

# Management Of Chronic Pelvic Sepsis Complicating Rectal Cancer Surgery

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## 1. Abstract

Chronic pelvic sepsis following low anterior resection of rectum for cancer remains a clinical challenge. A better understanding of the pathophysiology and natural history may enable its prevention and better management. A literature search of studies on chronic pelvic sepsis complicating low anterior resection of rectum for cancer and the management were reviewed. Drainage of the sepsis and diversion is key. The results of the operative intervention depend upon the technique employed and have mostly favourable outcome. High rates of success can be achieved with surgical salvage of pelvic sepsis in dedicated referral centres. In well selected and motivated patients, restoration of continuity procedures such as the pull-through coloanal anastomosis demonstrated healed anastomosis with acceptable function in the majority. In patients with profound pelvic fibrosis abdominoperineal resection with a permanent stoma is the best option.

## 2. Introduction

Anastomotic leak is still a major problem in colorectal surgery. The incidence range between 3 - 25% indicating a multifactorial aetiology, heterogeneity and inconsistency in definition [1]. The effect depends upon whether it is a high anastomotic leak (intra-peritoneal) which usually presents as peritonitis, a low anastomotic leak (extraperitoneal) and the time of detection (early or late). A low anastomotic leak is more difficult to diagnose because of the sealing off by the pelvic inlet and contained leakage. Although it may have mild clinical consequences particularly in the presence of a defunctioning ileostomy it can lead to chronic pelvic sepsis. There is a significant proportion of patients (10-20%) with chronic pelvic sepsis following anterior resection of rectum for cancer [2]. It is disabling to the patient and treatment can be challenging. An extended Hartmann's procedure (< 2 cm above the pelvic floor) is occasionally useful in rectal resections because anastomotic, perineal, and functional problems are

eliminate. However, the occurrence of pelvic sepsis after this procedure is still high (18-20%), particularly with the narrow pelvis in males and 40% remained unhealed after a year [2].

## 3. Method

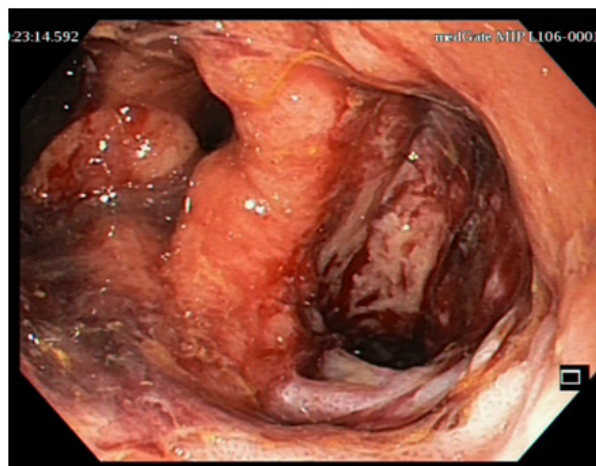
Electronic searches of the medline (PubMed) database, Cochrane library, and science citation index were performed to identify original published studies on chronic pelvic sepsis complicating low anterior resection of rectum for cancer and the management. Relevant articles were searched from relevant chapters in specialized texts and all included.

## 4. Pathophysiology and Natural History

Chronic pelvic sepsis presents sub-clinically from a silent or occult leak or as a missed small sinus when the stoma is reversed, or a reactivation leak after a year [3-6]. Most acute anastomotic leaks complicating low anterior resection of rectum for rectal cancer become chronic leaks and, is the commonest cause of chronic pelvic sepsis. The prevention of acute leaks becoming chronic leaks by endoscopic vacuum assisted surgical closure i.e. without excision of the anastomosis demonstrated a high success rate of 90% and, 100% for a redo anastomosis (restoration of continuity after resection of the leaking anastomosis or rectal stump of Hartmanns) [7]. The incidence of chronic anastomotic leak is about 13% in 30 days or overall 20% from delayed leaks [3]. Chronic leaks may also arise from late identification because of inadequate anastomotic assessment prior to stoma reversal. About 50% of chronic leaks that never heal become a sinus (figure 1) [3]. Patients who received radiotherapy for rectal cancer may present with late leaks after several years manifesting as a stricture overlapping with a sinus or chronic pelvic sepsis from soft tissue disintegration [7-9]. A chronic leak may be defined as an issue with the anastomosis after 1 year or fibrosis of the anastomosis after 3 weeks [8]. The prevalence of chronic pelvic sepsis is about 10% and, manifests as a sinus, fibrosis, complex

