



Original article

Laparoscopic approach for intestinal passage reconstruction after Hartmann's operation: Experience with 30 patients

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Introduction: Intestinal passage reconstruction after Hartmann's (PRH) operation is associated with a high morbidity and mortality of about 1%. Despite the increasing use of laparoscopy as an alternative in PRH, there is a lack of patient series at international level.

Patients and methods: The prospective series of patients subjected to (PRH) by laparoscopy was analysed using the demographic parameters, ASA classification, reason for primary surgery, time between initial surgery and reconstruction, operation time, conversion to open surgery, bowel rest recovery time, complications, hospital stay and follow up.

Results: A total of 30 patients with a mean age of 61.5±13 years were operated on using laparoscopy. The ASA classification was 1.8±0.3 the BMI was 26.1±2 kg/m². A total of 63% were admitted due to complicated Hinchley III or IV acute diverticulitis. The interval between initial surgery and the passage reconstruction was 7.1±2 months. Conversion to open surgery was necessary in three cases. The mean intestinal passage recovery was 2.1±1 days and the hospital stay was 5.6±1 days. The long-term complications were one mechanic ileum due to bridles and one case of anastomotic stenosis.

Conclusions: The post-Hartmann laparoscopic passage reconstruction is associated with a short intestinal motility recovery time, as well as a less prolonged hospital stay compared to an open surgery series. Randomised studies are needed to determine whether laparoscopic reconstruction is superior to the conventional technique.

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Abordaje laparoscópico para la reconstrucción de tránsito intestinal post-Hartmann: experiencia de un centro sobre 30 pacientes

R E S U M E N

Palabras clave:

Operación de Hartmann
Laparoscopia
Reconstrucción de tránsito

Introducción: La reconstrucción de tránsito posterior a una operación de Hartmann (RTH) se asocia a una alta morbilidad y mortalidad cercana al 1%. Pese al creciente uso de la laparoscopia como alternativa en la RTH, existen escasas series a nivel internacional.

Pacientes y métodos: La serie prospectiva de pacientes sometidos a RTH por vía laparoscópica fue analizada considerando parámetros demográficos, clasificación ASA, motivo de la cirugía primaria, tiempo entre la cirugía inicial y la reconstrucción, tiempo operatorio, conversión a cirugía abierta, tiempo de recuperación del reposo digestivo, complicaciones, estancia hospitalaria y seguimiento.

Resultados: Un total de 30 pacientes con una edad media de $61,5 \pm 13$ años fueron abordados por vía laparoscópica. La clasificación de ASA fue de $1,8 \pm 0,3$ y el IMC fue de $26,1 \pm 2 \text{ kg/m}^2$. Un 63% ingresó con diagnóstico de una diverticulitis aguda complicada Hinchey III o IV. El intervalo entre cirugía inicial y la reconstrucción de tránsito fue de $7,1 \pm 2$ meses. En tres casos fue necesaria conversión a cirugía abierta. La media de recuperación del tránsito intestinal fue de $2,1 \pm 1$ días y la estancia hospitalaria fue de $5,6 \pm 1$ días. Las complicaciones a largo plazo fueron un íleo mecánico por bridas y un caso de estenosis anastomótica.

Conclusiones: La reconstrucción de tránsito laparoscópica post-Hartmann está asociada a un tiempo de recuperación de la motilidad intestinal corto, así como a una estancia hospitalaria menos prolongada en relación con series de abordaje abierto. Estudios aleatorizados son necesarios para determinar si la reconstrucción laparoscópica es superior a la técnica convencional.

