Original Paper

Low Incidence of Pelvic Sepsis after Hartmann's Procedure: Radiation Therapy May Be a Risk Factor

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Keywords

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Abstract

Purpose: Hartmann's procedure is a well-established alternative in colorectal surgery when a primary anastomosis is contraindicated. However, the rectal remnant may cause complications. This study was designed to investigate the occurrence of pelvic sepsis after Hartmann's procedure and identify possible risk factors. **Methods:** All patients who underwent Hartmann's procedure between 2005 and 2012 were identified by the in-hospital registry. Information about pelvic sepsis and potential preoperative, perioperative, and postoperative risk factors was obtained by review of the medical records. **Results:** 172 patients were identified (97 females); they were aged 74 ± 11 years. Surgery was performed due to cancer (49%) or diverticulitis (35%) and other benign disease (16%). Rectal transection was carried out anywhere between the pelvic floor and the promontory. Pelvic sepsis developed in 6.4% (11/172) of patients. Pelvic sepsis was associated with preoperative radiotherapy ($p = 0.03$) and Hinchey grade III and IV ($p = 0.02$) in those patients who underwent Hartmann's procedure for diverticular disease. **Conclusion:** Hartmann's procedure is a safe operation when an anastomosis is contraindicated since the incidence of pelvic sepsis is low. Preoperative radiotherapy and Hinchey grade III and IV may be risk factors for the development of pelvic sepsis.

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Introduction

Hartmann's procedure (HP) entails resection of the sigmoid colon and/or rectum, and the rectal remnant is closed subsequently, leaving the patient with an end stoma. About 15% of the patients treated for rectal cancer in Sweden (www.cancercentrum.se/samverkan/cancerdiagnoser/tjocktarm-andtarm-och-anal/tjock-och-andtarm/kvalitetsregister/) are subjected to HP, and the procedure is also used for benign conditions, such as diverticulitis, adenomas, ischemic colitis, and incontinence. HP is reserved for patients who cannot tolerate an anastomotic leakage; often in elderly with severe comorbidities; or if fecal peritonitis or incontinence is present [1–3]. Ultralow HP, where transection is performed above the anal canal, has been compared to abdominoperineal excision (APE). The advantages with HP are shorter operating time, less surgical trauma, and avoidance of a perineal wound [4, 5]. The disadvantage with HP is the high proportion (12–32%) of pelvic abscesses and sepsis [2, 5, 6]. Pelvic sepsis is a feared complication due to the high morbidity and treatment difficulties. Previous studies have revealed that smoking and male gender are associated with pelvic sepsis, as well as a low transection level [6, 7].

The frequency of pelvic sepsis in a modern HP cohort is unknown. Published studies are old and contain few patients and heterogeneous diagnoses. The purposes of this study were to determine the frequency of pelvic sepsis after HP and to identify risk factors.

Methods

A retrospective study was carried out of all patients, acute and elective, who had a HP at the Helsingborg Hospital, Helsingborg, Sweden, between January 1, 2005, and December 31, 2012. Helsingborg Hospital has a catchment population of 268,000 people. The patients were identified by the in-hospital registry and were followed until March 2014. Pelvic sepsis was defined as a collection of pus in the pelvis verified by radiology or pus secretion through the remnant rectum.

The medical charts were obtained for each patient, and the following details were recorded: age, sex, preexisting medical conditions including smoking, body mass index, American Society of Anesthesiologists (ASA) score, operative indication, operation type and other perioperative technical details, length of hospital stay, neoadjuvant and adjuvant therapy, postoperative complications, presence of pelvic sepsis as defined above, treatment obtained for pelvic sepsis, and details from the follow-up visits to the clinic. All study parameters are listed in online Supplement 1 (for all online suppl. material, see www.karger.com/doi/10.1159/000493526).

Differences in mean values were calculated with the Mann-Whitney U test, χ^2 tests, and ANOVA. A *p* value <0.05 was considered as statistically significant. All calculations were made by SPSS® (IBM Corporation, Somers, NY, USA).

