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Chapter 13



13

Intersphincteric completion proctectomy with omentoplasty for chronic presacral sinus after low anterior resection for rectal cancer

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Abstract

Aim:

This study aimed to determine the clinical outcome of salvage surgery without restoring continuity for symptomatic chronic presacral sinus after low anterior resection (LAR) for rectal cancer.

Methods:

Out of a prospective cohort of 46 patients with chronic presacral sinus (>1 year after LAR), 27 underwent completion proctectomy with omentoplasty between January 2005 and July 2014.

Results:

The initial treatment for rectal cancer included neoadjuvant radiotherapy in 26 (96%) patients. Besides a chronic presacral sinus, a secondary fistula was present in 15 (56%) patients. Definitive salvage surgery was performed after a median of 40 (12-350) months from the primary resection. The median hospital stay after single and multiple-stage salvage surgery was 11 and 17 days. Postoperative complications occurred in 44% of patients. Re-intervention rate was 33% with a range of 1 to 10 interventions per patient. During a median follow-up of 20 (4-45) months from salvage surgery, healing of the chronic presacral sinus occurred in 78% of patients, with a healing rate after single and multiple-stage procedures of 88% and 64% respectively ($p=0.19$).

Conclusion:

Patients with a symptomatic chronic presacral sinus after LAR for rectal cancer, in whom restoration of continuity is not intended, can be effectively managed by completion proctectomy with complete debridement of the sinus and fistula tracts followed by an omentoplasty to fill the presacral cavity, preferably as a single stage procedure.

Introduction

Anastomotic leakage is one of the most dreaded complications of low anterior resection (LAR). A diverting loop ileostomy reduces the risk of a symptomatic leakage, but subclinical leaks can occur and may be diagnosed or become symptomatic well after the initial postoperative period.^{1,2} Anastomotic leakage after LAR is often treated with a defunctioning stoma if not already in place, combined with drainage of the presacral abscess via a trans-abdominal, trans-anal or percutaneous approach. A diverted anastomosis does not always heal, however, despite adequate exclusion of faeces and drainage and a chronic presacral sinus may develop.

The reported incidences of chronic presacral sinus of a few percent may be an underestimate of this difficult clinical problem.^{3,4} The increased use of neo-adjuvant radiotherapy is likely to reduce the rate of secondary healing after anastomotic leakage, because of its impact on wound healing.^{5,6} As a result, fewer stomas will be reversed with a subsequent impact on morbidity and quality of life. Up to 20% of defunctioning stomas after LAR are never reversed.⁶ Furthermore, secondary complications of a chronic presacral sinus, such as fistula formation and necrotizing fasciitis, may occur.^{3,7,8}

Based on our initial experience with salvage surgery for chronic presacral sinus, basic treatment principles were defined to increase the success rate.⁹ As a result an increasing numbers of patients with a complicated chronic presacral sinus have been referred to our academic hospital. For most of these patients, restoring continuity is no longer achievable or advisable. The purpose of the present study was to determine the outcome in the group of patients who had developed a chronic presacral sinus and who were then treated by completion abdominoperineal proctectomy with end colostomy and complete filling of the presacral cavity by an omentoplasty.

Methods

All 46 consecutive patients with a chronic presacral sinus after LAR for rectal cancer between January 2005 and July 2014 at our university hospital were prospectively registered in a database. A chronic presacral sinus was defined as a sinus diagnosed at least one-year after primary LAR. The presence and features of the sinus were investigated by radiological imaging and/or endoscopy (Figure 1). The initial cohort

of 22 patients included up to March 2012 has already been described in a previous study.⁹

