Transanal Hartmann reversal: a new technique

R. Bravo¹ · M. Fernández-Hevia¹ · M. Jiménez-Toscano¹ · L. F. Flores¹ ·
B. de Lacy¹ · S. Quaresima¹ · A. M. Lacy¹

Received: 2 June 2015 / Accepted: 3 August 2015 / Published online: 30 September 2015
© Springer Science+Business Media New York 2015

Abstract

Background Hartmann procedure consists in a sigmoidectomy followed by a terminal colostomy. However, the stoma is associated with complications and suboptimal quality of life, so the restoration of colonic continuity should be, at least, considered in any case. Open restoration has been associated with significant morbidity and mortality; therefore, many authors have described the advantages of laparoscopic Hartmann reversal. We want to go a step further showing our experience using a combined laparoscopic and transanal approach in an attempt to improve the surgical technique.

Methods Patients with an end colostomy due to an emergency Hartmann procedure are selected for this intervention. This approach is performed simultaneously laparoscopically and transanally, with single-port devices, through the colostomy wound in the first case and through anal canal in the second one. The previous stapler line is resected transanally and the proximal rectum and mesorectum are dissected until the peritoneal reflexion, where both teams work together to complete the adhesiolysis. Finally an end-to-end anastomosis is performed under laparoscopic control.

Results As in patients with rectal cancer, dissection of the stump in Hartmann reversal procedure may be better and associated with shorter operative time.

Conclusions As with any new surgical procedure, it is probably too early to draw conclusions, but nowadays transanal combined with laparoscopic approach seems to be a safe and feasible technique to perform a Hartmann reversal.

Keywords TAMIS · Hartmann reversal · Transanal total mesorectal excision · Rectal cancer

Henri Albert Hartmann, a French surgeon, first described in 1921 a technique for the treatment of rectal cancer, which consisted in a sigmoidectomy followed by a terminal colostomy in the left iliac fossa and closure of the rectal stump. However, Hartmann never considered the possibility of restoration of the intestinal continuity. Nevertheless, stoma is associated with complications and suboptimal quality of life, so the restoration of colonic continuity should be at least considered in any case. Open restoration has been associated with significant morbidity (13–50 %) [1], mainly anastomotic leakage (0–15 %), incisional hernia and wound infections, while mortality rate has remained as high as 5–10 % [1]. Due to these “deficient” outcomes and the associated patient comorbidities, up to 60 % of patients never have intestinal continuity re-established [2]. In 1993, Anderson et al. published the first report of a laparoscopically assisted Hartmann’s reversal and, since then, many other authors have described the advantages of this technique. Even after that, the procedure is not standardized. Hand-assisted and single-port techniques [3] have also been described with good results but still with technical difficulties. We want to go a step further showing our experience using a combined laparoscopic and transanal approach to re-establish the intestinal continuity in an attempt to improve the surgical technique.

Electronic supplementary material The online version of this article (doi:10.1007/s00464-015-4504-3) contains supplementary material, which is available to authorized users.

✉ R. Bravo
rbravo@clinic.ub.es

¹ Gastrointestinal Surgery Service, Hospital Clinic Barcelona, Carrer Villarroel 170, 08036 Barcelona, Spain

Surgical technique

Patients received mechanical bowel cleansing the day before. The rectal stump was cleaned with 250 cc of enema. All of them also received antibiotic prophylaxis with 2 g of cefoxitin, or 400 mg of ciprofloxacin and 500 mg of metronidazole in patients with allergy to penicillin, 30 min preoperatively. Patients were fixed and placed in lithotomy position with legs in padded, adjustable stirrups. The rectum was irrigated with diluted iodine solution. Two fields were prepared for both abdominal and perineal accesses. A urinary catheter was inserted in sterile conditions.

1. Abdominal approach:

A pericolicostomic incision was made, and the previous colostomy was individualized up to peritoneal cavity performing adhesiolysis if needed. The distal affected colon was resected and a purse string suture was performed around the anvil single-use stapler with 4.8-mm Staples (Autosuture, Covidien). A 12-mm umbilical trocar was located for a 30° camera. A GelPort Laparoscopic System (Applied Medical) with three 5-mm trocars was introduced through the colostomy wound. Pelvic adhesiolysis was performed.

2. Transanal approach:

The Lone star retractor was placed (CooperSurgical Inc., Stafford, TX) to evaluate the rectal stump. The GelPoint Path Transanal Access Platform (Applied Medical, Inc., Rancho Santa Margarita, CA) was introduced through the anal canal with three trocars in a triangle position: two conventional 12-mm trocars and one 10-mm AirSeal trocar (Surgique, Inc., Connecticut, USA), used to perform pneumorectum with steady flow and continuous smoke evacuation. CO₂ was insufflated to a pressure of 10–12 mmHg, and it was adapted during the progression of the dissection. A three-dimensional (3D) flexible-tip endoscope (Olympus KeyMed, Hamburg, Germany) is introduced through the inferior trocar. A tattoo was made with electrocautery around the circumference near the proximal part of the rectal stump, next to the previous stapler line. Once introduced into the presacral plane, the mesorectum was mobilized; the posterior dissection proceeded cephalic in the avascular presacral plane. This plane of dissection was extended medially, laterally and interiorly to achieve circumferential rectal mobilization. The dissection was performed circumferentially and progressively to avoid retraction of the contralateral rectum that could complicate the surgical dissection in that side. Finally, the peritoneal reflection was visualized and divided to achieve the proximal rectal stump removal, with both teams collaborating to