fistula, a major low anterior resection syndrome (LARS) or subsequent organ involvement such as urinary tract sepsis and mortality [3-5]. The sepsis spreads locally through routes of least resistance and the symptoms may vary from pain in the hips, back and pelvic pain to a life-threatening necrotizing fasciitis. Central sepsis may occur especially if there was superimposed

radiotherapy and disseminate into the sciatic notch causing sciatica and osteomyelitis. Chronic pelvic sepsis may also emanate from an abscess at the rectal stump of a low Hartmann's procedure as a result of dehiscence from ischaemia which may extend laterally to the hips or centrally fistulate into the vagina [2, 3-9]. Chronic pelvic sepsis can be more challenging to manage than the acute sepsis from an acute anastomotic leak [3, 8, 10]



**Figure 1:** Video endoscopic view of a chronic pelvic sinus in coloanal anastomosis few months after stoma reversal (with permission).

## 5. Clinical Assessment

The surgical management begins with a thorough assessment that includes a focused history and physical examination. The perianal area should be examined for signs of chronic irritation from seepage of purulent discharge, as well as skin (external) openings. The perianal area should be palpated for fluctuance or induration. A digital rectal examination (DRE) would indicate what the leak and pelvis feel like. It may reveal irregularities in the anastomosis related to the site of the leak or an internal opening, a stricture associated with sinuses which will influence management. Proctoscopy may be performed to visualize the entire anastomosis and purulent discharge from an anastomotic sinus. DRE may be limited by discomfort and examination under anaesthesia (EUA) would facilitate demonstrating a defect in the anastomosis with surrounding friable tissues. In the chronic situation it may appear as a small hole, typically located in the posterior mid-line and a flexible sigmoidoscopy is mandatory. A computed tomography (CT) scan of the pelvis with rectal contrast will confirm the diagnosis, but post evacuation films should always be obtained to avoid missing a leak if the catheter is placed beyond the anastomosis or the inflated balloon covers the anastomosis. It will also delineate the relation of the leak to the pelvic structures and help identify the size of the cavity. A CT scan with i/v contrast, will demonstrate active sepsis, vascularity of the colon, internal hernia, and a denuded colon that may have separated significantly. Magnetic resonance imaging (MRI) and MRI enema are good at identifying leaks not seen in contrast radiology, fibrosis and its location. CT and MRI of the pelvis can delineate the anatomy of the cavity or sinus tract and relationship to the pelvic floor musculature, sacrum and adjacent organs [10-12]. Anorectal manometry would provide data on anal sphincter strength and squeeze pudendal nerve function prior

to considering restoration of continuity especially when the expected anal function remains questionable and the patient wish to avoid a permanent stoma. Patients considered for restoration of continuity with redo anastomosis should undergo appropriate preoperative work-up to assess fitness for surgery. Due to the distortion of the anatomy in the re-operative pelvisinsertion of ureteral stents will decrease the rate of ureteral injury [13].

