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Original research

Single-port laparoscopic reversal of Hartmann's procedure via the colostomy site

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HIGHLIGHTS

- Laparoscopic techniques have been employed in colostomy reversals.
- Reports on the use of single-port technique for Hartmann reversal are rare.
- We reviewed the outcomes of 23 cases of single-port laparoscopic Hartmann reversal.
- We have demonstrated safety of patients and technical efficacy.

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ABSTRACT

Background: The aim of this study was to report our initial experience with single-port laparoscopic reversal of Hartmann's procedure (SP-LHR).
Methods: Between December 2009 and March 2014, 23 patients underwent single-port laparoscopic reversal of Hartmann's procedure. Single-port laparoscopic surgeries (SPLS) were performed through the preexisting stoma site. A commercially available single port with one 5 mm and two 12 mm trocars was used with conventional straight and rigid laparoscopic instruments. Patient demographics and operative and postoperative outcomes were analyzed.
Results: SP-LHR was successful in 22 patients. No additional incisions for trocars or conversions to open surgery were necessary. In 1 patient, the procedure was aborted. The median operative time and post-operative length of stay were 165 min (range, 100–340 min) and 8 days (range, 4–31 days), respectively. The median time to the resumption of oral intake was 3 days (range, 1–16 days). No intraoperative complications were noted; there were four postoperative complications including one anastomotic leak.
Conclusions: In our experience, SP-LHR via the colostomy site was safe and feasible, and may be considered an additional surgical option for experienced SPLS surgeons in selected patients.

1. Introduction

Reversal of Hartmann's procedure to restore intestinal continuity requires a major surgical procedure with a high morbidity (55–60%) and mortality (5–10%) [1–3]. For this reason, approximately 40% of patients never undergo reversal of their colostomies [4]. Laparoscopic techniques have been employed in colostomy reversals in an attempt to reduce morbidity and mortality. However, technical challenges such as trocar placement, dense adhesions, and rectal stump identification [5] have made surgeons reluctant to utilize the laparoscopic approach. Nevertheless, several studies comparing laparoscopic and open surgery have consistently demonstrated the advantages of the laparoscopic approach for reversal of Hartmann's closure [6]. Because of its benefits, single port laparoscopic surgery (SPLS) is being performed more frequently, particularly in colorectal surgery. However, reports on the use of SPLS for the reversal of Hartmann's procedure are rare. We performed 23 consecutive single-port laparoscopic Hartmann reversals (SP-LHR) via the colostomy site and found the procedure to be not only minimally invasive, but also simple and efficient for the restoration of intestinal continuity. In this article, we report our early experiences and techniques for SP-LHR via the preexisting

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stoma site.

2. Methods

2.1. Patients

Between December 2009 and March 2014, 23 patients underwent SPLS for reversal of Hartmann's procedure at Daejeon St. Mary's Hospital, an affiliate of the Catholic University of Korea. In one patient, the anastomosis could not be completed due to a previous gastrectomy, which prevented the descent of the proximal stump of the left colon to the rectal stump despite mobilization of the splenic flexure. In all other patients, the reversal of Hartmann's procedure was performed consecutively by a single surgeon using SPLS. The current study retrospectively analyzed the data collected from these 22 consecutive SPLS patients. Written informed consent was obtained from all patients who underwent SPLS. All patients who were eligible for conventional laparoscopic procedures met the inclusion criteria. No patients were excluded from SPLS on the basis of type and number of prior abdominal operations or BMI. Exclusion criteria were severe cardiopulmonary compromise during pneumoperitoneum under general anesthesia. Details of the initial Hartmann's procedure were recorded. Preoperatively, we examined and measured the length of the rectal stump by colonoscopy. All patients underwent preoperative bowel preparation. Patient demographics, perioperative outcomes, and intra- and postoperative complications were assessed.

2.2. Surgical technique

The patient was placed in the lithotomy position with the right arm adducted. The operator stood on the patient's left side for the initial mobilization of the colostomy. The stoma was first mobilized down to the fascia and completely detached from the abdominal wall. The colon was transected to remove the stoma and an optimal sized anvil of a circular stapler was secured in the proximal colon (Fig. 1). The prepared colon was then returned to the peritoneal cavity. After direct vision adhesiolysis of peritoneal adhesions around the stoma site we inserted a single port device comprised of an ALEXIS wound retractor (Xsmall; Applied Medical, Rancho Santa Margarita, CA, USA) and a surgical glove. Next, a commercial single-port (OCTO port; Dalim, Korea), with one 5-mm and two 12-mm trocars, was inserted (Fig. 2). The operator and scope assistant then moved to the patient's right side to begin SPLS.