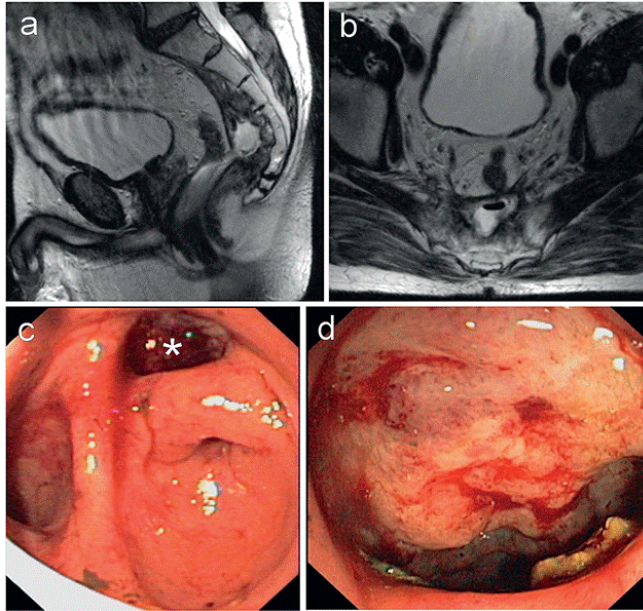


Figure 1 Presacral sinus

Sagittal (a) and transverse (b) image of a pelvic MRI, showing a colorectal anastomosis in connection with a presacral sinus. Endoscopic image (c) of a side-to-end colorectal anastomosis with a posterior located defect (), which is the entrance to the presacral sinus (d).*

The chronic presacral sinus was symptomatic in all 46 patients with one or more of the following symptoms: continuous purulent discharge from the anus and/or fistula tracts, urinary or faecal discharge from fistula tracts, sacral pain, pain radiating to the leg, difficulty in sitting and/or walking, chronic anaemia, the need for daily anal irrigation, the need for use of a pad, impaired physical condition with the inability to perform daily activities or being confined to bed. A sinus-related fistula was defined as having one or more tracks originating from the presacral sinus either with an external opening in the perianal area, the gluteal region or at the level of the major trochanter of the femur (Figure 2) or with a communication to an adjacent organ such as the bladder or small bowel. Emergency presentations were mostly related to fistula tracts along the piriformis muscles with abscesses in the buttocks or legs, potentially giving rise to necrotizing fasciitis (Figure 3).

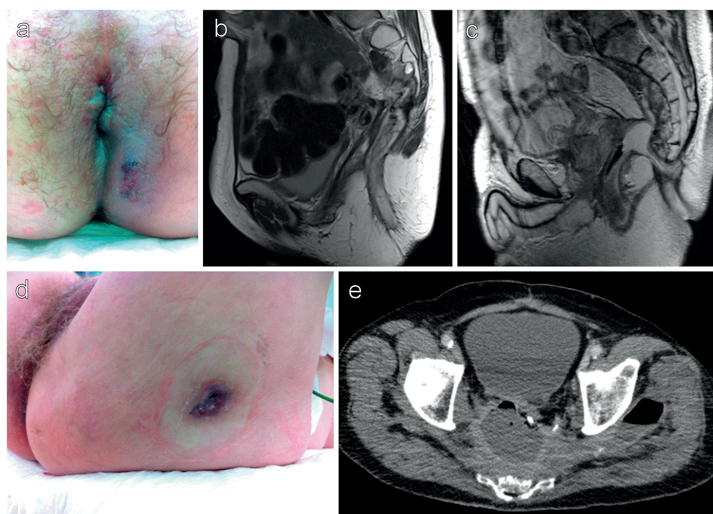


Figure 2 Two main types of fistula's originating from a chronic presacral sinus

Two main types of fistula's originating from a chronic presacral sinus: a gluteal fistula (a) with sagittal MRI images showing the gluteal fistula tract in two other patients (b, c), and a trochanteric fistula (d) with a fistula tract/abscess along the piriformis muscle as shown on a transverse CT image (e).

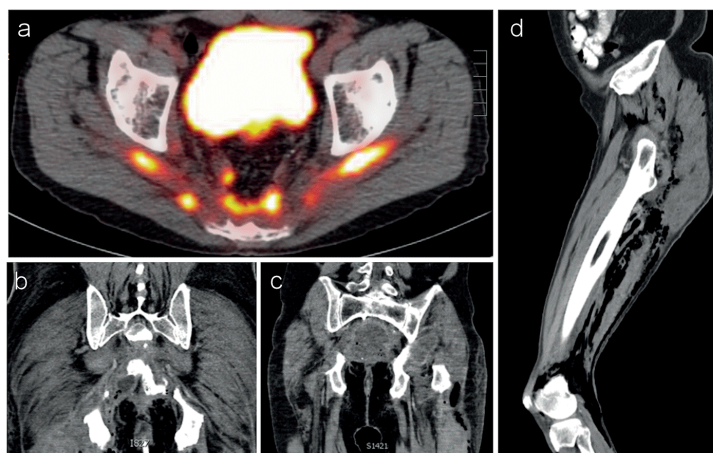


Figure 3 Extension of infection from a chronic presacral sinus along the piriformis muscles

Extension of infection from a chronic presacral sinus along the piriformis muscles as shown by PET-CT imaging (a) with the risk of subsequent soft tissue infiltration including air bubbles in the right gluteal (b) and left trochanteric (c) area as demonstrated by coronal CT images of two other patients, which may result in necrotizing fasciitis of the leg as demonstrated by a sagittal CT image of a fourth patient (d).