## 6. Treatment Options

Chronic anastomotic leaks are typically diagnosed by radiographic and endoscopic imaging during the preoperative assessment prior to defunctioning stoma reversal [1, 10, 14]. The operative strategy depends on the location of the anastomosis and the specific features of the anastomotic dehiscence. Low colorectal anastomosis following low anterior resection may require a transanal approach, transabdominal approach, or a combination. The outcome of the treatment options (tables 1, 2) may vary widely from achieving a restoration of continuity to the formation of a permanent stoma in order to maximize the quality of life [8, 14]. The options may be used singly or collaboratively. Conservative measures may include the instillation of fibrin glue into an anastomotic sinus tract with an initially reported 100% success rate [15], but these results have not been reproduced. It has been utilized in combination with other procedures such as negative pressure sponge dressing and stenting [16]. It carries minor risk and does not affect future surgical management. The application of the over-the scope clip is evolving and been broadened to include closing anastomotic leaks. Results of a small case series report an 86% success rate for chronic leaks [17, 18]. Marsupialization of the sinus tract is a more durable option with the goals of unroofing the cavity of the presacral abscess (the roof being the posterior wall of the colon) above the anastomosis and, debriding the cavity. This would facilitate healing by secondary

intention and eventual epithelialization. There are varying techniques with good success rates especially when used in combination with faecal diversion [10, 19, 20]. The drainage may be on-going in the radiated pelvis but since the cavity is wide open the sepsis should be limited. The defunctioning stoma may be closed after the cavity heals. A pelvic floor evaluation with anorectal manometry and MRI defaecography will give objective data on the potential poor functional outcome after stoma reversal [10]. Dilatation of stricture may help access the leakage in detail and relieve pain. It should be noted that the stricture may worsen over time depending on the extent of the leak.

The operative options may be quite formidable and highly complex. The rationale in the operative treatment is to (1) drain and divert the leak and, (2) resect and revise the anastomosis. In the former, local drainages can be used to manage leakage in selected patients without peritonitis who had been stoma reversed [21]. Endosponge vacuum-assisted drainage is successful with acute leaks after diversion with a defunctioning stoma [3, 8], but not effective for a chronic leak/sinus. In the latter, restoration of continuity will depend on the tissue environment. In patients in whom immediate reconstruction is not possible due to tissue quality and the inability to hold sutures, the delayed pull-through coloanal anastomosis of Turnbull-Cutait is mostly performed. The advantages are that it bypasses the troublesome area and fills the potential space. The prior anastomosis is resected along with the associated chronic abscess cavity. The colon is adequately mobilized to provide sufficient length with adequate perfusion to reach the anal canal. From a perineal approach, eight sutures are placed at the circumference at the anal canal to be used to create the anastomosis at a later time. The colon is pulled through the anal canal and a 6-8cm colonic stump is left in place transanally and wrapped in moist gauze. A diverting loop ileostomy may be created selectively. The second stage is performed 8- 10 days later at which time the exteriorized segment of colon is resected and a handsewn coloanal anastomosis completed using the previously placed absorbable sutures [10, 22-24]. A pull-through Turnbull-Cutait coloanal anastomosis has a good success rate and acceptable function without a permanent stoma in over 75% of patients [25-27]. Reasons for failure include faecal incontinence, ischaemic necrosis, recurrent rectovaginal or rectourethral fistula and anal stricture. Sharabiany S et al demonstrated a 100% control of pelvic sepsis in patients who received a revision of the anastomosis and, 95% for the non-restorative intersphincteric resection of the anastomosis or rectal stump. Restorative procedures resulted in a healed anastomosis with restored faecal stream in 68% of patients [8]. Minimally invasive techniques have been applied to the repair of chronic anastomotic leak such as transanal endoscopic microsurgery (TEMS)

