends and compliance of the neorectum. For this reason, we introduced the combined treatment modality of EVT with early surgical closure (EVASC).

In our experience, it usually takes two to four sponge exchanges to obtain a clean cavity and allow for early surgical closure (EVASC) of the remaining defect (►**Fig. 1**). In case of

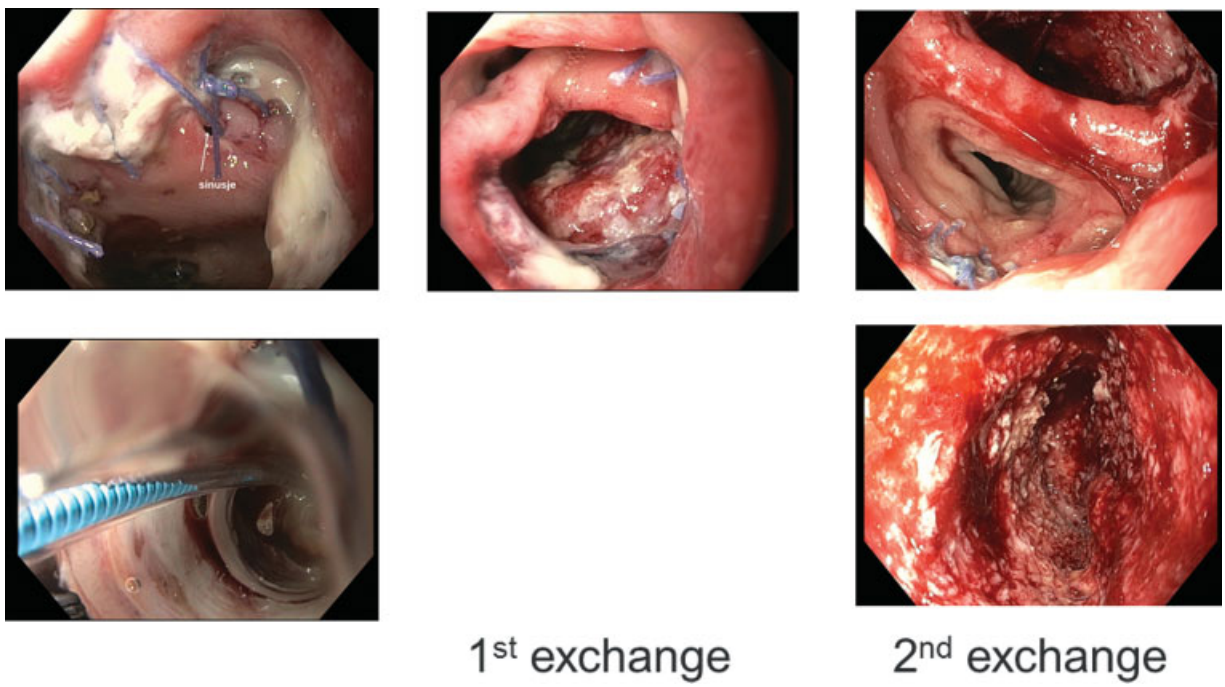

Fig. 1 Endoscopic vacuum therapy for the treatment of anastomotic leaks. After two Endo-SPONGE exchanges, the cavity appeared clean with granulation tissue and suitable for early surgical closure (endoscopic vacuum-assisted surgical closure).

prior radiotherapy and large abscess cavities with abundant necrotic tissue and debris, another two to four sponge exchanges might be necessary. The cavity should be carefully irrigated and debrided during endoscopic inspection before placing a new sponge. Endoscopic graspers or snares can be used to remove debris and necrosis. Partial closure might be considered during initial assessment of the leakage, when there is more than 180 degrees dehiscence. Partial reconstruction of the anastomosis might prevent progressive dehiscence and retraction, and the remaining defect can be used for subsequent EVASC. Leaks with very small cavities behind it (e.g., anteriorly located leaks) are often too small to facilitate the smallest sized Endo-SPONGE. Then, simple resuturing without EVT might be considered.