complete it. The previous stapler line with the resected tissue was then exteriorized through the anus. The distal rectum was prepared with a circumferential purse string suture of prolene. The proximal colon, with the anvil attached with a purse string on its distal side, was extracted through the rectal stump and connected to the circular stapler EEA 33-mm single-use stapler with 4.8-mm staples (Autosuture, Covidien), performing an end-to-end anastomosis at 7–8 cm of the anal verge. The correct position of the proximal colon was checked laparoscopically, avoiding torsion or tension. The integrity of the anastomosis was evaluated with an air test, as well as an intraluminal examination through the transanal GelPoint device, looking for local bleeding. There was no need of loop ileostomy. The operative time was 135 min, and the patient was discharged at fourth day without postoperative complications.

Discussion

The morbidity and mortality associated with Hartmann reversal make that its rate does not reach 60 % in the different series, as a consequence [4, 5]. Leakage rates of 0–15 % and a perioperative mortality as high as 10 % have reduced the number of patients in whom this procedure can be performed, less than one-third of elective patients [6, 7]. Moreover, the important effect in quality of life in patients with stomas [8, 9] encourages us to look for new surgical techniques that may enable a reduction in this significant morbidity. Consequently, Hartmann reversal rate could be increased, with an improvement of mid- and long-term outcomes. Laparoscopic surgery was developed in an attempt to reduce morbidity and mortality of procedures such as Hartmann reversal [10]. In the first years, comparable results between laparoscopic and open approaches came out [11, 12]. These data came from small single institutions and retrospective studies with differences in data collection, which make conclusions unreliable. Siddiqui et al. [13] published a systematic review where the safety of laparoscopic procedure was demonstrated with low morbidity and length of hospital stay. Furthermore, other authors such as Cellini or Van de Wall [1] described laparoscopic approach as an independent factor associated with fewer major, septic and incisional complications, as well as shorter length of hospital stay and overall complication rate compared to open surgery. Finally, in 2014, The American College of Surgeons published low rates of incisional hernia, organ space infection, sepsis and reoperation [14]. The main difference of transanal surgery in Hartmann reversal, comparing with actual techniques as

laparoscopic procedure or single-port procedure, is the great aid of using the transanal approach to dissect the rectal stump and perform pelvic adhesiolysis through the anus in a safer manner with an excellent 3D vision. Once again, Hartmann takedown is a morbid operation with substantial risk of inadvertent enterotomy and other serious complications. It reflects the challenge of reoperative pelvic surgery. In our opinion, there are many advantages with the resection of rectal stump with this technique. Firstly, we work in a surgical plane not touched in the previous surgery, without adhesences. The second one is the ability to identify, more precisely the structures with adhesences to the rectal stump, like small bowel or ureter, and avoid its damage. Finally, we take off the tissue with staples and fibrosis, performing the anastomosis with a new purse string in the rectal stump, with the objective of doing a safer anastomosis to prevent the anastomotic leakage. Due to all these advantages, all patients with Hartman procedure have eligibility criteria to make transanal reversal. In patients with a very short rectal stump, as cases treated with Hartmann procedure after anastomotic leak of low anterior resection, it could be impossible to place the rectal device. In these cases, our option is to perform only laparoscopic approach without transanal approach. The main difficulty of this technique could be the performance of adhesiolysis in patients with previous open procedure due to a perforation with peritonitis. In these cases, it is important to perform adhesiolysis with a combined approach, both abdominal and transanal, because small bowel is allocated in the pelvis and frequently with hard adhesions to the rectal stump. We also had the experience in a patient with a retraction of both ureters attached to the rectal stump, which could be dissected by transanal approach. There was no failure in this technique, and all the patients could have their bowel continuity restored. Just in two patients, a loop ileostomy was needed due to a difficult dissection of the rectal stump and severe adhesences in the pelvis. Our learning curve of transanal approach was done with more than 200 cases of rectal cancer, so we only had to adapt the knowledge we got previously for this new indication. In our opinion, this is a difficult but reproducible technique. It is important to have experience in transanal approach with the handicap of patients with previous surgery.

There has been considerable recent interest in the use of transanal surgery for rectal diseases. This approach is not only feasible, but also is associated with a reduced morbidity. As in patients with rectal cancer, where an accurate total mesorectal excision can be undertaken faster than by standard laparoscopy [15], dissection of the stump in Hartmann reversal procedure may be better and associated with shorter operative time. Moreover, there are other advantages such as an easier rectal dissection due to

transanal carbon dioxide insufflation, and the view with the 3D flexible-tip endoscope must be taken into account.

