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### Search details

Hartmann's Procedure – reversal procedure and complications.

### Resources searched

National Library of Guidelines, NLH Specialist Library – Surgery, TRIP, Badolier, Cochrane Library, NICE, MEDLINE, EMBASE

### Summary

#### Guidelines

Colorectal disease: position statements on malignant large bowel obstruction and anal fistula 2007.

#### Evidence based reviews


Published research

1. **Primary anastomosis vs Hartmann's procedure in patients undergoing emergency left colectomy for perforated diverticulitis.**

   **Author(s):** Zingg U, Pasternak I, Dietrich M, Seifert B, Oertli D, Metzger U

   **Citation:** Colorectal Disease, January 2010, vol./is. 12/1(54-60), 1462-8910;1463-1318 (2010 Jan)

   **Publication Date:** January 2010

   **Abstract:** **OBJECTIVE:** Comparison of primary anastomosis (PA) and Hartmann's procedure (HP) in perforated diverticulitis is biased as the patient groups are different in age, comorbidity and severity of disease. Still, PA has been advocated as the procedure of choice. The aim of this study was to compare the two surgical procedures after eliminating this selection bias using a propensity score model. **METHOD:** Sixty-five HP and 46 PA patients who underwent emergency laparotomy for perforated diverticulitis were analysed. Multivariate logistic regression using the Mannheim peritonitis index, Colorectal Physiological and Operative Severity Score for the enUmeration of Mortality and Morbidity, Charlson comorbidity index and Hinchey score was performed to determine the propensity score. **RESULTS:** Patients with HP had significantly higher scores, median age and were more often on immunosuppressive medication. Unadjusted logistic regression for outcome showed a significant risk of HP vs PA for nonsurgical morbidity (odds ratio 3.25, 95% CI: 1.26-8.43; P = 0.015), but not for mortality and surgical morbidity. After adjusting for the propensity score, outcome was not significantly different. Patients with PA had a clinical leak rate of 28% and none of the patients with leakage had a protective ileostomy. Patients with PA and leak had higher Charlson scores whereas all other scores were similar to nonleak patients. **CONCLUSION:** The theory that PA is generally superior to HP cannot be supported. HP remains a safe technique for emergency colectomy in perforated diverticulitis, especially in elderly patients with multiple comorbidities. If PA is performed, a protective ileostomy must be considered.

   **Source:** MEDLINE

2. **Routine evaluation of the distal colon remnant before Hartmann's reversal is not necessary in asymptomatic patients.**

   **Author(s):** Ballian N, Zarebczan B, Munoz A, Harms B, Heise CP, Foley EF, Kennedy GD

   **Citation:** Journal of Gastrointestinal Surgery, December 2009, vol./is. 13/12(2260-7), 1091-255X;1873-4626 (2009 Dec)

   **Publication Date:** December 2009

   **Abstract:** **BACKGROUND:** Reversal of Hartmann's is a common surgical
procedure. Routine preoperative evaluation of the distal colonic/rectal remnant (DCRR) with contrast and/or endoscopic studies is frequently performed despite lack of evidence to support this practice. We hypothesize that asymptomatic patients can safely undergo Hartmann's reversal without preoperative DCRR evaluation. METHODS: Adult patients undergoing reversal of Hartmann's at a single institution were retrospectively identified. Operative characteristics and outcomes in patients with and without preoperative DCRR evaluation were compared. RESULTS: Between 1993 and 2008, 203 patients underwent reversal of Hartmann's at a tertiary referral center. Sixty-eight patients (33%) did not undergo preoperative DCRR evaluation and had comparable demographic characteristics, comorbidities, DCRR length, and perioperative outcomes to 135 patients who underwent preoperative contrast and/or endoscopic studies. After evaluation, 125 (93%) patients had normal findings, seven (5%) patients had abnormal studies that did not impact their management, and three (2%) patients underwent additional procedures. CONCLUSION: Hartmann's reversal without previous DCRR evaluation is acceptable in selected asymptomatic patients, without increased risk of complications.

Source: MEDLINE

3. Reversal of Hartmann's procedure following acute diverticulitis: is timing everything?

Author(s): Fleming FJ, Gillen P

Citation: International Journal of Colorectal Disease, October 2009, vol./is. 24/10(1219-25), 0179-1958;1432-1262 (2009 Oct)