Transanal closure of an anastomotic defect is performed in the lithotomy position under general anesthesia with intravenous antibiotics. The Endo-SPONGE is removed and the neorectum or pouch as well as the cavity are irrigated with a betadine solution. For low coloanal anastomoses or ileoanal pouches, sufficient exposure can be obtained by just using a Lone Star retractor and some specula (e.g., Langenbeck retractor). When the defect is located more proximal, a transanal platform (e.g., GelPOINT Path Transanal Access Platform) can be installed. One should ideally visualize the cavity because sometimes pieces of sponge can remain behind. A gauze can be placed in the afferent colon loop or pouch to prevent accidental closure when placing the sutures. A suction drain (6–8 Fr) is placed through the wall of the rectal stump or anal canal into the abscess cavity and fixated with sutures at the level of the anoderm. The drain can be placed using the small redon needle in an antegrade direction or retrograde direction, the latter being performed by bringing the needle into the cavity, and then moving the needle with the point in the direction of the dentate line with a needle holder. This might be a challenging part of the procedure. Appropriate drain placement seems to be an essential component of EVASC because this will result in collapse of the cavity behind the reconstructed anastomosis by suctioning the wall of the neorectum or pouch to the sacrum. For the highest chance of obtaining complete vacuum in the cavity, a drain tract of sufficient length is chosen through normal tissue with an exit point distal from the anastomosis, and not through the anastomotic defect.

Mobilization of the proximal or distal rectal cuff can provide additional length to approximate the defect. Then, the defect is closed with interrupted full-thickness 2–0 Vicryl sutures with a 5/8 circle needle. We do not recommend the use of a running V-lock suture based on our experience. If there is a bit of traction, it is helpful to first place all the sutures, and subsequently, relieve the tension of the Lone Star during knotting. If an endoscopic platform is used, it is still advised to bring the endings of every single suture out of the transanal platform with temporary fixation of the stitches on the Lone Star retractor, although this requires the installation of the pneumorectum every time again. Subsequently, the port is removed with handed knot tying. Finally, the afferent loop is inspected for patency. Details on the procedure and a video vignette on the procedure were published earlier by our group and another example is shown in ►**Fig. 2**.[23,25,26]

Postoperative protocol entails drain removal on days 5 to 7 in the outpatient clinic and oral antibiotics for 7 to 10 days. Endoscopic inspection after 2 weeks is essential to evaluate if the procedure has been successful. In case of failure, one might consider to restart EVASC and to perform a second attempt of closure within 2 weeks. When endoscopic inspection reveals an intact anastomosis, CT scan with rectal contrast is performed to exclude any remaining fluid collection behind the reconstructed anastomosis. If such a collection is seen on CT, but without contrast extravasation or substantial amount of air, transgluteal percutaneous drainage might be considered. But if there is any suspicion of recurrent leakage, restart of EVASC is advised.

The exception in which EVASC might not be the best treatment is when early inspection (until 7–10 days postoperative) reveals a vaginal fistula or ischemia of the afferent loop in a patient who is not septic and does not have abdominal contamination. Then, there is a possibility to perform an acute redo anastomosis. This entails transanal resection of the insufficient anastomosis with laparoscopic mobilization of the colon to gain additional length. Subsequently, an immediate or delayed (Turnbull-Cutait) handsewn coloanal anastomosis can be performed.[27,28]

A recent systematic review, including 276 patients treated with EVT for AL found a healed anastomosis rate of 85.3% and a stoma reversal rate of 75.9%.[29] Critical appraisal showed a wide variety in patients (rectal cancer, IBD, FAP, etc.) and treatment (mostly EVT alone, some EVASC, or fibrin glue). A retrospective study compared patients who underwent EVT with patients who underwent conventional treatment and found higher restored continuity rates after EVT treatment (86.7 vs. 65.9%).[30] This study might be subject to selection bias because the conventional group consisted of significantly more cancer patients and related neoadjuvant therapy.