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Introduction

In the 1920s, Hartmann described a surgical technique for the treatment of proximal rectal cancer. Since then, this procedure has been used in situations such as distal obstructions and perforations of the rectosigmoid region, complicated diverticular disease, colonic volvulus, and iatrogenic lesions of the colon in an effort to reduce mortality caused by anastomotic leakage following a primary union. Even when the patient has completely recovered from the initial pathology, passage reconstruction with colorectal anastomosis is still considered a major surgical procedure, associated with surgical morbidity and mortality that reach 50% and 5%, respectively.¹ In recent decades, several attempts have been made at performing passage reconstructions after a Hartmann's operation (TRH) using less invasive techniques, in an attempt to reduce the described morbidity and mortality rates. However, an estimated 50% of patients that have undergone a Hartmann's operation do not receive passage reconstructions either using less invasive techniques or by open surgery.¹ Laparoscopic passage reconstruction after a Hartmann's operation (LR) is a safe procedure when performed by a surgeon with experience in minimally invasive techniques. It has a mortality rate that varies between 0% and 7% according to studies (Table 1) and with associated conversion rates between 9% and 15%.²⁻⁵ Furthermore, LR is associated with a low rate of morbidity, less pain, shorter hospitalisation periods, reduced postoperative ileus, and earlier reintegration into the workplace.^{6,7}

Objective

The objective of this prospective study was to describe the results obtained in patients that underwent LR in the Clinical Hospital of the Pontificia Universidad Católica de Chile between 1998 and 2008.

Patients and methods

Within a ten-year period (between November 1998 and November 2008), a total of 68 patients underwent an intestinal passage reconstruction after Hartmann's operation. All patients that underwent an LR from this group were included in the analysis. The decision to operate using a laparoscopic or open surgery approach depended on the surgeon's personal experience using colorectal laparoscopic surgical techniques. Data were compiled for demographic parameters (age and sex), American Society of Anaesthesiology (ASA) classification, body mass index (BMI), reason for emergency primary surgery, time between initial surgery and LR, operation time, intraoperative complications and need to convert from laparoscopic to open surgery, bowel rest recovery time, early and late complications, hospital stay, and follow-up. We considered the operative wound to have become infected if erythema or drainage with fluids yielding a positive infection culture was present, which required local treatment or antibiotic prescription. The postoperative follow-up was performed by checking the medical histories and contacting

Table 1 – Hospitalisation days, conversion, morbidity, and mortality of laparoscopic passage reconstruction studies with more than 20 patients

First author (year)	No.	Hospitalisation, days	Conversions, %	Morbidity, %	Stenosis, %	Leakage, %	Infection, %	Mortality, %
Regadas (1996)	20	4	15	15	–	–	10	0
Rosen (2005)	20	4.2	9	18	–	–	18	0
Khaikin (2007)	23	6	14.8	18	–	0	20	0
Slawik (2008)	28	3	3.6	7.1	–	–	7.1	7.1
Carus (2008)	28	8.6	17.9	14.3	–	3.6	10.7	–
Chouillard (2008)	44	4.8	9.1	11.2	–	–	9	2.2
Haughn (2008)	61	–	–	10.3	1.6	–	3.8	0
Mazeh (2009)	41	6.5	19.5	17.6	–	0	14.6	0
Petersen (2009)	71	–	12.7	2.8	–	–	–	1.4
Caselli (2010)	30	5.6	10	10	3.3	0	13.3	0

Adapted from: Van de Wall B, Draaisma W, Schouten E, Broeders I, Consten E. Conventional and laparoscopic reversal of the Hartmann's procedure: a review of literature. *J Gastrointest Surg.* 2010;14:743-52.

the patients by telephone. We defined early complications to be all cases of morbidity that occurred within the first 30 days after surgery. Late complications were those that occurred after 30 days.

Surgical technique

All patients received an antegrade mechanical bowel preparation, performed using 2 vials of Fleet Phospho-soda® and prophylactic antibiotics administered by i.v. 30 min before surgery (1 g cefotaxime and 500 mg metronidazole). The procedure commenced by placing the patient in the Lloyd-Davies position. The ostomy was created and, depending on the diameter of the ostomy, an ILS CDH 33® or 29® (Ethicon Endo-Surgery Inc) circular stapler anvil was placed. This proximal end was introduced into the abdominal cavity and a digital examination was performed to make sure that there were no dense adhesions in the periumbilical region. Once the existence of adhesions had been ruled out, a 10 mm umbilical trocar was placed (for the 0° laparoscope) and another was set in the ostomy site. Once the intra-abdominal pressure was at 15 mm Hg, two 5 mm trocars were placed. We then proceeded with a blunt dissection of adhesions to fully expose the rectal stump. When increased tension was detected in the descending colon, the splenic angle was freed in order to ensure a safe and tension-free anastomosis. The anvil was assembled with the circular stapling point introduced transanally under laparoscopic control. Subsequently, anastomotic leaks were ruled out using pneumatic tests. A pelvic drain was placed in all the cases. The trocars were removed under direct visual control and the aponeurosis of the umbilical trocar and ostomy wound were closed using reabsorbable material.