Concerns exist about the safety of transanal total mesorectal excision (taTME), because of the iatrogenic perforation of the rectum and the possible bacterial contamination potentially resulting in intra-abdominal infections. There are studies that have demonstrated the occurrence of abdominal bacterial contamination during taTME procedures. Patients with positive cultures had an increased risk of the development of infectious complications. None of the patients developed clinically severe infections, and none of the patient with negative cultures developed infectious complications [16]. No patients in our series of ten cases of transanal Hartmann reversal had presacral abscesses after the procedure.

Finally, this technique is not expensive than laparoscopic approach. In the transanal phase, we use the conventional laparoscopic instruments and in abdominal phase we do not use staplers for the rectal stump. Furthermore, the mean operative time is lower than in laparoscopic approach so we can use the operating room for another intervention. The postoperative results of these patients are good, without major complications, so their hospital stay is shorter. If we can reduce the postoperative complications we can reduce also the cost associated with them.

As with any new surgical procedure, it is probably too early to draw conclusions, but nowadays transanal combined with laparoscopic approach seems to be a safe and feasible technique to perform a Hartmann reversal.

Compliance with ethical standards

Disclosures Authors R. Bravo, M. Fernández-Hevia, M. Jiménez-Toscano, L. F. Flores, B. de Lacy, S. Quaresima and A.M. Lacy have no conflicts of interest or financial ties to disclose.

References

1. van de Wall BJ, Draaisma WA, Schouten ES, Broeders IA, Consten EC (2010) Conventional and laparoscopic reversal of the Hartmann procedure: a review of literature. *J Gastrointest Surg* 14:743–752
2. Maggard MA, Aingmond D, O'Connell JB, Ko CY (2004) What proportion of patients with an ostomy (for diverticulitis) get reversed? *Am Surg* 70:928–931
3. Carus Th, Emmert A (2011) Single-port laparoscopic reversal of Hartmann's procedure: technique and results. *Minimal Invasiv Surg*. doi:[10.1155/2011/356784](https://doi.org/10.1155/2011/356784)
4. Holland JC, Winter DC, Richardson D (2002) Laparoscopically assisted reversal of Hartmann's procedure revisited. *Surg Laparosc Endosc Percutan Tech* 12(4):291–294
5. Khaikin M, Zmora O, Rosin D, Bar-Zakai B, Goldes Y, Shabtai M, Ayalon A, Munz Y (2006) Laparoscopically assisted reversal of Hartmann's procedure. *Surg Endosc* 20:1883–1886
6. Riansuwan W, Hull TL, Millan MM, Hammel JP (2009) Non-reversal of Hartmann's procedure for diverticulitis: derivation of

- a scoring system to predict nonreversal. *Dis Colon Rectum* 52(8):1400–1408
7. Banerjee S, Leather AJ, Rennie JA, Samano N, Gonzalez JG, Papagrigoriadis S (2005) Feasibility and morbidity of reversal of Hartmann's. *Colorectal Dis* 7(5):454–459
 8. Fucini C, Gattai R, Urena C, Bandettini L, Elbetti C (2008) Quality of life among five-year survivors after treatment for very low rectal cancer with or without a permanent abdominal stoma. *Ann Surg Oncol* 15:1099–1106
 9. Vermeulen J, Gosselink MP, Busschbach JJ, Lange JF (2010) Avoiding or reversing Hartmann's procedure provides improved quality of life after perforated diverticulitis. *J Gastrointest Surg* 14(4):651–657
 10. Gorey TF, O'Connell PR, Waldron D, Cronin K, Kerin M, Fitzpatrick JM (1993) Laparoscopically assisted colostomy closure after Hartmann's procedure. *Br J Surg* 80:109
 11. Bozzetti F, Nava M, Bufalino R, Menotti V, Marolda R, Doci R, Gennari L (1983) Early local complications following colostomy closure in cancer patients. *Dis Colon Rectum* 26:25–29
 12. Ghorra SG, Rzezzycki TP, Natarajan R, Pricolo VE (1999) Colostomy closure: impact of preoperative risk factors on morbidity. *Am Surg* 65:266–269
 13. Siddiqui MRS, Sajid MS, Baig MK (2010) Open vs laparoscopic approach for reversal of Hartman's procedure: a systematic review. *Colorectal Dis* 12:733–741
 14. Arkenbosch J, Miyagaki H, Shantha Kumara HM, Yan X, Cekic V, Whelan RL (2015) Efficacy of laparoscopic-assisted approach for reversal of Hartmann's procedure: results from the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database. *Surg Endosc* 29(8):2109–2114
 15. Fernández-Hevia M, Delgado S, Castells A, Tasende M, Momblan D, del Gobbo GD, de Lacy B, Balust J, Lacy AM (2015) Transanal total mesorectal excision in rectal cancer: short-term outcomes in comparison with laparoscopic surgery. *Ann Surg* 261(2):221–227
 16. Velthuis S, Veltcamp Helbach M, Tuynman JB, Le TN, Bonjer HJ, Sietes C (2015) Intra-abdominal bacterial contamination in TAMIS total mesorectal excision for rectal carcinoma: a prospective study. *Surg Endosc*. doi:[10.1007/s00464-015-4089-x](https://doi.org/10.1007/s00464-015-4089-x)