Based on our initial experience, we defined basic treatment principles consisting of either constructing a new anastomosis or intersphincteric completion proctectomy end colostomy and filling of the presacral cavity.⁹ For the purpose of the present study, the subgroup of patients who underwent single or multiple-stage salvage surgery including completion proctectomy and omentoplasty were selected from the enlarged cohort of 46 patients with extended follow-up. We further optimized the approach of salvage surgery based on monitoring of our results.⁹

In our initial experience, a trans-perineal intersphincteric completion proctectomy without abdominal exploration was performed where the anastomosis had already been dismantled and an end-colostomy had been formed. Even if an omentoplasty had been performed at the time of leakage of the anastomosis (Figure 4), resecting the rectal stump only was associated with a high risk of persisting presacral abscess formation. In such multiple stage procedures, the omentum does not completely fill the presacral cavity and, an additional abdominal exploration is

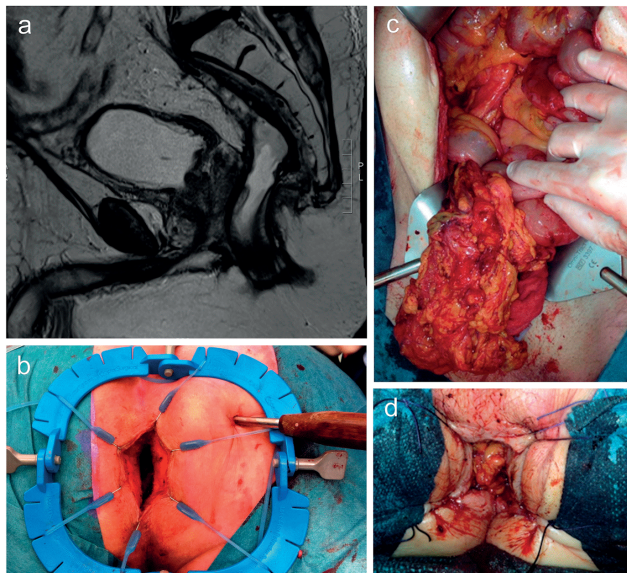


Figure 4 Persisting infectious problems after dismantling of the anastomosis and omentoplasty, but with the rectal stump still being in situ

Persisting infectious problems after dismantling of the anastomosis and omentoplasty, but with the rectal stump still being in situ as shown on sagittal MRI (a). Intersphincteric completion proctectomy with debridement of a gluteal fistula (b). Omentoplasty mobilized along the splenic hilum and greater curvature of the stomach, with the right gastroepiploic artery as feeding pedicle, tunnelled beneath the transverse colon and terminal ileum to the pelvic cavity (c). 'Pull-trough' omentoplasty visible within the external sphincter after intersphincteric resection of the rectal stump (d).

subsequently required to mobilize the omentum and bring it down to the level of the external sphincter as a 'pull through' procedure. Alternatively it may be necessary to use a muscle transposition flap. We therefore modified our surgical strategy to a one stage abdominoperineal approach with simultaneous resection of the disrupted anastomosis including the rectal stump, debridement of the sinus and fistula tracts, and a 'pull through' omentoplasty (Figure 4).

Data collection

Patient and treatment characteristics were retrospectively collected from patient records.

Operation reports, pathology reports, endoscopic reports, radiology reports and patient charts were searched for demographics, primary treatment characteristics, tumour characteristics, symptoms related to the presacral sinus, secondary complications, hospital stay, preceding interventions or re-interventions (radiological, endoscopic and surgical), and disease status at the last date of follow-up. The primary endpoint was healing of the sinus and secondary fistula tracts. Healing was defined as the absence of discharge and symptoms related to a persisting presacral sinus during follow-up. Healing rate of a one-stage abdominoperineal approach was compared with multiple-stage salvage procedures.

Statistical analysis

The median with range or interquartile range (IQR) was used to express non-parametric data. Categorical data were analysed using the Fisher's exact test and continuous variables were analysed using the Mann-Whitney-Wilcoxon test. All analyses were performed with IBM SPSS Statistics, version 20.0.0 (IBM Corp., Armonk, NY, United States). The Institutional Review Board (IRB) declared exemption from approval for this study.

