Low risk of pelvic sepsis after intersphincteric proctectomy in patients with low rectal cancer

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ABSTRACT

INTRODUCTION: Pelvic sepsis after Hartmann's procedure for low rectal cancer is a frequent complication. It has been reported at a frequency of 12.2-17.2% and has even reached 33% when the transection level of the rectum is ≤ 2 cm from the anal verge. The aim of this study is to examine whether intersphincteric proctectomy reduces the frequency of pelvic sepsis in patients operated with an extended Hartmann's procedure for rectal cancer.

METHODS: Patients undergoing elective extended Hartmann's procedure with an intersphincteric proctectomy from 2010 until 2014 were reviewed retrospectively. Patient characteristics and post-operative complications were obtained and analysed.

RESULTS: A total of 50 patients were included in this analysis. Sixteen were female, the median age was 73 years, and the median BMI was 26 kg/m^2. Furthermore, the American Society of Anesthesiologists (ASA) scores were as follows: ASA 1 (28%), ASA 2 (60%), and ASA 3 (12%); their tumour-node-metastasis (TNM) staging was TNM: ≤ T2 (30%), T3 (50%), and T4 (20%); and 26% had received neoadjuvant radiotherapy, whereas 40% had received chemotherapy. A total of three patients (6%) developed a post-operative pelvic sepsis. The median length of post-operative hospitalisation was 9.5 days. Overall mortality was 4% (n = 50). The most frequent surgical complication to intersphincteric proctectomy was perineal wound infection, occurring in 20%.

DISCUSSION: This study suggests a reduction in the frequency of pelvic sepsis when intersphincteric proctectomy is performed in patients who undergo extended Hartmann's procedure. The frequency is, however, larger than that reported herein when the rectal stump is left long. Intersphincteric proctectomy should therefore primarily be reserved for low cancers with short rectal stumps.

FUNDING: not relevant.

TRIAL REGISTRATION: not relevant.

Patients with a high risk of anastomotic leakage following low anterior resection and a high subsequent mortality risk will benefit from Hartmann's operation. The risk of pelvic sepsis after extended Hartmann's procedure has been reported to be 12.2-17.2% [1, 2] and to reach even 32.9% after extended Hartmann's procedure, where the rectum is transected ≤ 2 cm above the pelvic floor [3]. Coherence between the level of transection of the rectum and the frequency of rectal stump leakages has also been reported to be 33% (3/9 patients) "blow-outs" when the rectum was divided below the peritoneal reflection, and only 1.9% (1/53 patients) when it was divided above in patients with inflammatory bowel disease (IBD) and acute colitis [4]. Another study reported 13/43 (30%) pelvic sepsis after Hartmann's procedure with an intraperitoneal closure, and 43/57 (75%) pelvic sepsis after extended Hartmann's with an extraperitoneal closure in patients with cancer of the sigmoid or rectum [5]. Others report a high overall incidence (37.5%) of pelvic sepsis after Hartmann's procedure for carcinomas of the rectum and the sigmoid colon, but find no correlation with the transection level (short stump 25%, long stump 37%) [6]. Yet another study, in which Hartmann's procedure was performed in patients with rectal cancer and complicated diverticular disease, showed an overall low incidence of pelvis sepsis of 3.8% (4/105) and no correlation with transection level; and the study reported 4.1% pelvic sepsis in (3/72) patients with an intraperitoneal rectal stump and 3.0% pelvic sepsis in (1/33) patients with an extraperitoneal rectal stump [7]. A low incidence of pelvic sepsis 5.5% (2/36) was also reported in patients having an extended Hartmann's procedure for rectal cancer [8]. In comparison, pelvic sepsis after low anterior resection (LAR) and abdominoperineal resection (APR) have been reported at 12% in a systemic review from 2010 [9].

Pelvic sepsis as a post-operative complication that leads to increased morbidity and mortality and which requires treatment with drainage, which results in prolonged post-operative hospitalisation and additional cost [2]. The procedure intersphincteric proctectomy (IP) was first described by J. C. Goligher [10]. An improved perineal wound healing rate for patients with IBD operated with IP versus conventional proctectomy has been reported [11-15].

The use of IP also showed promising results in patients with severe anorectal Crohn's disease in whom an IP accommodated healing of the perineal wound [16].

Pelvic sepsis is a frequent complication after extended Hartmann's procedure for rectal cancer. The literature suggests that the lower the rectal cancer and the shorter the rectal stump, the higher the frequency

ORIGINAL ARTICLE

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Dan Med J 2014;61(12):A4972

of pelvic sepsis becomes. A number of hospitals are already using IP in addition to the extended Hartmann's procedure for this type of patient, and our hypothesis is that when performing an extended Hartmann's procedure, an additional IP may reduce the frequency of pelvic sepsis. To our knowledge, IP has to date not been described in the literature as a technique used to reduce the risk of pelvic sepsis in patients operated with an extended Hartmann's procedure for rectal cancer.