Publication Date: October 2009

Abstract: BACKGROUND: Patients who undergo a Hartmann's procedure may not be offered a reversal due to concerns over the morbidity of the second procedure. The aims of this study were to examine the morbidity post reversal of Hartmann's procedure. METHODS: Patients who underwent a Hartmann's procedure for acute diverticulitis (Hinchey 3 or 4) between 1995 and 2006 were studied. Clinical factors including patient comorbidities were analysed to elucidate what preoperative factors were associated with complications following reversal of Hartmann's procedure. RESULTS: One hundred and ten patients were included. Median age was 70 years and 56% of the cohort were male (n = 61). The mortality and morbidity rate for the acute presentation was 7.3% (n = 8) and 34% (n = 37) respectively. Seventy six patients (69%) underwent a reversal at a median of 7 months (range 3-22 months) post-Hartmann's procedure. The complication rate in the reversal group was 25% (n = 18). A history of current smoking (p = 0.004), increasing time to reversal (p = 0.04) and low preoperative albumin (p = 0.003) were all associated with complications following reversal. CONCLUSIONS: Reversal of Hartmann's procedure can be offered to appropriately selected patients though with a significant (25%) morbidity rate. The identification of potential modifiable factors such as current smoking, prolonged time to reversal and low preoperative albumin may
allow optimisation of such patients preoperatively.

Source: MEDLINE


Author(s): Riansuwan W, Hull TL, Millan MM, Hammel JP

Citation: Diseases of the Colon & Rectum, August 2009, vol./is. 52/8(1400-8), 0012-3706;1530-0358 (2009 Aug)

Publication Date: August 2009

Abstract: PURPOSE: A Hartmann's procedure is performed in perforated diverticulitis, but in some patients the colostomy is never closed. Identification of patients at risk for Hartmann's nonreversal would be helpful to determine the extent of resection. The aim of this study was to quantify the risk of nonclosure by deriving a predictive score. METHODS: Patients undergoing a Hartmann's procedure for diverticulitis were identified from database. They were separated into those who underwent Hartmann's reversal within one year of the initial operation, and those who did not. The data were analyzed in univariable and multivariable logistic regression. A predictive scoring system of Hartmann's reversal was created. The predictive power of the multivariable models, the predictive scoring system, and colorectal POSSUM physiology scores were compared. RESULTS: Eighty of 117 patients (68.4%) had their colostomy reversed. Multivariate analysis identified age, American Society of Anesthesiologists' score, pulmonary comorbidity, preoperative blood transfusion, perforation, and anticoagulants as the factors of failure for stoma reversal. All 36 patients with a predictive score of less than 14 had their stoma reversed. Twenty-two of 25 patients (88%) with scores greater than 18 did not have a reversal. Predictive power was similar when using only colorectal POSSUM physiology scores alone, or with preoperative data. CONCLUSIONS: More than 30% of patients undergoing a Hartmann's procedure for diverticulitis will not have their stoma reversed within a year. If this scoring system can be validated in an independent group of patients, it will be useful in allowing surgeons to strategize accurately and to counsel patients realistically.

Source: MEDLINE

Full Text:

Available in print at Grantham Hospital Staff Library

5. Restoration of bowel continuity after surgery for acute perforated diverticulitis: should Hartmann's procedure be considered a one-stage procedure?

Author(s): Vermeulen J, Coene PP, Van Hout NM, van der Harst E, Gosselink MP, Mannaerts GH, Weidema WF, Lange JF

Citation: Colorectal Disease, July 2009, vol./is. 11/6(619-24), 1462-
Abstract: OBJECTIVE: Hartmann's procedure (HP) still remains the most frequently performed procedure in acute perforated diverticulitis, but it results in a end colostomy. Primary anastomosis (PA) with or without defunctioning loop ileostomy (DI) seems a good alternative. The aim of this study was to assess differences in the rate of stomal reversal after HP and PA with DI and to evaluate factors associated with postreversal morbidity in patients operated for acute perforated diverticulitis. METHOD: All 158 patients who had survived emergency surgery for acute perforated diverticulitis in five teaching hospitals in The Netherlands between 1995 and 2005 and underwent HP or PA with DI were retrospectively studied. Age, gender, ASA-classification, severity of primary disease, delay of stoma reversal, surgeon's experience, surgical procedure and type of anastomosis were analysed in relation to outcome after stoma reversal. RESULTS: Of the 158 patients, 139 had undergone HP and 19 PA with DI. The reversal-rate was higher in patients with DI (14/19; 74%) compared to HP (63/139; 45%) (P = 0.027) Delay between primary surgery and stoma reversal was shorter after PA with DI compared with HP (3.9 vs 9.1 months; P < 0.001). Cumulative postreversal morbidity after HP was 44%. Early surgical complications occurred in 22 of 63 patients. Morbidity after DI reversal was 15% (P < 0.001). Three patients died after HP reversal, none died after DI reversal. Anastomotic leakage was observed in 10 patients after HP reversal. This was less frequently observed when the operation was performed by a specialist colorectal surgeon (10%vs 33%; P = 0.049) and when a stapled anastomosis was performed (4%vs 24%; P = 0.037). CONCLUSIONS: Reversal of HP should only be performed by an experienced colorectal surgeon, preferably performing a stapled anastomosis, or probably not be performed at all, as it is accompanied by high postoperative morbidity and even mortality. It is important that these findings are taken in account for when performing primary emergency surgery for acute perforated diverticulitis.