Results

Patients

Twenty-seven patients with a chronic presacral sinus after LAR for rectal cancer underwent single or multiple stage salvage surgery including completion proctectomy, debridement of the sinus and fistula tract(s) if present, and cavity filling using

an omentoplasty (Table 1). Thirteen of the 27 had been described in our previous report⁹, but four of these had undergone further surgery since the publication because of non-healing of the sinus. The details of the remaining 19 patients, who were excluded for the present analysis, are summarized in Table 2.

Table 1 Demographics of 27 patients treated for presacral sinus after low anterior resection.

		n=27
Gender	Male (%)	17 (63)
Age	Median age (years, IQR)	66 (59-72)
Comorbidity	Smoker (n, %)	3 (11)
	Diabetes Mellitus (n, %)	2 (7)
Referral	Number of patients referred (n, %)	23 (85)
	Median time between primary surgery and referral (months, IQR)	32 (18-71)
Neoadjuvant radiotherapy	Short course 5x5 Gy (n, %)	21 (78)
	Long course with concomitant chemotherapy (n, %)	5 (19)
	No radiotherapy (n, %)	1 (4)
Low anterior resection (LAR)	Laparoscopic surgery (n, %)	11 (41)
	Primary anastomosis with diverting ileostomy (n, %)	19 (70)
	Primary anastomosis with diverting colostomy (n, %)	3 (11)
	Primary anastomosis without faecal diversion (n, %)	5 (19)
	Side to end anastomosis (n, %)	15 (56)
	End to end anastomosis (n, %)	6 (22)
	Unknown type of anastomosis (n, %)	6 (22)
	Clinical signs of an anastomotic leakage (n, %)	10 (37)
Primary tumour pathological stage	Other postoperative complications ^a (n, %)	5 (19)
	yp T ₀₋₂ (n, %)	10 (37)
	yp T ₃₋₄ (n, %)	17 (63)
	yp N ₀ (n, %)	17 (63)
	yp N ₊ (n, %)	10 (37)
	yp M ₀ (n, %)	27 (100)
	Median tumour distance from anal verge (cm, IQR)	6 (4-8)
	Median tumour size (cm, IQR)	3 (2-4)
Adjuvant therapy	Chemotherapy (n, %)	5 (19)
Time interval	First sign of presacral abscess after LAR (months, IQR)	1 (0-32)

Data are expressed as median with interquartile range (IQR) or percentage. a= abscess (n=2), urinary tract infection (n=1), postoperative bleeding (n=1), and surgical site infection (n=1).

Initial treatment for rectal cancer included neo-adjuvant (chemo)radiotherapy in 26 (96%) patients. In 10 (37%) of the 27 patients anastomotic leakage occurred in the early postoperative period. Overall, the median interval from the operation to the diagnosis of anastomotic leakage was one (0-32) month. The anastomoses had

been diverted in all patients during the period between LAR and salvage surgery, by primary diverting stoma in 23 and a secondary diverting stoma in four. The diverting stoma was still *in situ* at the time of salvage surgery in 17 of the 27 patients. In total, 23 of 27 (85%) patients were referred with a median time between diagnosis of anastomotic leakage and referral of 17 months (IQR 10-38).

Table 2 Patients with chronic presacral sinus not included in the present analysis

Bowel continuity or stoma	Management	n=19
Restored bowel continuity	<i>Repeated colo-anal anastomosis</i>	10
	<i>Observation, old anastomosis in situ, patient refused further surgery</i>	2
Diverting ileostomy	<i>Observation, old anastomosis in situ, mild symptoms, patient refused further surgery</i>	1
	<i>Observation, old anastomosis in situ, Endo-sponge,</i>	1
End-ileostomy	<i>Observation, patient condition does not allow for further surgery</i>	1
End-colostomy	<i>Observation, patient went back to referring hospital</i>	1
	<i>Observation, patient refuses further surgery</i>	1
End-colostomy with stapled efferent loop in situ	<i>Observation, patient has mild symptoms and refuses further surgery</i>	1
Other	<i>Marsupialization</i>	1

Presacral sinus and salvage surgery

All patients had a chronic presacral sinus associated with the anastomotic defect and an additional fistula originating from the presacral sinus had developed in 15 (56%) of the 27 patients, including a fistula to the perineum (n=4), the gluteal or trochanteric region (n=6), the small bowel (n=3), the large bowel (n=1) and the bladder (n=1). Other secondary complications related to the chronic presacral sinus consisted of hydronephrosis due to fibrosis around the ureter (n=2), significant anal blood loss (n=1) and sepsis (n=1). Interventions that had been performed before salvage surgery are summarized in Table 3.