The aim of this study is to examine whether IP reduces the incidence of post-operative pelvic sepsis in cancer patients operated with an extended Hartmann's procedure. Secondly, we aim to evaluate medical and surgical complications after IP.

METHODS

The Department of Surgical Gastroenterology, Slagelse Hospital, Region Zealand, Denmark, introduced the IP procedure in 2010 to reduce the frequency of pelvic sepsis. To evaluate the results, a single-centre review was preformed which included all patients who had a primary elective extended Hartmann's procedure with an IP as a one-step operation in the period from January 2010 to March 2014. Patients were identified searching the hospital database. A total of 84 patients were identified. We only included patients operated due to rectal cancer. A total of 34 patients were excluded; 27 were incorrectly coded and had other anal procedures performed, e.g. for anorectal fistulas or perianal abscesses, two had primary surgery due to IBD and one due to diverticulitis, two had an IP due to complications to an earlier Hartmann's procedure with abscess or fistula, two had an IP due to anal pain problems. A total of 50 consecutive patients (16 female) were included in the study, and information was obtained retrospectively from files. Information was obtained about age, sex, body mass index (BMI), American Society of Anesthesiologists (ASA) score, operation date, operation type, tumour-node-metastasis (TNM) classification, adjuvant chemo/radiotherapy, post-operative hospitalisation and post-operative complications (**Table 1**). The choice to perform an extended Hartmann's operation with an IP was based on the clinical situation and the patient's or the surgeon's preference. The determining clinical factors were most commonly: low rectal cancer, age or severe co-morbidity and a too high risk of an anastomosis leakage if LAR were performed, e.g. due to tissue damage after radiotherapy or in cases where anatomical conditions did not allow for an anastomosis.

Pelvic sepsis

Pelvic sepsis was suspected in patients with a significant discharge of pus from the perineal wound, increased C-reactive protein and/or white cell count, fever and pain; but pelvic sepsis was only defined as such if a fluid accumulation in the small pelvis was subsequently demonstrated by computed tomography (CT).

Intersphincteric proctectomy

The IP technique starts with the intra-abdominal pelvic dissection, following the mesorectal fascia down to the pelvic floor. After performing the intra-abdominal part of the operation, including the stoma, the patient is placed in the Lloyd-Davies position. Ventrally, the incision of the skin follows the intersphincteric groove and dorsally the incision is pointed. Hereafter, the dissection is carried

TABLE 1

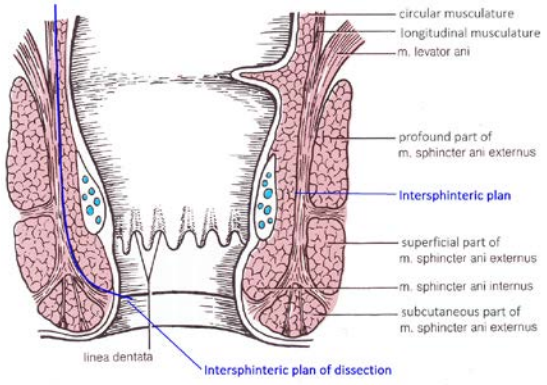
Patient characteristics.

Gender, n (%)	
Male	34 (68)
Female	16 (32)
Total	50
Age, yrs, median (range)	73 (53-89)
BMI, kg/m^2, median (range)	26 (19-36)
ASA, n (%)	
1	14 (28)
2	28 (56)
3	8 (16)
Neoadjuvant radiotherapy, n (%)	13 (26)
Chemotherapy, n (%)	20 (40)
Tumour stage, n (%)	
≤ T2	15 (30)
T3	25 (50)
T4	10 (20)

ASA = American Society of Anesthesiologists classification of physical health; BMI = body mass index.

FIGURE 1

Planes of intersphincteric resection. © De indre organers anatomi. 9 ed. Copenhagen: Forlaget Munksgaard, 2002:372, Figure 25-16.



cephalad between the internal and external sphincters (**Figure 1**). This results in preservation of the external sphincters and levators which can then be closed in the midline with a reabsorbable suture in the muscular layer and with a non-reabsorbable suture in the skin.

Statistics

The demographics of patients are reported as medians, range of number of patients and percentages. The SPSS package version 19.0 for Windows (SPSS Inc. Chicago, IL) and R version 3.1.1 were used for the statistical analysis.

Trial registration: not relevant.

