Surgical treatment of perianal and rectal fistula
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Chapter 9

*The persisting presacral sinus following anastomotic leakage after anterior resection: incidence and outcome*

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ABSTRACT

Background
Despite improvements of anastomotic techniques and specialised surgery, anastomotic leakage is still frequently encountered following anterior resection. Anastomotic leakage of a low anterior resection can eventually evolve into a presacral sinus. This study assesses the incidence, the natural course and outcome of the persisting presacral sinuses resulting from anastomotic leakages.

Methods
In a two-center retrospective study, all consecutive patients who underwent anterior resection for cancer or restorative proctocolectomy for ulcerative colitis or familial poliposis were eligible. Patients with an anastomotic leakage or presacral abscess were included in this study. Primary outcome parameters were the incidence of persistent presacral sinuses, the closure rate of these sinuses, the average time to closure and the rate of successful closure of the ostomy.

Results
Between 1997 and 2007, 25 patients (M:F=14:11) had an anastomotic leakage complicated by a presacral sinus after low anterior resection (n=20) or a restorative proctocolectomy (n=5). Definitive resolution of the sinus occurred in 12 out of 25 patients (52%). This was achieved in a median of 340 days (range 23-731). In the malignant group in 10 patients (56%) the treatment was successful compared to three out of five patients (60%) in the benign group (p=1.000). At final follow-up, nine of the 23 patients had permanent fecal diversion due to recurrent abscesses or a persistent sinus, seven after low anterior resection and two after restorative proctocolectomy.

Conclusions
A significant part of patients with anastomotic leakage after low anterior resection or restorative proctocolectomy develop a chronic sinus of which only half heal over time. The persisting sinuses are the main cause of a permanent ostomy in these patients. Since treatment of the persistent sinus is difficult, all effort should be directed to the prevention of the development of the sinus once the anastomotic leakage has been established.
INTRODUCTION

Despite improvements of anastomotic techniques and specialised surgery, anastomotic leakage is still frequently encountered following anterior resection. Considerable morbidity and even mortality can result from anastomotic leakage.1−4 Mostly a surgical reintervention is required demanding dismantling of the anastomosis or defunctioning by performing a loop ileostomy to treat imminent abdominal sepsis. Presacral abscesses might develop as result of a sealed leakage, in the presence of a defunctioning ileostomy with preserved anastomosis or as a result of an infected hematoma perforated through the low anastomosis. Surgical or non-surgical drainage is mostly required and is characterised by long term drainage and increased hospital stay.2 When the acute sinus does not heal, a chronic sinus will develop which delays or even precludes ostomy closure. When the sinuses eventually resolves and ostomy closure is possible, the function of the neorectum is often jeopardized by the fibrosis due to the chronic inflammation.5 It is unknown what the incidence is of these chronic presacral sinuses as a late complication of anastomotic failure, and it is unknown how many of these sinuses resolve over time.

The object of the present study is to assess the incidence, the natural course and outcome of the persisting presacral sinuses after anterior resection for rectal malignancy and after restorative proctocolectomy for ulcerative colitis or familial poliposis.

METHODS

Patients

In a two center retrospective study, all consecutive patients who underwent anterior resection for cancer or restorative proctocolectomy for ulcerative colitis or familial poliposis were eligible. Patients with an anastomotic leakage and presacral abscess were included in this study. Anastomotic leakage was generally detected by CT scan which was done on clinical suspicion of anastomotic leakage. Patients with generalised peritonitis were managed by relaparotomy. Anastomotic dehiscence of the low colorectal, coloanal or pouch anal anastomosis was defunctioned by a loop ileostomy and the abdominal cavity was lavaged. Dismantling of the low anastomosis
was generally not done, because the height of the anastomosis precluded future restoration of the continuity. In the absence of peritonitis and a sealed presacral abscess, the abscess was drained transanastomotically or percutaneously.

Primary outcome parameters were the incidence of persistent presacral sinuses, the closure rate of these sinuses, the average time to closure and the rate of successful closure of the ostomy. Closure of the abscess cavity was assessed by endoscopy, CT scan or by double contrast study of the colon.

Data collection

Retrospectively, patients’ charts were reviewed and data was extracted on demographic data, Body Mass Index (BMI), pre-operative chemo and/or radiotherapy, type and indication of surgery (possible diverting ileostomy/colostomy), level of anastomosis, time till closure abscess cavity, 30-day morbidity and mortality, post-operative hospital stay, readmissions, and amount of reoperations.

Statistical analysis

Continuous data are presented as median values (range) unless otherwise specified. Categorical data are presented as frequencies or percentages. For the comparison of categorical variables, the Chi-squared or Fisher exact test was used. A p-value of 5% or lower was considered statistically significant. Statistical analysis was done using the SPSS version 15.0.1 for Windows (SPSS, Chicago, Illinois, USA).