and transanal minimally invasive surgery (TAMIS) [28, 29]. As GelPOINT Path Transanal Access Platform (Applied Medical) placed in the anal canal provides a clear view and exposure of the lower pelvis. Following rectal insufflation the surgeon has direct in-line view of the failed anastomosis. The application of the TAMIS technique has been shown to result in restoration of bowel continuity in 76% of patients [30]. Ablative procedures such as abdominoperineal resection (APR) of the rectum with a permanent stoma is required when the anastomosis cannot be salvaged because of profound pelvic fibrosis, extensive tissue destruction or in patients whose anorectal function is expected to be poor. Symptoms may persist even with a defunctioning stoma in place and, cancer surveillance may be challenging in the defunction colon. APR should be considered in patients who are fit. In the setting of chronic sepsis, the muscle flap is harvested from the rectus muscle and rotated on the epigastric pedicle to fill the deep space of the pelvis [31]. APR and a permanent end colostomy either with minimally invasive surgery (MIS), TEM or TAMIS have a high success rate in the treatment of chronic pelvic sepsis [10, 32]. Anal procedures alone such as a full-thickness lateral sphincterotomy may facilitate better drainage especially when pelvic sepsis complicates a pelvic exenteration. Adjuncts such as omentoplasty follow abdominoperineal resection. Pelviperineal wound complications frequently occur after salvage surgery for chronic pelvic sepsis despite using an omentoplasty. Sufficient perfusion of the omentoplasty following mobilization using fluorescence - indocyanine green angiography (ICG) is essential for proper healing [10, 33]. Although it is ultimately a benign disease process for highly selected patients with non-repairable fistula and debilitating, refractory symptoms, radical resection of the involved pelvic organs, soft tissues and bone may be the only option to control sepsis and improve quality of life. particularly with established osteomyelitis or if recurrence occurs within the radiation necrosis. Brown KGM, et al reported pelvic exenteration for refractory chronic fistulating pelvic sepsis after multimodal treatment of non-colorectal pelvic malignancy to be safe and effective in selected patients. However, although there was no intraoperative or postoperative mortality there was a major complication rate of 32% [34].

## 7. Conclusions

Managing chronic pelvic sepsis is challenging. Drainage of the sepsis and diversion is the key. The results of the operative intervention depend on the technique employed and have mostly favourable outcome. Major surgical options such as the pull-through coloanal anastomosis are generally successful with acceptable compromised function. The patient should be properly selected for the right procedure alongside the necessary preoperative work-up.

**Table 1:** Treatment options 1.

| OPTION                                        | RATIONALE                                                                                                                                                                  | RESULTS                                                                                                                                                                               | DISADVANTAGES                                                                                                                                                    |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FIBRIN GLUE</b>                            | <ul style="list-style-type: none"> <li>o Curettage of cavity tract</li> <li>o Occlude and fill tract cavity</li> </ul>                                                     | <ul style="list-style-type: none"> <li>o Good initial results</li> <li>o Not reproduced</li> <li>o Mostly ineffective (alone)</li> </ul>                                              | <ul style="list-style-type: none"> <li>o Few</li> <li>o Minor risk/low morbidity</li> <li>o Cost</li> </ul>                                                      |
| <b>OVER THE SCOPE CLIP</b>                    | <ul style="list-style-type: none"> <li>o Close mucosal aspect of defect</li> <li>o Obliterate tract/ cavity</li> </ul>                                                     | <ul style="list-style-type: none"> <li>o 4/5 “success”</li> <li>o Low morbidity</li> <li>o Small case series</li> </ul>                                                               | <ul style="list-style-type: none"> <li>o Access to deploy device</li> <li>o Appropriate placement?</li> </ul>                                                    |
| <b>MARSUPIALISATION OF SINUS TRACT/CAVITY</b> | <ul style="list-style-type: none"> <li>o “Deroof” cavity</li> <li>o Debridement &amp; Drainage</li> <li>o Facilitate healing</li> </ul>                                    | <ul style="list-style-type: none"> <li>o Mostly posterior midline</li> <li>o Various techniques: Stapler/energy</li> <li>o Favourable healing</li> <li>o Small case series</li> </ul> | <ul style="list-style-type: none"> <li>o Uncertain function post reversal</li> <li>o Case selection</li> <li>o How to best decide on resulting cavity</li> </ul> |
| <b>STRICTURE DILATATION</b>                   | <ul style="list-style-type: none"> <li>o Therapeutic alone</li> <li>o Adjunctive</li> <li>o Facilitate drainage</li> <li>o Pain relief</li> <li>o Assess cavity</li> </ul> | <ul style="list-style-type: none"> <li>o favourable</li> </ul>                                                                                                                        | <ul style="list-style-type: none"> <li>o unclear length clinically</li> <li>o disruption</li> <li>o repeated treatment</li> </ul>                                |