Source: MEDLINE


Author(s): Agaba EA, Zaidi RM, Ramzy P, Aftab M, Rubach E, Gecelter G, Ravikumar TS, DeNoto G

Citation: Surgical Endoscopy, July 2009, vol./is. 23/7(1483-6), 0930-2794;1432-2218 (2009 Jul)

Publication Date: July 2009

Abstract: BACKGROUND: A laparoscopic technique for acutely perforated diverticulitis (i.e., laparoscopic Hartmann's procedure) has not been described. The authors present their technique for laparoscopic sigmoid resection, end colostomy, and subsequent laparoscopic takedown of
colostomy. METHODS: A retrospective review of patients with Hinchey III/IV diverticulitis who underwent a laparoscopic Hartmann's procedure was performed in this study. Laparoscopic takedown of sigmoid colostomy was performed 2 to 3 months later. Data from these procedures including estimated blood loss (EBL), length of the operative procedure, patient outcomes, and demographics were evaluated. RESULTS: Seven patients with a mean age of 49.7 years underwent laparoscopic sigmoid colectomy with end colostomy. None of these patients had a history of diverticulitis. Their mean EBL was 138 ml, and their mean operative time was 154 min. None of the procedures required conversion to use of a hand port or conversion to open procedure. The average time to return of bowel function was 3.7 days, with one patient experiencing a postoperative ileus. The mean postoperative hospital stay was 6.6 days. There were no complications. Laparoscopic Hartmann's takedown was performed for all the patients approximately 2 to 3 months later. The mean EBL was 107 ml, and the average operative time was 189 min. One patient had intraoperative anastomotic leak, which was successfully repaired and retested. Again, none of the procedures required the use of a hand port or a laparotomy. The average time to return of bowel function was 3.4 days. The average length of hospital stay was 5.3 days, with one patient experiencing a fat necrosis. CONCLUSIONS: Laparoscopic Hartmann's procedure and laparoscopic takedown are technically feasible procedures with reasonable outcomes.

Source: MEDLINE


Author(s): David GG, Al-Sarira AA, Willmott S, Cade D, Corless DJ, Slavin JP

Citation: Colorectal Disease, March 2009, vol./is. 11/3(308-12), 1462-8910;1463-1318 (2009 Mar)

Publication Date: March 2009

Abstract: INTRODUCTION: Hartmann's procedure is widely used in the management of complicated diverticular disease and for colorectal cancer. Very little national data are available about the reasons for performing this procedure and the reversal rate. METHOD: Hospital episode statistics data were obtained from The Department of Health and exported to an Access database for analysis. A cohort of patients who underwent a Hartmann's procedure between April 2001 and March 2002 were identified and followed until April 2006 to identify patients undergoing reversal of Hartmann's. RESULTS: Approximately 3950 Hartmann's procedures were performed between April 2001 and March 2002, 2853 as an emergency and 1097 as an elective procedure. Most emergency Hartmann's were performed for benign disease (2067, 72.5%) whereas a majority of the elective Hartmann's were performed for cancer (756, 68.9%). Seven hundred and thirty six (23.3%) of these patients underwent reversal during the study period. The median time interval between a Hartmann's procedure and reversal was 284.5 days (interquartile range 181-468.25). CONCLUSION: This study represents the
single largest cohort in whom outcome after Hartmann's procedure has been studied. A majority of Hartmann's are performed as an emergency for benign diseases and most of them are not reversed.

Source: MEDLINE

8. Laparoscopic and open reversal of Hartmann's procedure--a comparative retrospective analysis.


Citation: Surgical Endoscopy, March 2009, vol./is. 23/3(496-502), 0930-2794;1432-2218 (2009 Mar)

Publication Date: March 2009

Abstract: BACKGROUND: Restoration of intestinal continuity after Hartmann's procedure has traditionally required laparotomy. This study compares our experience with laparoscopic and open reversal of Hartmann's procedure. STUDY DESIGN: All laparoscopic and open Hartmann's reversal procedures performed between January 1998 and June 2006 were reviewed. Patients with laparoscopic reversal were retrospectively matched by age, body mass index (BMI), and indication to controls with open reversal. Demographic data, perioperative course, and postoperative complications were documented. RESULTS: We identified 41 patients who underwent laparoscopic reversal of Hartmann's procedure and these were matched to 41 patients with open reversal. The groups had similar average age and BMI. The predominant indication for surgery in both groups was diverticular disease. Conversion to laparotomy occurred in eight patients (19.5%), and was due to dense adhesions or difficulty in identification of the rectal stump. Adhesions were significantly greater in the conversion group (p <0.05), and the rectal stump was not marked in any of these cases. The most common short-term complications were ileus and surgical site infection. There were no anastomotic leaks and no mortalities. The mean operative times in the laparoscopic and open groups were 193 versus 209 min, respectively (p = 0.33). The laparoscopic group had a significantly lower estimated blood loss of 166 versus 326 mL (p < 0.0005), shorter time to bowel function return (4.1 versus 5.2 days, p < 0.05), and a shorter hospital stay (6.4 versus 8.0 days, p < 0.05). The major complication rate was also significantly lower in the laparoscopic group than in the open group (4.8% versus 12.1%, p < 0.05). CONCLUSIONS: Laparoscopic reversal of Hartmann's procedure is a safe and practical alternative to open reversal. It can be performed with similar operative time, fewer complications, and a faster recovery time. Conversion during the reversal procedure was significantly impacted by severity of adhesions and marking of the rectal stump.