RESULTS

Between January 1997 and 2007, 834 patients underwent a low anterior resection (LAR) for malignant disease and 229 patients had a restorative proctocolectomy for ulcerative colitis or familial poliposis with ileoanal pouch anastomosis. From this group, 69 (7%) patients had an anastomotic leakage which required a reintervention, 46/834 after LAR and 23/229 after restorative proctocolectomy (Figure 9.1). In 25 of these 69 patients (36%) a presacral sinus was found at a median of 10 days after surgery (range 3-79). In the pouch group, five out of the 23 (22%) patients with anastomotic leakage developed a presacral abscess. Twenty of the 46 (43%) patients

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Persisting presacral sinus following anastomotic leakage with anastomotic leakage after LAR presented with a presacral abscess (Table 9.1). In the majority of the cases (n=20), a contrast CT scan was used to diagnose the anastomotic leakage. In one patient the leakage was discovered by flexible endoscopy. In two patients a double contrast study of the colon established the diagnosis. In two patients a reoperation was performed based on clinical judgment. In all patients a diverting ostomy was constructed after discovery of the leakage if this had not been done during the initial surgery. In two patients (LAR group) the anastomosis was dismantled and an end colostomy was fashioned and these patients were excluded from the analysis.

January 1997-2007
AMC, Amsterdam
Gelre Hospitals, Apeldoorn

TME resections n = 834
Anastomotic leakage n = 46
Presacral abscess n = 20
Abscess cavity closed n = 10
Chronic sinus n = 8
Stoma closed n = 9
Definite stoma n = 9 / 23

IPAA n = 229
Anastomotic leakage n = 23
Presacral abscess n = 5
Abscess cavity closed n = 3
Chronic sinus n = 2
Stoma closed n = 2
Stoma closed n = 3

Figure 9.1 – Flow chart. TME=Total Mesorectal excision, IPAA=Ileal Pouch-Anal Anastomosis

Percutaneous drainage, ultrasound or CT guided, was done in four patients in the
## Characteristics of patients with a presacral abscess

<table>
<thead>
<tr>
<th>Variable</th>
<th>N=25</th>
</tr>
</thead>
<tbody>
<tr>
<td>M:F</td>
<td>14:11</td>
</tr>
<tr>
<td>Age (median in years)</td>
<td>58 (23-68)</td>
</tr>
<tr>
<td>Indication for surgery</td>
<td></td>
</tr>
<tr>
<td>Benign</td>
<td>5</td>
</tr>
<tr>
<td>Malignancy</td>
<td>20</td>
</tr>
<tr>
<td>BMI (kg/m², median, range)</td>
<td>26 (19-31)</td>
</tr>
<tr>
<td>Preoperative treatment</td>
<td></td>
</tr>
<tr>
<td>Radiotherapy</td>
<td>12</td>
</tr>
<tr>
<td>Chemoradiation</td>
<td>1</td>
</tr>
<tr>
<td>Type of surgery</td>
<td></td>
</tr>
<tr>
<td>Open</td>
<td>22</td>
</tr>
<tr>
<td>Laparoscopic</td>
<td>3</td>
</tr>
<tr>
<td>Anastomosis level (cm, mean, range)</td>
<td>4 (2-8)</td>
</tr>
<tr>
<td>Ostomy created before or during initial surgery</td>
<td>14</td>
</tr>
<tr>
<td>Hospital stay (median, days, range)</td>
<td>22 (3-249)</td>
</tr>
<tr>
<td>Readmittance (n=12) (median, days, range)</td>
<td>20 (5-122)</td>
</tr>
<tr>
<td>Closure of abscess cavity (n)</td>
<td>12 (52%)</td>
</tr>
<tr>
<td>Time till closure (days, median, range)</td>
<td>340 (23-731)</td>
</tr>
<tr>
<td>Follow-up (months, range)</td>
<td>30 (9-61)</td>
</tr>
</tbody>
</table>

BMI=Body Mass Index, cm=centimeters

In eight patients the presacral abscesses were drained transanastomotically. A combined treatment of relaparotomy and drainage transanastomotically was done in eight patients. Five patients underwent a relaparotomy and the abscess was drained transabdominally.

Definitive resolution of the sinus occurred in 12 out of 23 patients (52%). This was achieved in a median of 340 days (range 23-731). In the malignant group in 10 patients (56%) the treatment was successful compared to three out of five patients (60%) in the benign group (p=1.000). A persistent sinus was present in 8/18 (44%) after LAR and 2/5 (40%) after restorative proctocolectomy. Twelve patients received preoperative radiotherapy out of the group of 18 patients that underwent colorectal resection for malignant disease. The sinus closed in half of the patients that underwent radiotherapy. In the group without radiotherapy the sinus closed in four of the six patients (p=0.638). Overall, in twelve of the thirteen patients with a closed abscess cavity the ostomy could be closed. In one patient with a closed sinus the ostomy was considered definitive because of patient preference. In three patients with a small, not completely closed sinus the ostomy was closed without further complications in two patients. As result of recurrent abscesses the third
Persisting presacral sinus following anastomotic leakage

Patient needed a reoperation and an end colostomy was fashioned. In another three patients the anastomosis was dismantled later in the course of treatment and an end-colostomy was constructed. At final follow-up, nine of the 23 patients had permanent fecal diversion due to recurrent abscesses or a persistent sinus, seven after LAR and two after restorative proctocolectomy.

