Laparoscopic Hartmann's Reversal: A Single Center Experience

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Rezumat

Repunerea în tranzit după operația Hartmann: experiența unui singur centru

Chirurgia colorectală minimal invazivă prezintă numeroase avantaje în ceea ce privește morbiditatea, abordul laparoscopic utilizat în cazul repunerilor în tranzit după Hartmann îmbunătățind rata de repunere și evoluția postoperatorie. A fost analizată baza de date a Institutului Clinic Fundeni, Departamentul de Chirurgie Generală, fiind selectate cazurile de refacere a continuității intestinale utilizând laparoscopia. Au fost identificate nouă cazuri, cu vârsta mediană de 63 de ani, cu o medie a BMI-ului de 29, dintre care trei pacienți operați inițial deschis. Timpul operator mediu a fost de 223 de minute și nu au necesitat ileostomie de protecție. Nu au fost raportate cazuri de dehiscență de anastomoză. Abordul laparoscopic rămâne o alternativă fezabilă pentru repunerea în tranzit după operația Hartmann, luând în considerare experiența echipei chirurgicale și particularitățile pacientului. Sunt necesare studii suplimentare pe loturi mai mari pentru a stabili clar avantajele acestui abord.

Cuvinte cheie: Hartmann, laparoscopie, colostomie, repunere

Abstract

Minimally invasive colorectal surgery showed multiple advantages in terms of morbidity, surgeons applied this approach to Hartmann reversal considering improving the reversal rate and postoperative

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outcome. The database from Fundeni Clinical Institute, General Surgery Department, was analyzed, selecting the laparoscopic Hartmann reversals. Nine cases were reported with a median age of 63 years, mean BMI 29 and three of them with prior open Hartmann surgery. The average operative time was 223 minutes, without any case necessitating ileostomy diversion. No anastomotic leakage was reported. The laparoscopic approach seems to be an attainable alternative in the reversal of Hartmann procedure, considering the experience of the surgical team and the patient's characteristics. Further studies are needed in order to confirm its superiority on larger case series.

Key words: Hartmann, laparoscopy, colostomy, reversal

Introduction

Hartmann procedure, initially introduced for sigmoid cancer by Henri Albert Hartmann in 1921 (1), nowadays, represents a rescue surgery performed most times in emergency when per primam anastomosis is considered unsafe. The high morbidity and mortality, 50% respective 15%, are not given by the procedure itself, but more likely by the clinical context in which it is performed, patients' comorbidities and its indications (stenotic colorectal cancer, peritonitis from diverticular disease, anastomotic complications, ischemic colitis, left side colonic volvulus, abdominal trauma and in patients with multiple comorbidities) (2). Specifically, for cancer, the mortality reported ranged between 7-27%, the morbidity 23-55% and the rate of restoration of continuity 36% (3-5). The median rate for reversal for all etiologies is 44%, ranging from 19% to 71% and the median time interval is 5-7 months (6). This may be due to the fact that restoration of intestinal continuity following Hartmann's procedure is burdened by high morbidity 4-30% and mortality 10-14% (7). Observing the tendencies in colorectal surgery and trying to reduce the amount of surgical trauma accompanying the open approach (8), thus reducing perioperative morbidity and mortality, the laparoscopic approach was proposed with clear advantages: lowering the duration of hospital stay and reducing the overall complication rate (9, 10). Many studies arose supporting the laparoscopic reversal: Golash V. (11), Kwak et al (12), Onder et al (13),

Celentano et al (14), Yang et al (15), Huynh et al (16), Di Carlo et al (17), Giuseppe et al (18) etc. Horesh et al (19) stated that a laparoscopic approach did not offer any short-term advantage when compared with open approach and Lucchetta et al (20) proposed a selection of patients suitable for an laparoscopic approach: young and without a severe peritonitis at the first operation. Regardless, high level evidence is needed to determine whether the laparoscopic approach is superior. But given the fact that laparoscopic Hartmann reversal is one of the most challenging interventions in minimally invasive colorectal surgery (21), with less than 20% of the reversal procedures being attempted laparoscopically, a good patient selection needs to be carried out (22). With new technological advantages, the minimally invasive approach to Hartmann reversal improves: trans-anal reversal (23, 24) and single-port reversal (7, 25).