In the multicenter CLEAN study coordinated by our center, EVASC for low colorectal/coloanal anastomotic leaks in 30

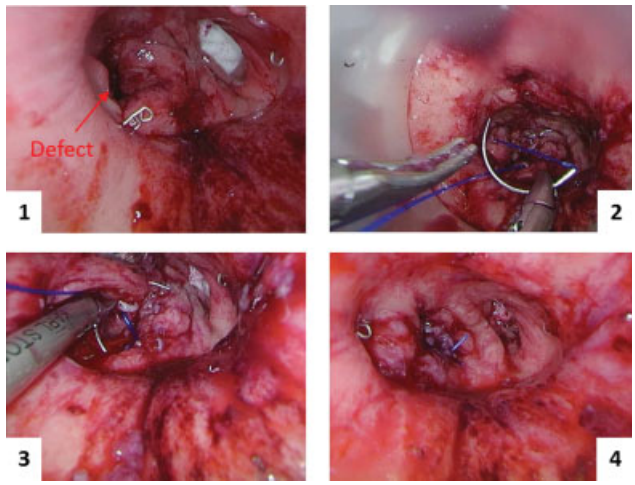

Fig. 2 Transanal closure of a defect in the blind loop of a side-to-end anastomosis. Image 1 shows the anastomotic defect after prior endoscopic vacuum therapy treatment. In images 2 and 3, transanal sutures are placed closing the defect. In image 4, the defect is closed.

patients with a 73% neoadjuvant radiotherapy rate resulted in a healed anastomosis in 70% and restored continuity in 67%.[24] Patients who were treated within 21 days after index operation ($n = 15$ in both cohorts) showed more healed anastomoses (73 vs. 67%) and more restored continuity (73 vs. 60%). We recently updated our institutional results with EVASC, which revealed a healed anastomosis rate of more than 90% since the introduction of the transanal platform in 2014 (unpublished data).

A retrospective study investigating EVT in 20 patients (including 3 patients with EVASC) found a restored continuity rate of 70% and a healed anastomosis rate of 85%.[31]

Most effective use of EVASC has been reported for patients with leakage of an IPAA.[32] A retrospective cohort study from our group compared EVASC with conventional treatment and found higher anastomotic healing rates (100 vs. 52%) after EVASC at 6 months.[25] Another retrospective study from our center found that conventional treatment showed worse pouch function and higher pouch failure rate, if compared with EVASC.[33] Because of the high efficacy of early diagnosis and proactive treatment strategy found in the treatment for pouch leakage, we have adapted our protocol for colorectal and coloanal leaks. Our current success rates are significantly higher than were published in the CLEAN study and we hope to present these soon.[24]

A proactive AL management algorithm is displayed in ►**Fig. 3** and represents the institutional protocol as we use at the Amsterdam UMC. After diagnosis, a diverting stoma is created, if not created primarily to control pelvic sepsis. EVASC is preferred treatment and preferably starts within 4 to 14 days after index surgery, and within 48 hours of diagnosis of AL. When the leak has healed based on endoscopic and imaging assessment, the stoma is reversed. When the leak has not healed based on endoscopic assessment, a second attempt of EVASC can be started. Sometimes, only a small remaining sinus is found, and further healing is awaited during the next few months.

Transanal Surgery for Chronic Leaks

A chronic presacral sinus is the result of nonhealing of a pelvic anastomosis. Most sinuses are asymptomatic for a certain period of time varying from months to numerous years. But in the presence of a competent sphincter, the longstanding retention is likely to result in progressive pelvic infection with secondary fistula formation. This is an important clinical problem, and its incidence may be underestimated because long-term follow-up is required. Complaints can be limited to pain or increased defecation, but some patients might develop sepsis with severe conditions such as necrotizing fasciitis, pelvic fistula, hydronephrosis, coxarthritis, etc.[10]

When an acute leak does not heal or if a patient presents with a chronic sinus, it is important to discuss the natural