Source: MEDLINE

9. Laparoscopically assisted Hartman's reversal is an efficacious
and efficient procedure: a case control study.

Author(s): Chouillard E, Pierard T, Campbell R, Tabary N

Citation: Minerva Chirurgica, February 2009, vol./is. 64/1(1-8), 0026-4733;0026-4733 (2009 Feb)

Publication Date: February 2009

Abstract: AIM: Laparoscopy may lower the mortality and morbidity rates of Hartmann's procedure reversal. However, it remains a challenging operation mainly due to adhesions of the small bowel and to the rectal stump. METHODS: We performed a retrospective review of 44 patients who had laparoscopic Hartmann's reversal (Group A). On a case-control basis, these patients were compared to 44 patients (Group B) who had open Hartmann's reversal. RESULTS: Preoperative patients' characteristics (sex, gender, BMI, ASA status, prior surgery, comorbidities, colonic disease) were comparable. Conversion rate in Group A was 9.1%. Operative incidents were comparable in both groups. Operative duration was not significantly shorter in Group B (195 min versus 160 min in Group B). Mortality rate was 2.2 % and 0 % in group A and B, respectively. Overall morbidity rate was 11.4 % and 28.6 % in Group A and B, respectively (P<0.05). The mean length of hospital stay was significantly shorter in Group A (4.8 days) as compared to Group B (6.8 days), respectively. An efficiency analysis was performed and demonstrated that laparoscopic reversal did not generate a significant additional cost. CONCLUSION: Our laparoscopic technique of Hartmann's procedure reversal is safe and efficient. It compares positively with the same procedure performed openly in a case control study. Moreover, an indirect cost reduction is generated by the reduction of the length of hospital stay.

Source: MEDLINE
stoma side, without direct vision between thumb and index finger. The rectal stump was identified intra-abdominally using a transanal rigid club. A manually controlled stapled end-to-end colorectal anastomosis was created.

RESULTS: Mean duration of operation was 81 min (range 58-109 min); mean hospital stay was 4.2 days (range 2-7 days). In two patients the procedure was converted because of strong adhesions in the lower pelvic cavity around the rectal stump that could not be lysed manually safely. No complications occurred in the patients in whom reversal was completely done through the stomal site. CONCLUSIONS: In our opinion, restoration of intestinal continuity through the stomal side after HP is a feasible operation, without need for additional incisions. In the hands of a specialist gastrointestinal surgeon this technique can be attempted in all patients, as conversion to a laparoscopic-assisted or an open procedure can be performed when necessary.

Source: MEDLINE

11. Complication rates after Hartmann's reversal: open vs. laparoscopic approach.

Author(s): Haughn C, Ju B, Uchal M, Arnaud JP, Reed JF, Bergamaschi R

Citation: Diseases of the Colon & Rectum, August 2008, vol./is. 51/8(1232-6), 0012-3706;1530-0358 (2008 Aug)

Publication Date: August 2008

Abstract: PURPOSE: This study was performed to compare open Hartmann's reversal to laparoscopic Hartmann's reversal with regard to complication, readmission, and reoperation rates. METHODS: Data of patients who underwent open Hartmann's reversal or laparoscopic Hartmann's reversal between 1998 and 2004 at two institutions were collected. End points were complications in the hospital or after discharge, readmission to the hospital, and reoperation within 6 months after initial surgery. RESULTS: Sixty-one open Hartmann's reversal and 61 laparoscopic Hartmann's reversal patients were well matched except for American Society of Anesthesiology grade (1.9 vs. 1.6; P = 0.008), timing of Hartmann's procedure (14 vs. 6 months; P = 0.001), operation time (210 vs. 154 minutes; P = 0.001), and estimated blood loss (363 vs. 254 ml; P = 0.01). Thirty-day complication rates did not differ (18 vs. 13 percent). At 6 month follow-up, open Hartmann's reversal patients had increased complication (16.4 vs. 3.3 percent; P = 0.015) and reoperation (13.1 vs. 3.3 percent; P = 0.048) rates but the same readmission rates (16.4 percent). CONCLUSIONS: Compared with open Hartmann's reversal, 6 month complication and reoperation rates were lower in laparoscopic Hartmann's reversal patients. Most of the six-month complications and reoperations in open Hartmann's reversal were abdominal wall-related. Readmission rates were similar, but reasons for readmission were surgical in open Hartmann's reversal and medical in laparoscopic Hartmann's reversal.