Descriptive statistical analysis

This review article is based on an observational study of a series of cases with data entered prospectively.

Results

Between November 1998 and November 2008, 30 LR were attempted. Sixteen patients were female (54%), with an average age of 61 (13) years. The ASA classification for the patients that underwent this procedure was a mean of 1.8 (0.3), (ASA I, II, and III with 10, 16, and 4 patients, respectively). No patients in the study fell within the ASA category IV. The mean body mass index (BMI) was 26.1 (2) kg/m². The majority of the patients had initially undergone a Hartmann's operation for complicated diverticular disease (19 patients). Of this group, 16 were admitted with an initial diagnosis of Hinchey stage III acute diverticulitis (with generalised purulent peritonitis), and the other three were diagnosed with Hinchey stage IV acute diverticulitis (faecal peritonitis). The cause for the primary surgery in the rest of the patients is summarised in Table 2. The mean interval of time between the first surgery and the LR was 7.1 (2) months. In accordance with the operation data, the mean duration of surgery was 172.5 (58) min (with a range of 90-300 min). No cases required transfusion of haemoderivatives. Three patients had intraoperative complications that required conversion to open surgery. The causes were an anastomotic leak detected by the hydropneumatic test, lysis of problematic bridges in the second case, and the third was an ischaemically compromised oral end of the colon. No other cases of colorectal anastomotic leaks occurred during the hospitalisation period. The recovery of the intestinal passage required a mean of 2.1 (1) days, and the mean duration of hospitalisation was 5.6 (1) days. The global morbidity rate was 20%. Among these, one patient had prolonged ileus, requiring 9 days of hospitalisation. No cases of evisceration or problems derived from the trocars were found (neither bleeding or seroma). In two patients, the site of operation became infected, in the umbilical trocar in both cases, with positive cultures for gram-positive bacteria. Both were controlled using oral antibiotics. Lastly, one patient in our study had an atelectasis that was treated medically. As far as late morbidity is concerned, one case of stenosis of the colorectal anastomosis was produced that corresponded

Table 2 – Reasons for the primary surgery (Hartmann's Operation) in patients that underwent laparoscopic passage reconstruction surgery

Reasons for the Hartmann's operation	No.	%
Acute complicated diverticulitis	19	63
Obstructive neoplasms of the sigmoid colon	3	10
Perforated neoplasms of the sigmoid colon	2	6.6
Ischaemic colitis	2	6.6
Sigmoid volvulus	1	3.3
Iatrogenesis	1	3.3
Ischaemic colitis	1	3.3
Gynaecological neoplasia	1	3.3

to the first patient in the laparoscopic study, and which was treated conservatively with endoscopic dilations. A mechanic ileus was provoked by a single adhesion in one patient, which appeared 20 months after the passage reconstruction surgery. This was treated using laparoscopic surgery with good clinical results. The mean follow-up time of the study was 34 months, and mortality was 0%.

Discussion

Historically, an intestinal passage reconstruction after Hartmann's operation required major abdominal surgery, including extensive lysis of bridles and adhesions, severe postoperative pain, and prolonged mental and physical recovery time. Furthermore, complications have been reported in passage reconstruction by open surgery in between 4% and 43% of cases, with rates of infection between 5% and 24% and rates of anastomotic leaks between 12% and 16%.⁵⁻⁷ Mortality for this surgery could be as high as 4%-5%,⁸⁻¹⁰ mostly due to the inflammatory complications from anastomotic leaks and collections.

