

Original Article

Laparoscopically Assisted Reversal of Hartmann's Pouch

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Key Words

Reversal of Hartmann's pouch;
Laparoscopy;
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Purpose. Restoration of bowel continuity after Hartmann's procedure is a major operation and is associated with increased morbidity and mortality, especially in elderly patients and in those in a poor condition. Our aim was to evaluate laparoscopically assisted reversal of Hartmann's pouch in a case series of patients.

Methods. A retrospective review of patients who underwent laparoscopically assisted reversal of Hartmann's pouch was performed between January 2002 and January 2005. All 10 patients were diagnosed with perforated diverticulitis of left sided colon and were initially treated by exploratory laparotomy with Hartmann's procedure.

Results. Ten patients (9 men and 1 woman; mean age, 58.6 years) underwent laparoscopically assisted reversal of Hartmann's pouch. All patients were diagnosed with perforated diverticulitis at a mean time of 5.2 months after the initial operation. The mean operative time was 248.4 min, and the mean longest incision length was 5.3 cm. The mean estimated blood loss was 98.7 ml. No conversion to laparotomy was noted (0%). Intraoperative complications included 1 bowel injury and 1 bladder injury. Post-operative complications included 4 colostomy-site wound infections. There was no mortality associated with the procedure.

Conclusions. Laparoscopically assisted reversal of Hartmann's pouch is technically challenging and time consuming. It has low operative morbidity and mortality. Conventional laparotomy is one choice for reversal of Hartmann's pouch, and laparoscopic reversal of Hartmann's pouch is another good choice. Laparoscopic reversal is our preferred approach for reversal of Hartmann's pouch.

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Minimally invasive techniques have been used for colorectal surgery more frequently since 1990.¹ Since 1993, reports of laparoscopic techniques for reversal of Hartmann's pouch have been described, illustrating their feasibility and safety.^{2,3} Hartmann's procedure consists of a colostomy and a

sigmoidectomy with closure of rectal stump. It is a common operation for colonic surgery in disease of the left side of the colon, such as complicated perforated diverticulitis, distal neoplastic perforation, distal neoplastic obstruction, and traumatic lesions.

The aim of this study was to evaluate the results of

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laparoscopically assisted reversal of Hartmann's pouch in a single hospital in patients diagnosed with perforated diverticulitis.

Materials and Methods

Of the patients who were treated at the Division of Colon and Rectal Surgery at the Tri-Service General Hospital between January 2002 and January 2006, 10 patients were diagnosed with perforated diverticulitis and were initially treated by exploratory laparotomy with Hartmann's procedure. They then underwent laparoscopically assisted reversal of Hartmann's pouch. These patients were fit for laparoscopic surgery under general anesthesia with laparoscopically assisted reversal of Hartmann's pouch. All patients underwent preoperative evaluation, which included assessment of the remaining colon and rectal stump by colonoscopy and rectoscopy.

Data on age at reversal, sex, body mass index, operative time, largest incision length, volume of blood loss, intraoperative complications, operative complications, postoperative bowel movements, length of hospital stay, and length of follow-up at the outpatient department were recorded.

Surgical Technique

All operations were performed in the modified lithotomy position under general anesthesia. The surgeon stood on the right side of the patient, with the assistant standing on the left. First, the colostomy site was mobilized through a peristomal incision with the anvil of a circular stapling device inserted into the lumen of descending colon. The descending colon with anvil secured was placed into the abdominal cavity. The fascia of the colostomy site was closed, and the colostomy site was used as the 5-mm port site.

Second, a 10-mm port was inserted to gain access to the peritoneal cavity with establishment of pneumoperitoneum above the umbilicus. Two additional ports were inserted directly under clear vision. A 12-mm

port was placed in the right lower iliac fossa, and a 5-mm port was placed into the right upper quadrant of the abdomen. Intra-abdominal adhesiolysis was performed by sharp dissection. Mobilization of the descending colon and the splenic flexure was done to ensure a tension-free colorectal anastomosis. Resection of residual distal sigmoid colon to the junction of the rectosigmoid was achieved using a laparoscopic linear stapler. The rectal stump was mobilized to facilitate the transanally inserted circular stapler or Hegar dilator. Finally, we performed the transanal end-to-end anastomosis using a circular stapling device.