Source: MEDLINE

Author(s): Trompetas V

Citation: Annals of the Royal College of Surgeons of England, April 2008, vol./is. 90/3(181-6), 0035-8843;1478-7083 (2008 Apr)

Publication Date: April 2008

Abstract: INTRODUCTION: The management of acute left-sided colonic obstruction still remains a challenging problem despite significant progress. METHODS: A literature search was undertaken using PubMed and the Cochrane Library regarding the options in emergency management of left-sided colonic obstruction focusing on outcomes such as mortality, morbidity, long-term prognosis and cost effectiveness. DISCUSSION: Colonic stenting is the best option either for palliation or as a bridge to surgery. It reduces morbidity and mortality rate and the need for colostomy formation. Stenting is likely to be cost effective, but data are variable depending on the individual healthcare system. Nevertheless, surgical management remains relevant as colonic stenting has a small rate of failure, and it is not always available. There are various surgical options. One-stage primary resection and anastomosis is the preferred choice for low-risk patients. Intra-operative colonic irrigation has no proven benefit. Subtotal colectomy is useful in cases of proximal bowel damage or synchronous tumours. Hartmann's procedure should be reserved for high-risk patients. Simple colostomy has no role other than for use in very ill patients who are not fit for any other procedure.

Source: MEDLINE

Full Text:

Available in fulltext at National Library of Medicine

Available in print at Lincoln County Hospital Professional Library


Author(s): Bretagnol F, Pautrat K, Mor C, Benchellal Z, Huten N, de Calan L
Abstract: BACKGROUND: Classic emergency surgical management of complicated perforated sigmoid diverticulitis is based on the principle of a two-stage operation, with colon resection and temporary stoma (Hartmann's procedure). But the later second-stage operation can be technically difficult and can be associated with a significant morbidity rate. We argue that laparoscopy may be beneficial in such patients with peritonitis in terms of operative results and could facilitate later surgical management. STUDY DESIGN: We studied all consecutive patients with perforated sigmoid diverticulitis requiring emergency surgery between January 2000 and December 2004. RESULTS: Twenty-four patients underwent emergency laparoscopic management for perforated sigmoid diverticulitis. Nineteen patients (80%) were found to have a purulent or fecal diffuse peritonitis. No conversion and colostomy were necessary. The overall morbidity rate was 8%; 2 patients with pelvic abscesses required radiologic drainage. The median hospital stay was 12 days (range 7 to 35 days). Prophylactic sigmoid resection was performed by laparoscopy in all patients, with a conversion rate of 16%. CONCLUSIONS: Laparoscopic treatment of generalized peritonitis secondary to diverticulitis is feasible and safe and may be a promising alternative to more radical surgery in selected patients, avoiding fecal diversion and allowing a delayed elective laparoscopic sigmoid resection.

Source: MEDLINE

Full Text:
Available in print at Grantham Hospital Staff Library

14. Laparoscopic reversal of Hartmann's procedure: technique and results.

Author(s): Carus T, Bollmann S, Lienhard H

Citation: Surgical Laparoscopy, Endoscopy & Percutaneous Techniques, February 2008, vol./is. 18/1(24-8), 1530-4515;1530-4515 (2008 Feb)

Publication Date: February 2008

Abstract: Reversal of Hartmann's procedure is associated with a high morbidity and mortality leading to a low rate of intestinal restoration. We investigated whether the laparoscopic reversal is safely feasible and offers any advantage to the patient. The reversal operation was performed in 28 of
34 patients after Hartmann's procedure. The laparoscopic reversal of Hartmann's procedure had a short operative time (69 min) and a conversion rate of 17.9%. Wound complications occurred in 10.7%, an anastomotic leak in 1 patient (3.6%). On average the patients were discharged after 8.6 (6 to 17) postoperative days. We conclude that the laparoscopic reversal of Hartmann's procedure is a technically demanding but feasible operation with a low postoperative morbidity and mortality. We recommend the laparoscopic approach, which could be favorable compared with historical open series.