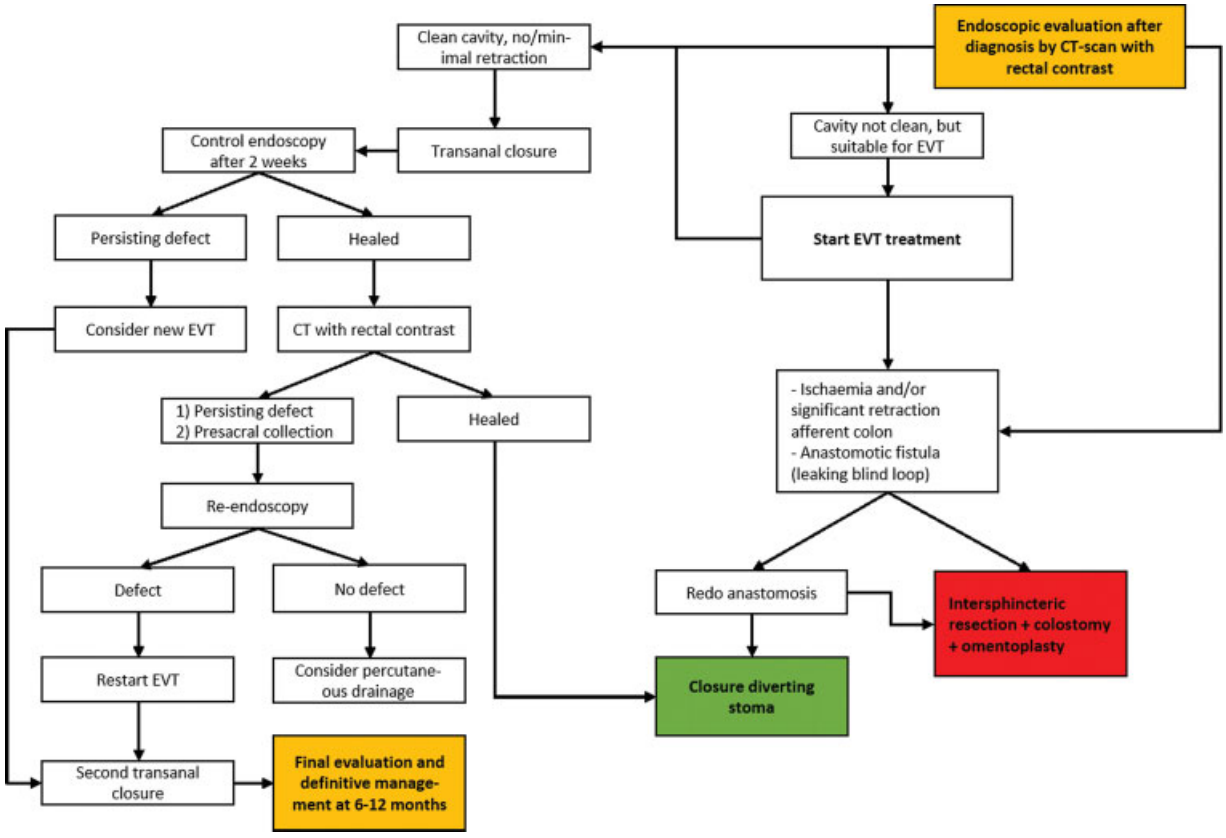

Fig. 3 Proactive management of endoscopic vacuum-assisted surgical closure) algorithm. CT, computed tomography; EVT, endoscopic vacuum therapy.

course of this condition and treatment options with the patient. In a shared decision fashion, the patient can decide what to do. Options are wait and see, endoscopic or local attempts to treat the sinus or major redo surgery with or without restoration of the continuity. It is important to notice that the presence of a diverting stoma does not prevent potential worsening of the pelvic condition during the subsequent years because mucus, pus, and air can accumulate in the sinus due to the inability for adequate drainage in the presence of a closed anal sphincter. Marsupialization of the sinus by using an endoscopic surgical stapler or by simple electrocautery has been advocated as a treatment option, but this only optimizes drainage of the cavity into the neorectum. The intraluminal retention and absence of a bowel wall at the level of the sinus are still a risk for progressive pelvic inflammation with abscess and fistula formation, particularly in the irradiated patients. Chronic sinuses have also been treated with an injection of fibrin glue after curettage of the cavity.[34,35] High success rates have been reported of both marsupialization and fibrin glue, but these treatments are likely to fail with extended follow-up in our experience. Promising results have been published when using endoscopic sinusotomy for a chronic ileal pouch sinus and might prevent major redo surgery.[36]

When a patient does not experience symptoms from the presacral sinus and is not motivated for major salvage surgery after being fully informed, a wait-and-see approach can be employed. This might consist of yearly pelvic imaging with CT or magnetic resonance imaging. The patient should know that referred leg pain is one of the warning signs of fistula formation along the piriformis muscle, with the need for urgent intervention.