Materials and Methods

The database from Fundeni Clinical Institute, General Surgery Department, was analyzed between January 2012 and December 2018, from which patients with malignant tumors localized on descending colon, sigmoid colon or rectum were selected. From 3066 cases, 742 had Hartmann procedure, with 79 (10.64%) minimally invasive resections. 159 cases (21%) of Hartmann reversal procedure were recorded, with 9 cases that underwent laparoscopic reversal. The data was analyzed using Microsoft Office Excel and Access.

Surgical Technique

Preoperative assessment consisted in a computer tomography of the abdomen and pelvis, to exclude a possible recurrence or metastatic disease and in a colonoscopy on the rectal stump and on the remaining colon, to exclude metachronous disease and to evaluate the rectal stump and his length.

The bowel preparation was done using osmotic laxative (macrogol) and a mild enema to empty the rectal stump, a day prior to the surgery. Preoperative antibiotic prophylaxis was done one hour before the skin incision and subcutaneous low-molecular-weight heparin was administered the whole perioperative period.

The patient was placed in modified lithotomy position with the right arm tucked at his side. A urinary catheter and a nasogastric tube were placed.

The pneumoperitoneum was obtained through open laparoscopy with a 12 mm trocar placed paraumbilical right. Three to five trocars are used depending of the intraoperative assessment. Adhesiolysis is done in order to enable the placement of the additional trocars and to properly perform the surgery. The first step was the mobilization of the small bowel from pelvis and left iliac fossa, after that the rectal stump was minimally dissected to ensure an adequate area for the anastomosis on the anterior wall, taking care not to injure the posterior wall of the bladder. For an easier identification, the rectal stump can be suspended to the presacral fascia, but this technique was not used in this cases (26). Colo-parietal dissection was performed, afterwards the splenic flexure was mobilized, in order to ensure a tension free anastomosis. This is considered the key point of the surgery. The colostomy was removed, and

the bowel was taken out from the abdomen. Two techniques were used to achieve the anastomosis. First one, intracorporeally: the anvil was introduced in the proximal end after careful preparation and the bowel was returned in the abdominal cavity with the closure of the colostomy site. In difficult cases the colostomy site can be used to hand assist the formation of the anastomosis. The second, extracorporeally, uses the colostomy orifice, after careful surgical site isolation, to mobilize the proximal and distal ends through it and perform a latero-lateral anastomosis, obviously in this case a longer stump is needed (*Fig. 1*).

The rectal stump was intraoperatively cleansed, and the circular stapler was positioned. The majority had intracorporeal anastomosis performed under laparoscopic guidance, with no diversion stoma and no additional suture reinforcement. The lavage of the peritoneal cavity was done, careful hemostasis was performed, and a pelvic drain was placed. Pneumoperitoneum was evacuated, the trocars removed, and the surgical access was closed.

Results

The median age of the group was 63 years old (50 to 79 years). Male to female ratio is 4:5 with a mean BMI of 29 (22 to 41). The majority of the patients was ASA II, except two cases with ASA III (*Table 1*).

The Hartmann procedure was performed for colorectal cancer in elective setting, with an open approach in 2 cases, laparoscopic in 5 and one robotic. The length of the rectal stump was greater than 10 cm with a mean value of 16.66 cm (10 to 30).

The time between the first surgery and the laparoscopic reversal varies from one month to 22 months, with an average of 8 months (*Table 2*).

Table 1. Patient's characteristics

	1	2	3	4	5	6	7	8	9
Age	62	78	50	62	57	78	79	63	63
Sex	M	F	F	F	M	M	M	F	F
BMI	28	32	41	26	22	24	30	27	32
ASA	II	III	II	II	II	III	II	II	II

Figure 1. Intraoperative aspects

The operative time for the laparoscopic reversal had an average of 223 minutes (180 to 260).