Source: MEDLINE

15. Minimally invasive stomas.

Author(s): Hellinger MD, Al Haddad A

Citation: Clinics in Colon & Rectal Surgery, February 2008, vol./is. 21/1(53-61), 1530-9681;1530-9681 (2008 Feb)

Publication Date: February 2008

Abstract: Traditionally, stoma creation and end stoma reversal have been performed via a laparotomy incision. However, in many situations, stoma construction may be safely performed in a minimally invasive nature. This may include a trephine, laparoscopic, or combined approach. Furthermore, Hartmann's colostomy reversal, a procedure traditionally associated with substantial morbidity, may also be performed laparoscopically. The authors briefly review patient selection, preparation, and indications, and focus primarily on surgical techniques and results of minimally invasive stoma creation and Hartmann's reversal.

Source: MEDLINE

Full Text: Available in fulltext at National Library of Medicine
16. Results of emergency Hartmann's operation for obstructive or perforated left-sided colorectal cancer.

Author(s): Charbonnet P, Gervaz P, Andres A, Bucher P, Konrad B, Morel P

Citation: World Journal of Surgical Oncology, 2008, vol./is. 6/(90), 1477-7819;1477-7819 (2008)

Publication Date: 2008

Abstract: BACKGROUND: Up to 15% of colorectal cancer (CRC) patients present with obstructive or perforated tumours, and require emergency surgery. The Hartmann's procedure (HP) provides the opportunity to achieve a potentially curative (R0) resection, while minimizing surgical trauma in poor-risk patients. The aim of this study was to assess the surgical (operative mortality), and oncological (long-term survival after curative resection) results of emergency HP for obstructive or perforated left-sided CRC.

METHODS: A retrospective review of 50 patients who underwent emergency HP for perforated/obstructive CRC in our institution between 1995 and 2006. RESULTS: Median age of patients was 75 (range 22-95) years and the indications for HP were obstruction (32) and perforation (18 patients). Operative mortality and morbidity were 8% and 26% respectively. 35 patients (70%) were operated with a curative intent in this group, overall 1-, 3- and 5-year survival rates were 80%, 54% and 40%. In univariate analysis, the presence of lymph node metastases was associated with poor 5-year survival (62% [Stage II] vs. 27% [Stage III], log-rank test, p = 0.02). Eleven patients (22%) had their operation reversed with a median delay of 225 (range 94-390) days. In this subgroup, two patients died from distant metastases, but there were no instances of loco-regional recurrence.

CONCLUSION: Hartmann's operation remains a good option to palliate symptoms in 30% of patients with left-sided CRC who are not candidates to a curative resection. For those who have a curative resection, the oncological outcome is acceptable, especially stage II patients, who appear to benefit the most from this surgical strategy.

Source: MEDLINE

Full Text: Available in fulltext at BioMedCentral
17. Comparison of conventional and laparoscopic Hartmann's procedure reversal.

**Author(s):** Faure JP, Doucet C, Essique D, Badra Y, Carretier M, Richer JP, Scepi M

**Citation:** Surgical Laparoscopy, Endoscopy & Percutaneous Techniques, December 2007, vol./is. 17/6(495-9), 1530-4515;1530-4515 (2007 Dec)

**Publication Date:** December 2007

**Abstract:** PURPOSE: This study compares open Hartmann's procedure reversal (OHPR) and laparoscopic Hartmann's procedure reversal (LHPR) in patients first treated for peritonitis (Henchey III or IV). METHODS: Fourteen patients who underwent LHPR during a 2-year period were compared with 20 patients who had previously undergone an open procedure at the same institution. RESULTS: Conversion rate was 14.28%. Operating time was shorter for the laparoscopic group [143 (90 to 240) vs. 180 (90 to 350) min, P<0.05]. Hospital length of stay was shorter for the laparoscopic group [9.5 (4 to 18) vs. 11 (6 to 39)]. Use of patient-controlled analgesia was not significantly shorter in the laparoscopic group [3 (0 to 4) vs. 3.5 (0 to 8)]. Morbidities observed in the LHPR group include a parietal abscess and an anastomotic stenosis without surgical treatment. The OHPR group had 6 complications: 1 anastomotic leak and 5 incisional hernias. CONCLUSIONS: LHPR with a conversion rate of 14.28% seems to be a method with shorter operating time and less morbidity compared with OHPR.

**Source:** MEDLINE

18. Reversal of Hartmann's procedure: a high-risk operation?

**Author(s):** Schmelzer TM, Mostafa G, Norton HJ, Newcomb WL, Hope WW, Lincourt AE, Kercher KW, Kuwada TS, Gersin KS, Heniford BT
**Citation:** Surgery, October 2007, vol./is. 142/4(598-606; discussion 606-7), 0039-6060;0039-6060 (2007 Oct)