Definitive treatment of a chronic presacral sinus can only be achieved by major salvage surgery, in which a few basic treatment principles have to be followed. EVT prior to salvage surgery for a few days can be beneficial to clean the abscess cavity. The first component of salvage surgery is resection of the old anastomosis or remaining rectal stump, with complete debridement and excision of all fibrotic tissue and cleaning of fistula tracts. Technically, this is the most demanding step, irrespective of the intention to preserve the continuity.

A redo of the anastomosis can be the last chance to preserve bowel continuity before creation of a permanent stoma. If this is the goal of salvage surgery, a rectotomy below the anastomosis is performed, followed by close bowel dissection and excision of the leaking anastomosis until *rendezvous* with the top–down transabdominal mobilization of the afferent bowel loop is achieved. Subsequently, extensive debridement is performed.

When bowel continuity is chosen not to be restored, salvage surgery is performed by intersphincteric dissection of the rectal stump and close bowel dissection along the leaking anastomosis until *rendezvous* with the top–down dissection is achieved. Presacral veins are generally thrombosed during the period of chronic inflammation. Presacral fibrosis can be removed with sharp dissection without the risk of significant bleeding. However, debridement should be more carefully performed at the level of the pelvic side walls with preservation of the ureters.

The second component of major salvage surgery is filling of the created pelvic cavity with well-vascularized tissue. This might either consist of the neorectum (afferent colon or ileoanal pouch), or autologous tissue when restoration of bowel continuity is not intended anymore, for example, omentoplasty. Restoring the continuity with neorectum or pouch or filling the cavity with omentoplasty is less demanding than the preceding step. It is obvious that in case of restoration of the continuity, the new anastomosis can once again leak, and if healed, the function of the redo low anastomosis has to be awaited.[37,38] Redo anastomosis is therefore a valuable option in selected patients who have a strong wish against a permanent stoma and can accept uncertain functional outcomes and morbidity. For obliteration of the cavity with well-vascularized tissue, first choice is an omentoplasty, but filling can also be obtained by creating a myocutaneous flap (e.g., rectus abdominis muscle flap).[10,39,40] Omentum is well vascularized and improves immunological response and angiogenesis.[41,42] Filling of the presacral cavity also prevents descent of small intestines, decreasing the chance of obstruction and formation of enteroperineal fistulas. When combining an intersphincteric resection with filling of the anorectal cavity with omentum, wound healing can be achieved in 78%, which improves to 88% when performed in a single setting.[40]

A bottom-up approach enables greater exposure and visibility during major salvage surgery for chronic leaks. It is sometimes almost impossible to reach the chronic sinus top down from the abdomen, especially because the posterior bladder wall and internal genital organs have shifted dorsally to some degree, and have become more rigid due to fibrosis, particularly after a low Hartmann procedure. The top-down dissection starts to become extremely tedious at the level of the vesicles where the rectum is curving anteriorly. This limits the exposure from the abdominal side, without the possibility to retract the anterior pelvic compartment because of rigidity of the tissues. Therefore, a transanal approach is very helpful overcoming this technical difficulty.

Traditionally, a transanal approach was performed in an open manner, either in the supine or prone position. With the help of a Lonestar retractor and other retractors, the bottom-up dissection was performed. An intersphincteric dissection or rectotomy at the level of the dentate line was performed depending on intended preservation of continuity, and further dissection of the anastomosis and afferent colon loop was performed as far as the exposure allowed for. Applying an open transanal approach is disadvantageous because the upper border of the prostate can rarely be reached due to lack of exposure.

With the help of the transanal minimally invasive surgery (TAMIS) platform, the procedure is greatly facilitated by superior exposure, adequate illumination, a magnified view, and completing the bottom-up dissection beyond the

vesicles and upper border of the prostate is rarely a problem anymore. Combining the abdominal top-down dissection and the TAMIS bottom-up dissection with *rendezvous* at the level of the vesicles generally ensures a very controlled and safe operation.[43] The use of a TAMIS platform significantly contributes to the quality of the debridement and facilitates the dissection of the distal rectal cuff for constructing a redo anastomosis, even with the possibility of a stapled redo anastomosis in patients with a relatively high primary anastomosis.