The median interval between primary LAR and salvage surgery for symptomatic chronic presacral sinus was 40 (12-350) months. Salvage surgery was performed as a single stage abdominoperineal procedure in 16 (59%) of 27 patients and as a multiple stage procedure in 11 (41%) patients. The rate of single stage salvage procedures increased from 5 of 13 (38%) patients up to March 2012, to 11 of 14 (79%) patients since (p=0.03). Salvage surgery was open in 22 patients and hand assisted laparoscopic combined with open surgery through a Pfannenstiel incision in five patients.

Table 3 Interventions preceding salvage surgery

		N=27
Surgical interventions	Per patient (n, range)	2 (0-4)
All interventions performed ^a	Per patient (n, range)	3 (0-22)
Endoscopic	Endo-sponge [*] treatment (n)	3
Radiological	Percutaneous drainage (n)	8
	Percutaneous nephrostomy (n)	14
Surgery	Trans anal drainage (n)	9
	Closure of diverting ileostomy (n)	15
	Closure of diverting colostomy (n)	8
	Diverting colostomy (n)	18
	Diverting ileostomy (n)	5
	Diverting jejunostomy (n)	1
	Sigmoid resection (n)	1
	Abscess drainage (n)	18
	Muscle flap (n)	2
	New colo-anal anastomosis (n)	1
	Lords Procedure (n)	1
	Resection of rectal stump (n)	1
	Coccyx resection (n)	1
	Segmental ileum resection (n)	2
	Debridement necrotizing fasciitis (n)	1
	Abdominal wall closure (n)	1
	Appendectomy ^b (n)	1
Other	Hyperbaric oxygen therapy (n)	1

Data are medians with range or number of interventions a=more than one procedure could be performed during the same operation. b=inflamed due to presacral infection.

Outcome

The median hospital stay was 13 (IQR 8-17) days. It was 11 (IQR 8-14) days for one-stage procedures and 17 (IQR 11-21) days for multiple stage procedures (p=0.09). One patient was admitted to the intensive care unit for 37 days due to postoperative sepsis and respiratory failure. Another patient was readmitted at the referring hospital after an uncomplicated postoperative course and died due to sepsis of unconfirmed origin 32 days after single stage salvage surgery. Overall, 15 postoperative complications occurred in 12 (44%) of the 27 patients. These consisted of abdominal wound infection (n=4), urinary retention (n=2), acute renal failure (n=1), ileus (n=1), delirium (n=1), respiratory insufficiency (n=1), pneumonia (n=1), small bowel perforation (n=1), gastroparesis (n=1), urinary tract infection (n=1), and urosepsis (n=1). The perineal wound was left to heal by secondary intention in all patients.

In nine patients further surgical and non-surgical re-interventions were required in 20 and seven patients (Table 4). An autologous tissue flap was performed after failed omentoplasty in three patients. The first underwent completion exenteration because of a bladder fistula with filling of the wound by a superior gluteal artery perforator (SGAP) fasciocutaneous transposition flap.¹⁰ In the second, a vertical rectus abdominus muscle (VRAM) flap was performed and in the third a gracilis and VRAM flap both failed and a subsequent gluteal VY plasty resulted in healing of the presacral sinus.

Table 4 Re-interventions after intersphincteric APR with omentoplasty

			N=27
Surgical re-interventions	<i>Percentage of patients</i>		19%
	<i>Total number per patient (range)</i>		1-7
All re-interventions ^a	<i>Percentage of patients</i>		33%
	<i>Total number per patient (range)</i>		1-10
<i>Endoscopic</i>	<i>Endo-sponge^a treatment (n)</i>		1
<i>Radiological</i>	<i>Percutaneous drainage (n)</i>		4
<i>Surgery</i>	<i>Surgical drainage (n)</i>		4
	<i>Fistula excision (n)</i>		2
	<i>Revision end colostomy (n)</i>		4
	<i>Muscle flap (n)</i>		4
	<i>Removal of muscle flap (n)</i>		2
	<i>Debridement sinus (n)</i>		1
	<i>Bladder excision (n)</i>		1
	<i>Ureter-jejuno-cutaneostomy^b (n)</i>		1
	<i>Ileo-coecal resection^c (n)</i>		1
<i>Other</i>	<i>VAC therapy (n)</i>		1
	<i>Hyperbaric oxygen therapy (n)</i>		1

VAC=vacuum assisted wound closure. APR=abdominoperineal resection. a= more than one procedure could be performed during the same operation. b= for ureter stenosis. c= due to stenosis resulting in ileus.