**Publication Date:** October 2007

**Abstract:** BACKGROUND: Patients who undergo Hartmann's procedure often do not have their colostomy closed based on the perceived risk of the operation. This study evaluated the outcome of reversal of Hartmann's procedure based on preoperative risk factors. METHODS: We retrospectively reviewed adult patients who underwent reversal of Hartmann's procedure at our tertiary referral institution. Patient outcomes were compared based on identified risk factors (age >60 years, American Society of Anesthesiologists [ASA] score >2, and >2 preoperative comorbidities). RESULTS: One-hundred thirteen patients were included. Forty-four patients (39%) had an ASA score of >or=3. The mean hospital duration of stay was 6.8 days. There were 28 (25%) postoperative complications and no mortality. Patients >60 years old had significantly longer LOS compared with the rest of the group (P = .02). There were no differences in outcomes between groups based on ASA score or the presence of multiple preoperative comorbidities. An albumin level of <3.5 was the only significant predictor of postoperative complications (P = .04). CONCLUSIONS: The reversal of Hartmann's operation appears to be a safe operation with acceptable morbidity rates and can be considered in patients, including those with significant operative risk factors.

**Source:** MEDLINE

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Available in *print* at *Lincoln County Hospital Professional*
19. Analysis of the factors related to the decision of restoring intestinal continuity after Hartmann's procedure.


Citation: International Journal of Colorectal Disease, September 2007, vol./is. 22/9(1091-6), 0179-1958;0179-1958 (2007 Sep)

Publication Date: September 2007

Abstract: BACKGROUND AND AIMS: Hartmann's operation is widely used for the surgical treatment of complicated left colonic disease. However, many patients never undergo reanastomosis. This study analyzes the factors related to the decision of restoring intestinal continuity. MATERIALS AND METHODS: Between 1997 and 2004, 162 patients underwent Hartmann's operation in our institution. Age, sex, anesthetic risk evaluation (ASA score), underlying disorder (neoplastic vs non-neoplastic), prevalence of colonic reconstruction, as well as postoperative length of hospital stay, perioperative mortality and complications due to the latter procedure were analyzed. Long-term survival was also recorded. RESULTS: Patients' mean age was 68.7 years (SD +/- 14.9); 104 were men (64.2%) and 58 were women (35.8%). Hartmann's operation mortality was 20.4%. Forty-two colonic continuity restorations were performed (25.9%). Mean time until reconstruction procedure was 13.3 months. There were no deaths (mortality 0%), but 23 cases suffered complications (54.8%). No suture dehiscence was
observed. Estimated probability of being alive 1, 3, and 5 years after the initial operation was 64.1, 50.4, and 44.3%, respectively. Significant univariate predictors of reversal were male sex (p = 0.003), non-neoplastic disorder (p = 0.004), younger age (p = 0.001) and lower anesthetic risk (p = 0.009). In the multivariate analysis, independent predictive factors were age (OR: 0.94; 95% CI: 0.91-0.98), non-neoplastic disorder (OR: 0.16; 95% CI: 0.05-0.45), and lower anesthetic risk (OR: 0.22; 95% CI: 0.08-0.58).

CONCLUSIONS: Hartmann's procedure implies a high mortality and a low percentage of restoration of intestinal continuity. In selected patients, closure of Hartmann's colostomy is a safe procedure, but has a significant morbidity.

Source: MEDLINE

20. Operative strategies for diverticular peritonitis: a decision analysis between primary resection and anastomosis versus Hartmann's procedures.

Author(s): Constantinides VA, Heriot A, Remzi F, Darzi A, Senapati A, Fazio VW, Tekkis PP

Citation: Annals of Surgery, January 2007, vol./is. 245/1(94-103), 0003-4932;0003-4932 (2007 Jan)

Publication Date: January 2007

Abstract: OBJECTIVE: To compare primary resection and anastomosis (PRA) with and without defunctioning stoma to Hartmann's procedure (HP) as the optimal operative strategy for patients presenting with Hinchey stage III-IV, perforated diverticulitis. SUMMARY BACKGROUND DATA: The choice of operation for perforated diverticulitis lies between HP and PRA. Postoperative mortality and morbidity can be high, and the long-term consequences life-altering, with no established criteria guiding clinicians towards selecting a particular procedure. METHODS: Probability estimates for 6879 patients with Hinchey III-IV perforated diverticulitis were obtained from two databases (n = 204), supplemented by expert opinion and summary data from 12 studies (n = 6675) published between 1980 and 2005. The primary outcome was quality-adjusted life-years (QALYs) gained from each strategy. Factors considered were the risk of permanent stoma, morbidity, and mortality from the primary or reversal operations. Decision analysis from the patient's perspective was used to calculate the optimal operative strategy and sensitivity analysis performed. RESULTS: A total of 135 PRA, 126 primary anastomoses with defunctioning stoma (PADS), and 6619 Hartmann's procedures (HP) were considered. The probability of morbidity and mortality was 55% and 30% for PRA, 40% and 25% for PADS, and 35% and 20% for HP, respectively. Stomas remained permanent in 27% of HP and in 8% of PADS. Analysis revealed the optimal strategy to be PADS with 9.98 QALYs, compared with 9.44 QALYs after HP and 9.02 QALYs
after PRA. Complications after PRA reduced patients QALYs to a baseline of 2.713. Patients with postoperative complications during both primary and reversal operations for PADS and HP had QALYs of 0.366 and 0.325, respectively. HP became the optimal strategy only when risk of complications after PRA and PADS reached 50% and 44%, respectively. CONCLUSION: Primary anastomosis with defunctioning stoma may be the optimal strategy for selected patients with diverticular peritonitis as may represent a good compromise between postoperative adverse events, long-term quality of life and risk of permanent stoma. HP may be reserved for patients with risk of complications >40% to 50% after consideration of long-term implications.