DISCUSSION

In the present study course and outcome of conventionally treated presacral sinuses resulting from anastomotic leakage after rectal surgery were assessed. Anastomotic leaks were associated with the development of chronic presacral sinus in 36% of the patients. One year postoperatively half of the presacral sinuses were closed spontaneously.

After colorectal surgery, one of the most feared complications is anastomotic leakage. The reported incidence of anastomotic leakage after low anterior resection for colorectal cancer is significant and ranges between 1-24%.\(^6\) Reported risk factors for anastomotic leakage include difficult surgical procedure, low tumour location, adjuvant radiochemotherapy, and poor preoperative patient condition.\(^7\) Early discovery of anastomotic leakage is crucial for prevention of serious adverse events which result from the septic source in the pelvis. The anastomotic disruption can lead to a presacral abscess and/or chronic para-anastomotic sinus. Often a wait and see strategy is used after the construction of an ileostomy. When the cavity is large the sinus is surgically or transanally drained by placement of a flexible drain. Radiological interventions are possible by positioning drains (percutaneously) in the abscess cavity. Flexible endoscopy can be performed to diagnose or to lavage the sinus.

One of the major problems for patients is the continuous drainage of debris from the sinus resulting in considerable patient discomfort. The continuous foul smell can result in patient isolation. In the long term recurrent pelvic sepsis can result in reinterventions, ongoing sepsis and neorectal insufficiency due to reduced neorectal capacity. Nesbakken \textit{et al.} reported on eleven patients with anastomotic leakage following total mesorectal excision (TME).\(^8\) The neorectal capacity was significantly lower in the group treated for anastomotic leakage compared to the non-leakage group, 120 vs. 180 ml (p=0.04) respectively. Hallbook \textit{et al.} compared two groups of
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patients with and without anastomotic leakage after TME. Patients were matched according to sex, age, height of the anastomosis and follow-up duration. In the group with the anastomotic leakage the neorectal function was clearly reduced. More recently a consecutive series of 86 patients was described by Arumainayagam et al.9 Of the patients that underwent TME with protecting ileostomy, in eight patients a presacral sinus developed. The sinus closed in three out of the eight patients with an average healing time of six months. In two patients, tumour recurrence was found in the presacral sinus (six and 19 years after surgery). This might be due to chronic inflammation. Several options are available to treat a persisting presacral sinus. Options are permanent fecal diversion, pouch-excision or excision of the neorectum, and omentoplasty of the cavity.10 Another option described by Whitlow et al.11 in six patients is the so-called deroofing of the anastomosis. This is performed by dividing the wall between the presacral sinus and the adjacent bowel lumen under direct vision through a rigid proctoscope. By dividing the wall, the lumen of the bowel and the sinus are connected avoiding retention in the presacral sinus. Patients were treated a median of 3.5 months after diagnosis of the sinus. The sinus resolved in five patients within one month and in another patient after twelve months. Besides one anastomotic stricture there were no complications reported. An alternative is closure of the opening in the anastomosis to the sinus with fibrin glue. Swain et al. applied this technique in the treatment of seven patients with sinus tracts following restorative proctocolectomy or low rectal anastomosis.12 The sinus was cleaned and filled with fibrin glue. After one week healing of the sinus was observed in all patients and after 11 months no recurrences were reported. Fibrin glue closure is probably only possible if the sinus tract is rather small, while deroofing is indicated when a large presacral sinus drains via a small gap in the anastomosis. According to the literature the treatment of a para-anastomotic sinus is difficult and results in a variable success rates. Furthermore, treatment often does not prevent the formation of a chronic sinus. The abscess cavity remains present next to the neorectum. In several studies it was shown that due to the chronic inflammation and fibrosis of the sinus the neorectal capacity is at risk.5,8 Since the treatment of the persistent presacral sinus is difficult, prevention of the development of a chronic sinus seems to be essential. Weidenhagen et al. introduced the endo-sponge.13 The low vacuum sponge ensures optimal drainage and the pre-
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The closure percentages from the endo-sponge range from 56-100%. In a series of 29 patients presented by Weidenhagen et al. the mean total hospital stay was 31 days. An advantage of the endo-sponge treatment is that patients can be treated as outpatients returning every 3-4 days for endo-sponge exchange. Endo-sponge treatment is probably only successful if started early after the discovery of the anastomotic leak when the neorectum is still compliant.

In conclusion, a significant part (36%) of patients with anastomotic leakage after LAR or restorative proctocolectomy develop a chronic sinus of which only half heal over time. The persisting sinuses are the main cause of a permanent ostomy in these patients. Since treatment of the persistent sinus is difficult, all effort should be directed to the prevention of the development of the sinus once the anastomotic leakage has been established. Endo-sponge treatment might play an important role in achieving this.

REFERENCES

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