Results

172 patients were identified (97 females); they were aged 74 ± 11 years. HP was performed due to cancer in 84 patients (49%), diverticulitis in 60 patients (35%) or other benign disease in 28 patients (16%). 78 procedures (45%) were performed acutely or subacutely (defined as within an acute admission). The median follow-up time was 56 months (range 15–97). All patients received antibiotics preoperatively. Pelvic sepsis developed in 6.4% (11/172) of the patients. Clinical characteristics of the study population are demonstrated in Table 1. Age, sex, body mass index, immunosuppression, smoking, diabetes, cardiovascular morbidity, and blood values for albumin and C-reactive protein were not related to the development of pelvic sepsis. Preoperative radiotherapy (RT) (*p* = 0.03) and Hinchey grade III and IV (*p* = 0.02), if HP was performed due to diverticulitis, were related to pelvic sepsis. The transection level of the rectum was not related to the development of pelvic sepsis (*p* = 0.79), nor was oversewing of

Table 1. Clinical characteristics of the study population and patients with and without pelvic sepsis

	Study population (n = 172)	Pelvic sepsis (n = 11)	No pelvic sepsis (n = 161)	p value
Age, years	74±11	71±10	76.5±10	0.11
Gender, male/female	76/96	7/4	69/92	0.18
ASA				0.52
I	15	1	14	
II	96	6	90	
III	55	4	51	
IV	6		6	
Weight, kg	73.9±16	77±10	73±16	0.89
Immunocompromised, yes/no	24/148	2/9	22/139	0.68
Smoking				0.72
Yes	21	3	18	
No	81	4	77	
No data	70	4	66	
Diagnosis, n				0.51
Cancer	84	4	80	
Diverticulitis	60	4	56	
Benign	28	3	25	
Preoperative radiotherapy, yes/no	31/141	5/6	26/135	0.03
Hinchey grade, n				0.02
I	10	0	10	
II	9	0	9	
III	17	1	16	
IV	11	3	8	
Diabetes, yes/no	22/150	3/8	19/142	0.82
CRP preoperatively, mg/L	93±128	118±184	92±125	0.80
Albumin preoperatively, g/L	33±7	36±5	33±7	0.46

Values are presented as means ± standard deviations unless otherwise indicated. ASA, American Society of Anesthesiologists; CRP, C-reactive protein.

the transection staple line ($p = 0.42$). Operation time and bleeding, use of a pelvic drain, irrigation of the rectal stump, or postoperative complications did not differ between the groups. The overall 30-day morbidity was 43%, and 30-day mortality was 8%. There was no difference in the length of hospital stay of patients with pelvic sepsis (19.6 ± 9.6 days) compared to patients without pelvic sepsis (16.3 ± 13 days; $p = 0.32$). Furthermore, whether the procedure was acute or elective did not predispose for pelvic sepsis ($p = 0.77$). All patients who developed pelvic sepsis were treated with antibiotics, and 6/11 (55%) needed drainage; 3/11 (27%) demanded further intervention with a surgical procedure to treat the pelvic sepsis. One patient who developed pelvic sepsis needed ICU care, but there was no 30-day mortality among the patients who developed pelvic sepsis. Three patients were diagnosed with pelvic sepsis after they had been discharged. Most datasets were complete; however, the intraoperative information regarding bleeding and operation time was missing in 10% of cases.

Discussion

This retrospective study on HP in a recent setting indicates that pelvic sepsis is less common than was described in historic materials [2, 5, 6]. We also recognized that preoperative RT and Hinchey grade III and IV, i.e., purulent and feculent peritonitis, associated with

perforated diverticular disease may be risk factors for pelvic sepsis. To our knowledge, this is the first study depicting the present incidence of pelvic sepsis in an unselected cohort of patients undergoing HP. This investigation implies that pelvic sepsis related to HP may be a relatively unusual event and, thus, of less clinical concern than anticipated earlier.