**Table 2:** Treatment options 2.

| OPTION                                                                                                                                                                                                     | RATIONALE                                                                                                                                                                                                                                                                                     | RESULTS                                                                                                                                          | DISADVANTAGES                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Operative intervention</b>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>• Diversion &amp; Drainage</li> <li>• Resect &amp; Revise</li> <li>• Stepwise after failed local control</li> <li>• Tissue “environment” guides options</li> <li>• Avoid unsuitable surgery/early identification of options/mitigate extent</li> </ul> | <ul style="list-style-type: none"> <li>• Depends on technique employed: mostly favourable outcomes</li> </ul>                                    | <ul style="list-style-type: none"> <li>• Extent &amp; relations of pelvic fibrosis in post leak pelvis</li> <li>• Pelvic compliance/volumetrics</li> <li>• Objective function determination</li> <li>• Extensive assessment/investigation</li> </ul>                                                    |
| <b>RESTORATIVE:</b><br>Pull-through procedures <ul style="list-style-type: none"> <li>• Soave- long mucosectomy-immediate</li> <li>• CAA (Park’s)/ immediate</li> <li>• Turnbull-Cutait-delayed</li> </ul> | <ul style="list-style-type: none"> <li>• Bypass troublesome area</li> <li>• Fill the potential space</li> <li>• Account for poor tissue quality-bring healthy to unhealthy</li> <li>• minimise surgical stress-minimally invasive surgery (MIS)</li> </ul>                                    | <ul style="list-style-type: none"> <li>• high success rates</li> <li>• high rates of stoma avoidance</li> <li>• ‘acceptable’ function</li> </ul> | <ul style="list-style-type: none"> <li>• Small case series</li> <li>• Higher conversion rate with MIS</li> <li>• Insufficient colonic length in redo surgery; may still require DLI</li> <li>• Conduit ischaemia/known risk factors; permanent stoma risk; ureteric stenting may be required</li> </ul> |
| <b>ABLATIVE:</b><br>Abdomino-perineal resection                                                                                                                                                            | <ul style="list-style-type: none"> <li>• resect sinus/cavity</li> <li>• poor pelvic floor function/destruction/extensive fibrosis</li> <li>• can be MIS-TEM/TAMIS</li> </ul>                                                                                                                  | <ul style="list-style-type: none"> <li>• high success rates; supplemented by plastic flaps to fill dead space</li> </ul>                         | <ul style="list-style-type: none"> <li>• permanent stoma</li> <li>• pelvic autonomic injury/ pelvic structures injury</li> <li>• recurrent pelvic sepsis</li> </ul>                                                                                                                                     |

|                             |                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                           |                                                                                                                                                                                 |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>ANAL POCEDURES ALONE</b> | <ul style="list-style-type: none"> <li>optimize drainage with sphincter division when anus left after proctectomy/wide disruption/pelvic sepsis/part of staged approach</li> <li>post low Hartmanns</li> <li>proctectomy leaving anus-rare</li> <li>supralevator/excision-when restoration not planned/suitable</li> </ul> | <ul style="list-style-type: none"> <li>poor historic results</li> <li>few recent reports</li> <li>heterogeneous-groups</li> <li>HIP Study-rectal ca; low Hartmanns/ palpable staple line i.e. low- 10% pelvic abscess</li> <li>Potential need in such patients</li> </ul> | <ul style="list-style-type: none"> <li>Proximity of small bowel/fistulation</li> <li>May require later procedure</li> <li>No recent consecutive series in literature</li> </ul> |
| <b>ADJUNCTS</b>             | <ul style="list-style-type: none"> <li>additional manoeuvres to reduce dead/potential space</li> <li>omentoplasty</li> <li>flaps</li> </ul>                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Omentoplasty concerns in APER</li> </ul>                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Few data</li> <li>Mobilization and perfusion etc</li> <li>What is a sufficient omentum?</li> </ul>                                       |

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