RESULTS

A total of 50 patients (n = 50) were included in this analysis, all of whom underwent an extended Hartmann's operation and an IP. Of these, three patients (6%, two male (95% confidence interval (CI): 1.25-16.54%)) developed a post-operative pelvic sepsis, confirmed by CT as a collection of pus in the pelvic area. Two of these patients had their pelvic sepsis treated with transanal drainage and daily irrigation and had no other complication. One of the three patients with pelvic sepsis was re-operated twice due to an additional rupture of the abdominal fascia and also developed a post-operative gastric ulcer. In addition, in this patient, the pelvic sepsis had created a vaginal fistula, which was treated with transvaginal drainage and vacuum-assisted closure (VAC) of the abscess cavity. The median time from the primary operation to the pelvic sepsis was 29 days (21-37 days). Of the three patients with pelvic abscess, one had preoperative radiotherapy. The median length of post-operative hospitalisation was 9.5 days (4-49 days). One of the pelvic sepsis patients had 49 days of post-operative hospitalisation. The other two had five and 11 days of post-operative hospitalisation.

Regarding the locations of the cancers, 12 (24%) patients had a low rectal cancer, 32 (64%) had a mid rectal cancer and 6 (12%) a high rectal cancer (low: 0-5 cm, medium: 5-10 cm and high: 10-15 cm, from the anal verge to the distal edge of the cancer, measured by proctoscope). The three patients with pelvic sepsis had cancers located at 5 cm, 6 cm and 11 cm from the anal verge. A total of 31 had a laparotomy, and 19 had a laparoscopic resection. In all, 48 patients had a rectal resection with colostomy and IP, and two had a proctocolectomy with ileostomy and IP due to synchronous tumour. For TNM, ASA, age and body mass index (BMI), see Table 1.

Follow-up

The median follow-up was 19.8 months (6 days to 50 months). Of surgical post-operative complications, the most frequent were perineal wound infections occurring in 10/50 patients (20% (95% CI: 10.03-33.72%)). Seven of these were superficial perineal wound infections, grade 1-2 by the Clavien-Dindo classification [17]. Six could be treated with bedside revision and irrigation, and did not delay discharge from hospital and one was treated with peroral antibiotics and control at the general practitioner. Three patients had deeper perineal wound infections that required revision under general anaesthesia followed by irrigation and one was also treated with VAC (**Table 2**).

The median time for healing of the perineal wound was 22 days (11-99 days). Seven (14% (95% CI: 5.89-26.73%)) patients experienced perineal pain after the operation. Three of these had perineal wound infection, one had pelvic sepsis, one had an intraabdominal abscess and one had an urethral lesion.

One patient had uncharacteristic perineal pain two months after surgery, which started after treatment with chemotherapy. A total of 6/7 patients reported mild perineal pain, and all symptoms subsided after treatment of the underlying reason was initiated (**Table 3**).

TABLE 2

Perineal wound infection.

Patient no.	Wound type	Length of healing, days	Treatment	Clavien-dindo classification
1	Superficial	37	Opened & irrigation	Grade 1
2	Deep	60	Revision in general anaesthesia & irrigation	Grade 3b
3	Superficial	22	Opened & irrigation	Grade 1
4	Deep	16	Opened & VAC & irrigation	Grade 3a
5	Superficial	11	Irrigation	Grade 1
6	Superficial	99	Opened & irrigation	Grade 1
7	Superficial	–	Antibiotics & controls	Grade 2
8	Deep	31	Revision in general anaesthesia & irrigation	Grade 3b
9	Superficial	14	Opened & irrigation	Grade 1
10	Superficial	19	Opened & irrigation	Grade 1

VAC = vacuum-assisted closure.

TABLE 3

Post-operative perineal pain.

Patient no.	Pain	Pain debut post-operatively, days	Other post-operative complications or reasons	Treatment	Duration of pain, days
1	Severe	16	Urethral lesion	Drainage	10
2	Minor	5	Perineal wound infection	Opened & irrigation	24
3	Minor	4	Perineal wound infection	Analgesics	1
4	Minor	15	Pelvic sepsis	Drainage	21
5	Minor	9	Perineal wound infection	Opened & irrigation	10
6	Minor	7	Intraabdominal abscess	Opened & irrigation & VAC	14
7	Minor	60	Chemotherapy	None	–

VAC = vacuum-assisted closure.

TABLE 4

Complications.

	n	% (95% CI)
Patients	50	–
Surgical complications		
Perianal wound infection	10	20 (10.03-33.72)
Parastomal hernia	8	16 (7.17-29.11)
Abdominal wound infection	4	8 (2.22-19.23)
Ileus	4	8 (2.22-19.23)
Pelvic sepsis	3	6 (1.25-16.54
Intraabdominal hematoma	3	6 (1.25-16.54)
Intraabdominal abscess	2	4 (0.49-13.71)
Rupture fascia	2	4 (0.49-13.71)
Stroma prolapse	1	2 (0.05-10.64)
Ureter lesion	1	2 (0.05-10.64)
Medical complications		
Urinary retention	5	10 (3.33-21.81)
Pneumonia	2	4 (0.49-13.71)
Cardiac complications	2	4 (0.49-13.71)
Pulmonary embolism	1	2 (0.05-10.64)
Renal insufficiency	1	2 (0.05-10.64)
Delirium	1	2 (0.05-10.64)

CI = confidence interval.

