

# Laparoscopic restoration of intestinal continuity after Hartmann's procedure

## Laparoskopinis žarnos vientisumo atkūrimas po Hartmanno operacijos

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### Introduction

A change in procedure from open to laparoscopic reversal of Hartmann's colostomy was implemented at our department between May 2009 and December 2010. The aim of the study was to investigate whether this change was beneficial for the patients.

### Methods

The medical records of all patients who underwent colostomy reversal after a primary Hartmann's procedure during the period from May 2009 to December 2010 were reviewed retrospectively in a case control study.

### Results

A total of 13 patients were included. Six had a laparoscopic and 7 an open procedure. The two groups matched with regard to age, sex, the American Society of Anaesthetist (ASA) score, body mass index and indication for Hartmann's operation. A significantly longer operation time was found for laparoscopic than for open surgery (median 285 versus 158 minutes,  $p < 0.001$ ), but with a less blood loss (median 100 versus 600 ml,  $p < 0.001$ ), faster return of bowel function (median three versus four days,  $p < 0.01$ ) and a shorter postoperative hospitalization (median four versus six days,  $p < 0.01$ ). No intraoperative complications occurred. One laparoscopic operation was converted (16.6%). There was no difference in postoperative complications between the two groups (10 versus 14%) and no anastomotic leaks. The total mortality was 0.

### Conclusion

It is possible for trained laparoscopic general surgeons to perform laparoscopic reversal of Hartmann's procedure as safely as in open surgery and with a faster recovery, shorter hospital stay and less blood loss despite a longer knife time. Therefore, it seems reasonable to offer patients a laparoscopic procedure at departments skilled in laparoscopic surgery and use it for standard colorectal surgery.

**Key words:** laparoscopic reversal of Hartmann's colostomy; restoration of intestinal continuity

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Hartmann's operation is a common procedure for left colonic pathology, especially in emergency surgery such as perforated diverticulitis, perforated sigmoid cancer or after iatrogenic perforation of the sigmoid [1–3]. Reversal of Hartmann's colostomy is a major abdominal operation which is considered a high-risk procedure. Nevertheless, many patients wish to have reversed colostomy for social, psychological, aesthetic or practical reasons. The rate of reversal has been reported to range from 52% to 60% only, as the patients are often aged with a higher co-morbidity than the average population [4–6]. For these elective operations, the reported mortality rates reach 10%, with anastomotic leakage rates 15% and morbidity rates ranging from 30% to 40% [2, 7]. Introducing a minimal invasive method such as the laparoscopic procedure seems to improve these figures [8, 9]. At the Department of General Surgery of Vilnius University Emergency Hospital, a change in the procedure from open to laparoscopic reversal of Hartmann's colostomy has been implemented since March 2009, and the aim of the present study was to investigate whether this change was beneficial for the patients.

## Materials and methods

The study was performed as a retrospective case-control study at the Department of General Surgery of Vilnius University Emergency Hospital. The medical records of all patients who had underwent colostomy reversal during the period from March 2009 to December 2010 were reviewed. Only closures of Hartmann's procedures were included into the study. Thirteen patients were found. Six were operated on by laparoscopic surgery (LS) and seven by open surgery (OS). The following variables were analyzed: age, gender, operative procedure, co-morbidity, American Society of Anesthesiologists (ASA) score, body mass index (BMI), indication for Hartmann's operation, time from primary operation to reversal, length of the rectosigmoid stump, operation time, estimated blood loss, early complications (within 30 days after the operation) including anastomotic leakage, time to flatus, time to defecation, hospital stay duration, mortality, and reoperation within 30 days postoperatively. The procedures were all performed by abdominal and general surgeons. The laparoscopic procedures were done by general surgeons. The anastomoses

were all stapled with a circular stapler, except one in the open group which was hand-sewn with a long distal stump (80 cm).

## Statistical analysis

Data were analyzed using non-parametric statistics, including the  $2\chi$  test and Mann–Whitney tests. The level of significance was set to 5%.