No conversions were reported, and the diversion ileostomy was not required.

Postoperative recovery was evaluated by the length of the hospital stay with a mean value of 8 days (6 to 13), the necessary time to

recover the bowel motility was 3 to 5 days with an average of 3 days and postoperative complications. Two patients had postoperative complications consisting in wound infection following stoma take down and hematuria, that needed supplementary treatment and investigations. No anastomotic leakage was reported (*Table 3*).

Table 2. Preoperative data

	1	2	3	4	5	6	7	8	9
Stump length	30	10	14	13	10	12	20	11	30
Initial approach	L	R	0	L	L	L	L	0	0
Time between surgeries	2	1	5	6	2	8	14	22	12

Table 3. Operative data

	1	2	3	4	5	6	7	8	9
Operative time	215	230	260	220	180	250	210	210	240
Postoperative hospital stay	7	7	10	6	10	6	13	7	9
Postoperative ileus	3	4	4	3	5	3	3	3	5
Complications	0	0	0	0	0	0	hematuria	0	Wound infection following stoma take down

Discussion

Colorectal cancer is a pathology that predominates in the elderly, usually associated with multiple comorbidities that challenges the therapeutic scheme. The age is not per se a factor of prognostic given the high heterogeneity of the elderly population (27). These features are highlighted in the study group. Given the current laparoscopic indications, patients with ASA III are not necessarily suitable for it, but they benefit the most from this type of approach (28).

Minimally invasive approach had shown multiple amenities in colorectal surgery (28, 29), from which the patients who had undergone Hartmann procedure can benefit, given the high mortality and morbidity associated. The reversal rate is low for Hartmann procedure performed for cancer, with studies reporting a rate as low as 17% (30). This can also be improved by laparoscopy, being a more patient-friendly approach.

The reversal rate is influenced by patient's wish, by the need of adjuvant chemotherapy, by the oncological outcome and by comorbidities.

The patient's wish was influenced by initially postoperative recovery, colostomy tolerance and management.

Adjuvant chemotherapy is often needed after Hartmann surgery and so the reversal is delayed until the first oncological assessment, fact also supported by the reported mean time difference from the initial surgery of 8 months. The local recurrence also impedes it.

Challenges in laparoscopic Hartmann reversal arise when the patient is obese, BMI over 30, the rectal stump is short, less than 10 cm, and the initial pathology is cancer. This can also be used as a selection criterion given the already difficult procedure. The laparoscopic approach in the reversal is influenced by the surgical team experience in minimally invasive colorectal surgery.

The most important step in this procedure is the adhesiolysis, which decides if the laparoscopic approach is suitable or needs conversion. Difficulties in pelvic dissection remain a key point, mainly when the rectal stump is short

and consecutively massive adhesions form. When performing adhesiolysis, the surgeon needs to take into account the risk of intestinal injuries which needs to be addressed intra-operatively. A rigorous rectal stump dissection is not necessary, lowering the risk of injuries and ensuring a proper anastomosis. Splenic flexure mobilization is mandatory and one of the key points of the surgery.

Another problem arises from the rectal stump atrophy which often impedes a termino-terminal anastomosis given the caliber difference, so a termino-lateral anastomosis is more appropriate and lowers the risk of anastomotic leakage. Given the surgical team experience and technical possibilities, an intracorporeal anastomosis can be performed with higher rates of restoration the intestinal continuity.

Conclusion

The laparoscopic approach is feasible in the reversal of Hartmann procedure, taking into account the experience of the surgical team and the patient's characteristics. The rapid postoperative recovery, the lack of ileostomy and the low rate of complications advocate for laparoscopy, being a good alternative, but further studies are needed in order to confirm its superiority.

Author's Contributions

Daniel Gavrilă and Corina Minciuna share the first authorship.

Conflict of Interest

The authors declare no conflicts of interests.

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