The median follow-up from salvage surgery was 20 months (IQR 4-45). Successful closure of the presacral sinus occurred in 21 (78%) of 27 patients after a median of four (IQR 1-31) months. This occurred in 14 (88%) of 16 patients when a one-stage procedure was performed and in 7 (64%) of 11 patients after multiple-stage surgery (p=0.19). The sinus eventually healed in all three patients undergoing an autologous tissue flap after failed omentoplasty. Of the 15 fistulas originating from the presacral sinus, all except for one were healed at the end of follow-up.

Discussion

Chronic presacral sinus after LAR for rectal cancer is a complex problem with a risk of secondary complications if not treated appropriately.⁹ Growing experience in salvage surgery for the condition at our institute has improved the results. In patients in whom restoration of continuity was no longer possible, perineal wound healing was achieved in 78% of patients by intersphincteric resection of the anorectal stump and filling of the presacral cavity with well-vascularized tissue. When this was performed as a single-stage abdominoperineal procedure, healing occurred in 88%.

Pain and bowel dysfunction may indicate the presence of a chronic presacral sinus, but often remain misinterpreted until pelvic imaging is performed or a secondary fistula has arisen. Initial management at the referring hospital mostly consisted of faecal diversion and drainage (Table 3). These measures may reduce symptoms but do not result in healing because of fibrosis due to the long-lasting pelvic inflammation and prior radiotherapy.^{11,12} Radiotherapy is probably the major factor preventing healing despite defunctioning, giving rise to complication as long as 30 years after the initial treatment. All but one patient in the present series had had neo-adjuvant radiotherapy. In recent years, patients were often referred much earlier as we became a national referral centre for such low volume revision surgery, which explains the increase from 38% to 79% in the proportion of referrals having salvage surgery. Early aggressive surgery seems justified, because of the high success and acceptable complication rate, given the complexity of the condition.

This presacral dead space after removal of the anorectal stump in an irradiated pelvis will only heal by filling it with well-vascularized tissue. Myocutaneous flaps such as the VRAM flap and gracilis flap have been described for this purpose^{9,13}, but they may cause morbidity at the donor site and can undergo necrosis.¹³ For this reason omentoplasty was preferred. The omentum is well-vascularized and outside the field of irradiation; it improves the local immune response and promotes angiogenesis, increasing the chance of healing.¹⁴⁻¹⁶ In addition omentoplasty prevents prolapse of small intestine into the pelvis, which may decrease the risk of obstruction or fistula formation. Filling of the pelvic cavity by an omentoplasty can be difficult in thin patients or when an omentoplasty has already been placed on to the rectal stump at the time of dismantling the anastomosis. The omentum then needs to be mobilized and brought down to the pelvic floor, usually requiring

complete mobilization along the greater curvature of the stomach to achieve additional length. Bringing it through the mesentery results in the shortest route to the pelvis (Figure 4).

The study is limited by the small number of patients, despite it being the largest published cohort of such patients to our knowledge. There is also a large element of selection bias whereby owing to the severity of their condition, the patients referred may not be representative of the whole population of chronic presacral sinus some of whom may be asymptomatic. In some cases with minor symptoms minimally invasive treatment such as fibrin glue injection along the track or stapler marsupialization have been reported to have a success rate in the short term.^{17,18} Clearly adequate follow-up in such patients is required, because secondary complications may occur even several years later.

In conclusion, a chronic presacral sinus may become a serious septic clinical problem almost exclusively in radiated patients. When restoration of continuity is not intended and the sinus is symptomatic or associated with secondary infection, there is a high chance of successful closure after a one-stage abdominoperineal intersphincteric completion proctectomy, debridement of the sinus and omentoplasty. If the omentoplasty fails, various plastic flap procedures are available. The complexity of this rare long-term complication requires centralized treatment in a specialist colorectal unit.

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