Ethics approval for the study was granted, and the patients provided informed consent.

Results

Ten patients who had undergone laparoscopically assisted reversal of Hartmann's pouch were included in the study. All patients were diagnosed with perforated diverticulitis and consented to initial surgery with Hartmann's procedure. There were 9 male patients and 1 female patient. The mean age was 58.6 years (range, 32-72 years). The mean body mass index was 24.8 kg/m² (range, 21.3-30.2 kg/m²).

The mean duration from the initial operation and the laparoscopically assisted reversal of Hartmann's pouch was 5.2 months (range, 3-8 months). The mean operative time was 248.4 min (range, 150-380 min), and the mean longest incisional length was 5.3 cm (range, 4-7 cm). The mean estimated blood loss was 98.7 ml (range, 50-200 ml) (Table 1). Intraoperative complications included 1 bowel injury and 1 bladder injury: repairs were performed under laparoscopy immediately. Post-operative complications included 4 colostomy-site wound infections after primary suture of the colostomy site, and these 4 patients had the longest hospital stay. No patients developed ileus, urinary tract infection, or incision hernia (Table 2). There was no mortality associated with the surgery.

The mean time to the first flatus was 2.8 days (range, 2-4 days), and the mean time to the first stool was 3.7 days (range, 3-5 days). The mean time to first

Table 1. Surgical and postoperative variables

Variables	Mean (range)
Duration of closure of colostomy (months)	5.2 (3-8)
Body mass index (kg/m ²)	24.8 (21.3-30.2)
Operation time (min)	248.4 (150-380)
The longest incision of length (cm)	5.3 (4-7)
Estimated blood loss (ml)	98.7 (50-200)
Time to first flatus (days)	2.8 (2-4)
Time to first bowel movement (days)	3.7 (3-5)
Time to oral intake (days)	3.1 (2-4)
Dose of Demerol used (mg)	35.3 (0-100)
Duration of hospital stay (days)	8.8 (6-14)
Follow up duration (months)	15.7 (4-38)

oral intake was 3.1 days (range, 2-4 days). The mean time of discharge from the hospital was 8.8 days (range, 6-14 days). During hospitalization, 2 (20%) patients used devices for pain control, and the mean dose of Demerol was 35.3 mg (range, 0-100 mg). After discharge, the mean duration of follow-up at the outpatient department was 15.7 months (range, 4-38 months) (Table 1).

Discussion

Hartmann's procedure is usually chosen for complicated diverticulitis and its associated complications, including fecal and purulent peritonitis followed by intra-abdominal abscess and fistula.⁴ A systematic review concluded that reversal of the Hartmann's pouch has a high operative morbidity and mortality and is performed in only 44% of the patients.⁵ Young and healthy patients are suitable for reversal of Hartmann's pouch, but elderly patients and those in poor condition also require reversal of Hartmann's procedure. The midline wound of the laparotomy can cause severe postoperative pain and compromised pulmonary function, with a high rate of morbidity and mortality.

The overall complication rate of Hartmann's procedure (laparotomy plus laparoscopic approach) is 16.3% (range, 3.6-50%).⁵ The most frequent postoperative complication is surgical wound infection (12.5%; range, 5-30%).⁶ The mean rate of late complications such as stricture of the anastomotic site is

Table 2. Intraoperative and postoperative complications

Characteristics	Number of subjects n (%)
Intraoperative complications	
None	8 (80)
Bowel injury	1 (10)
Bladder injury	1 (10)
Postoperative complications	
None	6 (60)
Urinary tract infection	0
Colostomy-site wound infection	4 (40)
Ileus (over 5 days)	0
Incisional hernia	0
Pain control anesthesia used	2 (20)

5.8% (range, 2-10%).⁵ The most frequent cause of mortality is septic shock with related complications due to dehiscence of the anastomotic site or intra-abdominal abscess formation.^{2,5-7} However, patients treated by laparoscopy had a lower mean complication rate than that of patients treated by laparotomy (12.2% vs. 20.3%), and the most frequent complications in these two groups (laparotomy plus laparoscopic groups) were wound infection (mean, 10.8% vs. 14.2%), leakage of anastomotic site (mean, 1.2% vs. 5.1%), and cardiopulmonary complications (mean, 3.6% vs. 5.1%). The mortality rates in the 2 groups were similar (mean, 0.9% vs. 1.1%).⁵ Many of the operative complications could contribute to colostomy site infection.⁵