There are conflicting findings in the literature whether neoadjuvant RT in rectal cancer has been related to anastomotic leakage [8, 9]. In the present study, neoadjuvant RT was a risk factor for developing pelvic sepsis, and this would be logical if the pathophysiology was similar, namely RT causing inflammation and edema, leading to relative ischemia. Abdominal contamination with pus or feces was also identified as a risk factor. Although precautions were taken, such as washouts, drain, and prolonged antibiotics, gross contamination is a substantial risk factor for pelvic sepsis just as it is for anastomotic leakage [10]. Certainly, in these subgroups increased awareness of pelvic sepsis is necessary, and an alternative procedure, such as intersphincteric APE, may be considered.

The 6.4% incidence of pelvic sepsis after HP is significantly lower than previously published data [1–3, 6]. However, another current study described an incidence of 3% for pelvic abscesses and an overall pelvic complication rate of 11% associated with HP in rectal cancer patients [11]. This was significantly lower than with APE (32%) although the HP population was older, had more comorbidities, more stage IV disease, and functional inferiority. The discrepancy between the studies may be related to our use of an unselected cohort of patients who underwent HP. The issue about pelvic sepsis following HP has been an ongoing debate since historic data claimed an incidence as high as 30% [6]. This concern has warranted further studies, and we are aware of at least 2 ongoing randomized controlled trials (HAPIRECT and HRA; www.clinicaltrials.gov) where intersphincteric APE with removal of the rectum and anal canal, but leaving the external sphincter and levator muscles in place, is randomized against HP. This is thought to significantly reduce the incidence of serious pelvic infection related to HP. Some surgeons are reluctant to perform this procedure due to the slightly increased operating time and the risk of the local wound failing to heal. Given the low incidence of pelvic sepsis, these studies may be underpowered to show any true differences, and our study suggests that adequate postoperative surveillance following HP resulting in a timely diagnosis and CT scans when symptomatic may be the way forward.

In the present study, none of the operative details, such as abdominal washout, preoperative bowel preparation and/or rectal irrigation, drain usage, stump length, and oversewing of the staple line were associated with the development of pelvic sepsis. This contradicts a previous study where ultralow HP was related to pelvic sepsis [6]. Another recent study concluded that stump management in inflammatory bowel disease is not crucial for the complication rate [12]. However, a meticulous surgical technique must be emphasized in this frail patient group. When leaving mucosa behind as in HP, there will be ongoing minor secretion and some evidence of diversion proctitis, but this does not appear to predispose for pelvic sepsis [13]. However, the patients need to be aware that if purulent discharge or fever arises even over time an extra checkup is mandatory.

The retrospective character of this study has some limitations. For example, not all factors (especially operative details) could be reliably collected in all patients. Furthermore, although many postoperative complications were recorded, some minor complications could have been missed. Pelvic CT scan or rectal stump examination was performed if the patients were symptomatic; accordingly, asymptomatic abscesses may not have been detected, and the absolute number may consequently be underestimated. However, all patients were followed up for at least 15 months (median 56), and, therefore, it is unlikely that pelvic collections causing clinical symptoms would have been undetected. Furthermore, due to the low incidence of pelvic sepsis, the associations with risk factors are based on few observations and need to be repeated in other studies.

It is noteworthy that most of the cases with pelvic sepsis were diagnosed during the initial hospital stay, but 3 out of 11 patients were diagnosed after discharge. During follow-up, there was no accumulation of pelvic sepsis over time, further emphasizing that HP seems safe. The timely diagnosis of pelvic sepsis may explain why most patients only needed antibiotics alone and only 3 out of 11 required surgical intervention.

Conclusions

Pelvic sepsis after HP may be less common than described in the literature, and, therefore, HP should be regarded as a safe procedure. Preoperative RT and Hinchey grade III and IV may be risk factors for the development of pelvic sepsis.

Statement of Ethics

This material has not been published in whole or in part elsewhere, and all authors have been personally and actively involved in substantive work leading to the manuscript and will hold themselves jointly and individually responsible for its content.

Disclosure Statement

The authors confirm that they have no conflicts of interest to declare.

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