## Results

The two groups were comparable with regard to age, sex, ASA score, BMI, indications for Hartmann's operation and the median length of the rectal stump (Table 1). The median time from the primary operation to colostomy reversal was significantly longer in the OS group. We found no obvious reason for this. The most common indications for the primary operation were

sigmoid diverticulitis and cancer. The perioperative data are shown in Table 2. The knife-time was significantly longer for LS than for OS, although there was no difference in the share of patients in the two groups who had the splenic flexure taken down. No perioperative complications occurred in either of the two groups. One laparoscopic operation was converted (16.6%, 83.4% confidence limits 0.1–24%). This patient was the only patient who had a reoperation due to rectal injury. The blood loss was significantly lower in LS than in OS. Postoperative complications were distributed equally in the two groups with two of 6 LS patients (10%, 95% confidence limits: 1–30%) and three of 7 OS patients (14%, 95% confidence limits 3–35%) suffering such complications. There were no anastomotic leaks. Consequently, the total mortality was 0. The median time to flatus was two days for both LS and OS, while a significant difference was found in the median time to postoperative defecation (three versus four days). Median hospital stay after operation was significantly shorter for LS than for OS (four versus six days).

## Discussion

No randomized study of open versus laparoscopic reversal of Hartmann's procedure exists, but several comparative studies were reviewed in a recent paper [10]. The eight reviewed studies comprised 450 patients, with 193

**Table 1.** Patient characteristics

	Laparoscopic surgery (n = 6)	Open surgery (n = 7)	p-value
Age, years, median (range)	61 (26–79)	55 (34–79)	0,76
Female / male, n	4/2	4/3	0.45
ASA score, median (range)	2 (1–2)	2 (1–2)	0.19
BMI, kg/m2, median (range)	23 (19–31)	30 (22–35)	0.08
<i>Indications for primary Operation</i>			
Cancer obstruction	2	5	
Diverticulitis	4	2	
Median time to reversal, days (range)	180 (90–390)	270 (120–900)	0.009*
Median length of rectosigmoid stump, cm (range)	20 (12–40)	20 (12–80)	0.58

\* Statistically significant.

**Table 2.** Operation time, splenic flexure loosening, blood loss, postoperative complications, postoperative 30-day mortality, time for flatus and defecation and length of postoperative hospital stay in patients with laparoscopic versus open reversal of Hartmann's procedure

	Laparoscopic surgery (n = 6)	Open surgery (n = 7)	p-value
Median knife-time, min (range)	285 (120–360)	157 (90–300)	< 0.001*
Median blood loss, ml (range)	100 (50–2,200)	600 (300–1,800)	< 0.001*
Postoperative complications, n (%)	2 (10)	3 (14)	0.7
Postoperative 30-day mortality, n (%)	0 (0)	0(0)	
Median time for flatus, days (range)	2 (1–5)	2 (1–6)	0.6
Median time for defecation, days (range)	3 (1–6)	4 (2–6)	< 0.01*
Median postoperative hospital stay, days (range)	4 (2–21)	6 (3–12)	< 0.01*

\* Statistically significant.

patients in the laparoscopic group and 257 in the open group. The results showed that laparoscopic surgery was as safe as open surgery and resulted in a significantly reduced complication rate, intraoperative blood loss and hospital stay. In the present study, no statistically significant difference was observed in the characteristics of the two patient groups. BMI was slightly lower in the laparoscopic group, which is probably an indicating of selecting patients for this procedure. This seems unnecessary, as it was demonstrated that with sufficient experience, laparoscopic colorectal surgery in obese patients is feasible and safe, offering all the benefits of a minimally

invasive procedure [11]. There were no perioperative complications in either of the two groups, but knife-time was significantly longer in the laparoscopic group, a result which agrees with large randomized studies of LO and OS for colon cancer [12]. In published studies of more than 15 cases of laparoscopic Hartmann's reversal, the conversion rate was 10 to 20% [12] versus only 16.6% in the present study, which may partly explain the relatively long laparoscopic knife-time found in the present study. In accordance with the studies included in the above-mentioned review [10], a significantly lower intraoperative blood loss and a reduced length of post-

operative hospital stay were found in the laparoscopic group. In contrast to previous studies [10, 13], we found no difference in the postoperative complication rate in favour of LS, probably due the small number of patients analysed. The total mortality rate of 0% was low as compared with that in other studies [2, 7].

## Conclusion

Although there are some limitations to the present study, resulting from its nonrandomized and retrospec-

tive design, we conclude that it seems probable that trained laparoscopic general surgeons may perform laparoscopic reversal of Hartmann's procedure as safely as in open surgery while achieving a faster recovery, shorter hospital stay and less blood loss despite a longer knife-time. It therefore seems reasonable to offer patients a laparoscopic procedure at the departments that are skilled in laparoscopic surgery and use it for standard general surgery.

## LITERATURE

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