Laparoscopically assisted reversal of Hartmann's pouch has some of the advantages of minimally invasive surgery that have been shown for colorectal procedures.^{2,5} Some cases series reported conversion rates ranging from 0% to 25%, most often because of extensive abdominopelvic adhesion.^{1,5} Adhesiolysis is the most difficult procedure in laparoscopic reversal of Hartmann's pouch, and some cases need to be converted to laparotomy because of it. In our patient population, laparoscopically assisted reversal of Hartmann's pouch was performed without conversion to open Hartmann's reversal (0%).

Several different laparoscopic techniques for Hartmann's reversal have been reported. Minilaparotomy has been described for colostomy mobilization to apply the Dexterity and Pneumo Sleeve device: this technique combines the advantages of a

minimally invasive approach with direct access by the surgeon's hand into the abdominal cavity.⁸ Some surgeons prefer initial port insertion with an open Hasson technique in the right lateral abdomen before mobilization of the colostomy from the abdominal wall in order to achieve adhesiolysis, with dissection of the colostomy under direct vision. Others surgeons advocate the use of the colostomy site as a safe and convenient initial port to establish pneumoperitoneum.¹

Perforated diverticulitis with peritonitis results in abdominal adhesions due to an inflammatory reaction after the initial Hartmann's procedure. Some surgeons mobilize the splenic flexure at the initial operation to facilitate laparoscopically assisted reversal, which creates an additional risk of complications (3.1%).^{2,5,9} Some studies have reported decreased morbidity related to extensive dense abdominopelvic adhesions with a longer interval between the initial surgery and Hartmann's reversal.¹⁰⁻¹² In our study, the mean interval was 5.2 months (range, 3-8 months), with most occurring within 5 to 6 months.

Several studies have reported a mean operative time of 226 min, which is longer than the operative time of 140-180 min for open surgery.^{1,12,13} In our population, laparoscopy required 248.4 min. The advantages of the laparoscopic approach include a relatively short hospital stay, and lower morbidity rate for adhesions and incisional hernias.¹

Conclusion

Although laparoscopically assisted reversal of Hartmann's pouch is technically challenging and time consuming, it carries a low rate of operative morbidity and mortality. Conventional laparotomy is one choice for reversal of Hartmann's pouch, and laparoscopic reversal of Hartmann's pouch is another good choice. Laparoscopic reversal is our preferred approach for reversal of Hartmann's pouch.

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原 著

腹腔鏡手術關閉 Hartmann's 造口

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目的 腹腔鏡手術關閉 Hartmann's 造口是一個可以重建大腸連續性的大型手術，且通常對於老年人及身體狀況欠佳的病人有相當高的併發症與死亡率。這項回顧性研究的目的是對於腹腔鏡手術關閉 Hartmann's 造口的病例做綜合討論。

方法 這項回顧性研究，共蒐集了九位男性和一位女性，全部都因左側大腸憩室炎破裂而接受剖腹及 Hartmann's 造口手術，而於 2002 年一月到 2005 年一月接受腹腔鏡手術關閉 Hartmann's 造口。

結果 十位病人的平均年齡是 58.6 歲，距離因憩室炎破裂而行的剖腹手術平均 5.2 個月。平均手術時間是 248.4 分鐘，平均最長傷口為 5.3 公分，術中平均出血量為 98.7 毫升。在腹腔鏡術中沒有任何一例轉換為剖腹手術，腹腔鏡術中併發症共兩例，一例為大腸損傷，另一例為膀胱損傷。術後併發症共四例，皆為術後原 Hartmann's 造口處的傷口感染。術後並沒有死亡發生。

結論 利用腹腔鏡手術關閉 Hartmann's 造口需要較高的技術及較長手術時間，但會帶來較低的致病率與死亡率。傳統剖腹是一個關閉 Hartmann's 造口的選擇，腹腔鏡手術關閉 Hartmann's 造口是另一個好選擇。目前我們傾向選擇使用腹腔鏡關閉 Hartmann's 造口。

關鍵詞 關閉 Hartmann's 造口、腹腔鏡、憩室炎。