Salvage surgery can be performed as a simultaneous transanal and transabdominal laparoscopic two-team approach, which is especially helpful when making the *rendezvous*. The abdominal phase includes full mobilization of the splenic flexure to obtain additional length and meticulous dissection of the afferent colon toward the level of the pelvic inlet. Ureteric stents might be used, but the value seems limited in the presence of extensive fibrosis. The same holds true for ileoanal pouch redo surgery, where the abdominal approach is necessary to obtain sufficient length of the mesentery to make the pouch reach.

In case of redo anastomosis, the transanal phase can start with a purse string of the afferent colon. However, creating a purse string is less important in redo surgery compared with low anterior resection for rectal cancer because the surgical field is already contaminated, and a purse string will not prevent infection. The rectal cuff is incised distal of the anastomosis and the anastomosis is mobilized. It is important to stay close to the bowel wall because there is no mesorectum and surrounding structures along the ventral and lateral dissection planes (e.g., autonomic nerves, urethra) can easily be damaged. When the neorectum is fully mobilized and rendezvous with the abdominal dissection plane is achieved, the colon is exteriorized either via the anal canal or via a Pfannenstiel incision. The level of colonic transection is determined after assessing the perfusion and pliability of the tissue. Subsequently, a new anastomosis can be created, either handsewn or by a circular stapler, depending on the available length of the rectal cuff. Alternatively, a Turnbull-Cutait procedure can be performed with delayed anastomosis, particularly in the presence of urethral or vaginal fistula. In a Turnbull-Cutait delayed redo anastomosis, temporary sutures are placed, the colon is exteriorized through the anal canal, and after 7 to 10 days, the redundant colon is resected, and the anastomosis is completed. Delayed anastomosis might also be beneficial for a redo anastomosis after ultralow anterior resections. However, immediate coloanal anastomosis has better functional outcomes, when compared with delayed.[28]

A recent review on redo anastomosis for complicated colorectal or coloanal anastomoses showed a pooled 79% anastomotic integrity rate during follow-up with a 16% major complication rate.[44]

The major complication rate appears low, when compared with the individual cohort studies including only redo anastomosis for chronic pelvic sepsis (41% AL rate,[38] 40.6% morbidity rate[37]) and might be explained by the heterogeneity in indication for redo surgery. In a multivariable model, leakage of the redoCAA was the only risk factor for permanent stoma (OR 0.022; 95% CI 0.004 −0.122).[38]

A minimally invasive transanal approach in redo surgery can provide better access to the surgical field and debridement of the presacral space can be performed more complete. Transanal minimally invasive redo surgery compared with conventional treatment showed a restored continuity rate of 72 versus 61% and it was possible to make a stapled anastomosis more often (62 vs. 0%).[43] In addition, the transabdominal part of the operation could be done more often minimally invasive.

The transanal approach can also be used for many various surgical causes of pouch failure because of the superior accessibility. Considerations to perform a redo pouch or pouch excision are largely similar to treating a chronic sinus after rectal cancer surgery. However, patients receiving an IPAA for ulcerative colitis, FAP, or Crohn's disease are often younger, more fit for major salvage surgery, and might have a stronger wish to preserve the anastomosis and prevent a permanent stoma.

When performing a sleeve advancement of the pouch (e.g., for cuffitis), first, the mucosa is incised at the level of dentate line. Then, the dissection is continued proximally, until the affected area is incorporated, and the sleeve can be advanced without tension. The sleeve is then trimmed to excise the affected tissue and the new cuff is then sutured to the anoderm. When a sleeve advancement is likely to result in tension at the anastomotic site (e.g., larger defect than expected or chronic sinus), the pouch can be fully mobilized transabdominally and transanally. If possible, the pouch can be remodeled or a new pouch can be created and anastomosed to the anus. A combined abdominal and transanal approach enables optimal preservation of the pouch and surrounding structures due to the superior exposure and operative view, thereby preventing damage to the nerves and ureters.

Concluding Remarks

Early transanal closure of anastomotic defects after a short period of endoscopic vacuum therapy (EVASC) proved to be very successful in early salvage of anastomotic leaks of low coloanal, colorectal, and ileoanal anastomoses. Early diagnosis and initiation of vacuum therapy are crucial.

Redo surgery for chronic pelvic sepsis after total mesorectal excision surgery and for surgical causes of pouch failure is greatly facilitated by TAMIS enabling precise bottom-up dissection beyond the upper border of the prostate and the vesicles.

Conflict of Interest
None declared.

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