During follow-up, none developed post-operative enterocutaneous fistula or a perineal hernia. Eight patients (16% (95% CI: 7.17-29.11%)) developed a parastomal hernia. Overall, there were 11 (22% (95% CI: 11.53-35.96%)) patients with more than one non-surgical complication. For details regarding complications, see **Table 4**. Two patients died during follow-up (4% (95% CI: 0.49-13.71%)), one died six days after the operation and one 35 days after. The first patient was an 81 year-old male, ASA 3 with a T3N0M0 rectal tumour. The patient was known with unstable angina pectoris and died of an acute myocardial infarction. The second patient was an 88-year-old male, ASA 3 with a T4N1M0 tumour. The patient had had a coronary artery bypass surgery performed 10 years prior to this operation and was also known with a mild aortic stenosis. On the first post-operative day, the patient developed acute tubulointerstitial nephropathy. On the eighth post-operative day, the patient was re-operated, and a large intra-abdominal haematoma was found. After the re-operation, the patient became more and more resigned and opposed further treatment.

DISCUSSION

This study showed an overall risk of pelvic abscess of 6% (95% CI: 1.25-16.54%) after IP following primary elective surgery for rectal cancer. Previous studies have reported an incidence of 12-33% of pelvic abscess after extended Hartmann's procedure in patients with low rectal cancer [1-4], and an incidence of pelvic sepsis of 1.9- 4.1% with long rectal stumps or intraperitoneal rectal stump [4, 7]. Our study found an incidence of pelvic sepsis when performing an IP which is lower than 33%, but no final conclusions can be drawn from this result. However, based on the literature and our findings, the indication for IP should only be reserved for low cancers with short rectal stumps. A short rectal stump has been defined as below the peritoneal reflection or as less than 2 cm above the pelvic floor [3-7]. We believe that the shorter the rectal stump, the higher the risk of stump blowout and pelvic sepsis. A total of 13 (26%) patients had neoadjuvant radiotherapy in our study, and one of these developed pelvic sepsis. We therefore cannot conclude that there is a correlation between patients having preoperative radiotherapy and the risk of pelvic abscess after IP. However, previous studies have reported a correlation between neoadjuvant chemoradiation and an increase in pelvic sepsis in patients operated for rectal cancer. In 246 patients who had undergone resection for rectal cancer, pelvic sepsis was seen in 9/60 (15%) among those who had received neoadjuvant chemoradiation and only 9/186 (4.8%) among those who underwent surgery without neoadjuvant chemoradiation [18]. In another study of 261 patients who had a total mesorectal excision for rectal cancer, 22 (14.8%) patients who received neoadjuvant radiotherapy developed a presacral abscess compared with 4 (3.6%) who did not receive neoadjuvant radiotherapy prior to operation [19].

Other considerations are the risk of fistulas, perineal wound infections and perineal hernias.

In our study, 20% (95% CI: 10.03-33.72%) had perineal wound infections. This is quite high and could present a problem when using IP. However, seven of these were superficial perineal wound infections, Grade 1-2 by the Clavien-Dindo classification [17], and they should therefore not be a contraindication for IP. The perineal wound infection rate after APR has been reported at 14.1-14.8% [2, 20]. Since APR leaves a bigger wound, one would argue that a lower frequency would subsequently occur with IP, but this was not seen in our study.

We had a median follow-up of patients of 19.8 months, and in that period no perineal hernias and no fistulas were found. In comparison, perineal hernias after APR have been reported to be very low at 0.39% (5/1266) [21]. In our study, 4% (95% CI: 0.49-13.71%) patients died post-operatively, primarily from medical comorbidity. To our knowledge, this is the first hypothesis-generating study that suggests that IP is a feasible procedure to lower the risk of pelvic sepsis in patients with low rectal cancer. But there are still questions to be answered regarding the frequency of pelvic abscess, perineal wound infections and other possible complications such as fistulas and perineal hernias. Our study is limited by its retrospective design, the relatively few pa-

tients and its lack of prospective patient follow-up. If possible, a multi-centre randomised study should be made to clarify this area.

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ACCEPTED: 1 October 2014

CONFLICTS OF INTEREST: none. Disclosure forms provided by the authors are available with the full text of this article at www.danmedj.dk.

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