Few comparative studies exist comparing open approaches versus laparoscopic procedures for TRH.⁸⁻¹² However, these clearly show the advantages of minimally invasive surgery over a laparotomy, with special emphasis on the shorter mean hospitalisation period (6.9 days vs 10.7 days for open surgery).^{2,13-18} The patients that underwent laparoscopic procedures had lower morbidity rates than those that received open surgery (10.8% vs 14.2%), lower rates of anastomotic leakage (1.2% vs 5.1%), and fewer cardiopulmonary postoperative complications (3.6% vs 6.9%).¹ Even reoperation rates and the need to create a permanent ostomy are reduced in LR, although mortality appears to be similar in both types of surgical approaches (0.9% vs 1.1%).¹ We must point out that none of the articles that we reviewed corresponded to clinical randomised studies, and so the conclusions made must be taken with caution, since these are only made from comparative studies. Now, if we compare the laparoscopic study with a historical study on passage reconstruction by open surgery at our centre,¹⁹ a clear benefit is shown in using the laparoscopic approach relative to infections of the

operation wound (6.6% vs 25%) and incisional hernia (12% vs 0%). These differences were statistically significant ($P < .05$). The difference was not significant when compared with mechanic ileus (2.8% vs 3.3%). Some international studies have found similar conversion rates to those seen at our institution (reaching 10% of cases), although the majority of the studies' conversion rates were greater than 20%.^{2,3,9,20,21} Only Rosen, Slawik, and Chouillard reported slightly lower conversion to open surgery rates than those from our study.^{17,20,22} Regarding early complications, no patients had postoperative anastomotic leaks in our study, or needed a new ostomy. With respect to these results, only Carus et al showed a rate of 3.6% of anastomotic leakage in a study of 14 patients.¹⁶

Among the late surgical complications, our study resulted in one case of anastomotic stenosis in the first patient from the laparoscopic study, and one case of mechanic ileus caused by bridles. Only two studies resulted in rates of anastomotic stenosis of 7%, although both corresponded to small patient studies.^{23,24}

Laparoscopic reconstruction appears to be a valid alternative to open surgery. In this way, the procedure would reduce the postoperative recovery time as well as total morbidity. In spite of these results, LR has not gained universal acceptance in the field.¹² Many of the factors that surround this negative impression of a laparoscopic approach for passage reconstruction are believed to be related to the high rates of conversion to open surgery, which can be as high as 22%,¹ reflecting the fact that this type of surgery is technically demanding, in part due to the difficulty of laparoscopic lysis of adhesions, the need for an intracorporeal anastomosis, and the lack of familiarity with laparoscopic mobilisation of the colon. In some cases, the splenic angle must be mobilised as well in order to achieve adequate exposition, making an already complex procedure even more difficult. Marescaux et al, in their evaluation article on the difficulty of different techniques in colorectal surgery, classed the passage reconstruction after Hartmann's operation as the most complex technique to be performed in colorectal surgery. This was due to the acute inflammatory process still present in the majority of cases of complicated diverticular disease, increasing the difficulty of exposure of the surgical site and the dissection itself. This is why the procedure should only be performed by surgeons who are familiar with colorectal laparoscopic surgical techniques. This is not an ideal first case for surgeons with little experience of laparoscopic surgery.²⁵ Considering this background, the position of this hospital is to consider the conversion to an open surgical procedure as an alternative procedure rather than a failure of the laparoscopic procedure.

There is still an important debate regarding the optimal time for a passage reconstruction following the primary surgery. The majority of studies suggest a minimum time period of 4 to 6 months.¹² Our interval was 7 months, with no important differences in the time that patients waited for intestinal passage reconstruction using open surgery or laparoscopic techniques with respect to larger studies.^{1,26}

Conclusions

Our results are subject to the limitations inherent to a non-randomised study, due to the fact there is no control group undergoing open surgery and it is impossible to check for confounding factors. However, the description of this laparoscopic study in Chile does provide information that could be valuable to other health centres. LR was associated with a recuperation time, duration of hospitalisation, and morbidity similar to the foreign comparative studies. Randomised clinical studies are needed in order to determine if laparoscopic reconstruction is superior to the conventional technique.

Conflict of interest

The authors affirm that they have no conflicts of interest.

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