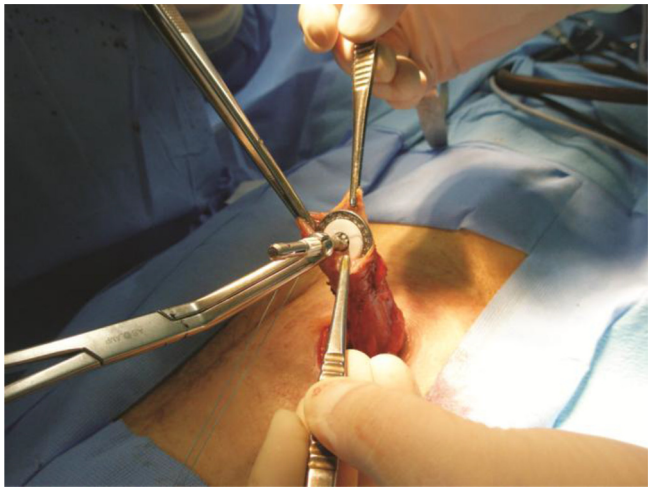

Fig. 1. Mobilization of colostomy and insertion of the anvil.

Pneumoperitoneum was established by insufflating the abdominal cavity to a pressure of 12 mmHg. In contrast to conventional laparoscopic surgery, we performed the operation from the patient's left side for the first five cases. However, during these five cases, the orientation felt awkward and clumsy. Subsequently we changed our approach to one from the patient's right side. With the patient tilted more steeply, we could perform routine SPLS in a fashion similar to conventional laparoscopic procedures. A rigid, 30-degree, 10 mm laparoscope was inserted through the 12 mm trocar. Conventional straight and rigid-type laparoscopic instruments were used. After the patient was moved into the Trendelenburg position, with the right side tilted down, a surgical procedure similar to a conventional laparoscopic Hartmann reversal was performed. We first identified the rectal stump (Fig. 3A). If adhesions were present between the single incision site and the rectal stump, a dissection was performed in a fan-shaped pattern towards the rectal stump region, with the incision site at the center. A splenic flexure mobilization was selectively performed when an appropriate length of proximal colon was not available to achieve a tension-free anastomosis with the rectal stump. In some cases, circular stapler sizers were used to assist in the identification and mobilization of the rectal stump. After an end-to-end anastomosis was made with a circular stapler transanally (Fig. 3B), we checked the anastomosis and intra-abdominal conditions, and completed the operation. The ostomy site was closed with absorbable sutures (Vicryl 1.0), and the skin was closed absorbable (Vicryl 4.0) or non-absorbable sutures (Nylon 2.0) (Fig. 4).

3. Results

Except for 1 patient in whom the colostomy closure was aborted, the SP-LHR was successful in 22 patients. No additional incisions for trocars or conversions to open surgery were required. No patients required a temporary loop ileostomy. Patient demographics and the indications for Hartmann's procedure are shown in Table 1. Prior Hartman's procedure was performed by laparoscopic surgery in 16 patients and by open method in 6. The two most common indications for Hartmann's procedure were complications of diverticular disease ($n = 6$, four perforation, one abscess, and one fistula), and colorectal cancer ($n = 6$, four obstruction and two perforation). Other indications ($n = 3$) included perirectal abscess, trauma, and undetermined colitis. The rectal stump length on preoperative colonoscopic evaluation was <10 cm in 7 cases, 10–20 cm in 14 cases, and >20 cm in 1 case. The operative and postoperative outcomes are shown in Table 2. No intra-operative complications were noted. Postoperative anastomotic site leakage occurred in 1 patient (4.5%) who was treated subsequently with resection and reanastomosis without fecal diversion using SPLS on postoperative day 10 and was discharged 7 days after the reoperation. One patient was readmitted 1 month postoperatively due to rectovesical fistula formation, and was treated with the Hartmann's procedure using the open method. Additionally, two minor postoperative complications were noted, namely, postoperative ileus ($n = 1$) and wound infection ($n = 1$). These complications resolved with conservative management.

4. Discussion

Although the Hartmann procedure was first developed to treat rectosigmoid carcinoma by Henri Hartmann in 1923, the procedure is still used today for a variety of indications, particularly diverticulitis complicated by peritonitis. Because no anastomosis is performed, the Hartmann procedure can be utilized relatively safely and effectively in emergency situations. Additionally, it permits early resumption of oral intake postoperatively. However, several