**Source:** MEDLINE

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21. **Laparoscopically assisted reversal of Hartmann's procedure.**

**Author(s):** Khaikin M, Zmora O, Rosin D, Bar-Zakai B, Goldes Y, Shabtai M, Ayalon A, Munz Y

**Citation:** Surgical Endoscopy, December 2006, vol./is. 20/12(1883-6), 0930-2794;1432-2218 (2006 Dec)

**Publication Date:** December 2006

**Abstract:** BACKGROUND: Restoration of bowel continuity after Hartmann's procedure is a major surgical procedure associated with substantial morbidity and occasional mortality. The authors review their experience with laparoscopically assisted reversal of Hartmann's procedure...
(LARH) to assess difficulties and potential advantages associated with this procedure. METHODS: A retrospective chart review of a prospectively entered database was performed to identify patients who underwent LARH over a period of 7 years. Data regarding demographic and clinical characteristics, surgical details, and postoperative course were reviewed. Specifically, age, gender, diagnosis at initial operation, American Society of Anesthesiology (ASA) score, comorbidities, operative time, conversion, surgical team, complications, postoperative bowel movements, and hospital stay were assessed. All surgeries were performed by six experienced laparoscopic surgeons. RESULTS: A total of 27 patients, 17 men and 10 women, with mean ages of 58.1 and 62.9 years, respectively, underwent LARH. Conversion to laparotomy was required for four patients (14.8%) because of dense adhesions after the initial Hartmann's procedure in three patients and rectal perforation in one patient. The median operative time was 226 min, and the median hospital stay was 6 days. The overall morbidity rate was 33% (9 patients), attributable to colostomy site infection in 5 of the 9 patients. One patient required reoperation because of intraabdominal bleeding. No anastomotic leaks or intraabdominal abscesses were recorded. There was no operative mortality. CONCLUSIONS: Laparoscopically assisted reversal of Hartmann's procedure is technically challenging and time consuming. However, in the hands of experienced laparoscopic surgeons, it is safe and associated with a reasonably low conversion rate. Furthermore, the relatively low morbidity rate, short hospital stay, and earlier return of bowel function may be beneficial to patients.

Source: MEDLINE

22. Hartmann's reversal is associated with high postoperative adverse events.

Author(s): Aydin HN, Remzi FH, Tekkis PP, Fazio VW

Citation: Diseases of the Colon & Rectum, November 2005, vol./is. 48/11(2117-26), 0012-3706;0012-3706 (2005 Nov)

Publication Date: November 2005

Abstract: PURPOSE: The aim of this study was to ascertain the prevalence and pattern of surgical and medical adverse events in patients undergoing Hartmann's reversal for diverticular disease. A comparison of postoperative outcomes is made between Hartmann's reversal and primary resection and anastomosis. METHODS: Data were collected from patients who underwent successful Hartmann's reversal (Group 1 n=121) and primary resection and anastomosis (Group 2 n=731) for diverticular disease in a single center from January 1981 to May 2003. Multivariate logistic regression was used to compare early postoperative mortality, medical and surgical complications and readmission rates between the two groups. RESULTS: Hartmann's reversal was associated with a higher prevalence of surgical or medical complications compared with primary resection and anastomosis (43.8 percent and 9.1 percent for Hartmann's reversal vs. 26.0 percent and 4.8 percent for primary resection and anastomosis). There was
no difference in the readmission rates (7.2 percent vs. 7.6 percent, respectively, P = 0.88) or early postoperative mortality (1.7 percent vs. 0.7 percent, P = 0.25) between Hartmann's reversal and primary resection and anastomosis. The need for reoperation, prolonged ileus respiratory tract infections, and renal failure were more common adverse events in the Hartmann's reversal group (P < 0.01). Having controlled for the number of comorbid conditions, extent of diverticular disease, severity of peritoneal contamination (Mannheim Peritonitis Index), and operative urgency, patients who underwent Hartmann's reversal were 2.1 times more likely to have adverse surgical events during their postoperative period (95 percent confidence interval for odds ratio = 1.3-3.3). CONCLUSIONS: Hartmann's reversal is a complex surgical procedure that is associated with a high prevalence of postoperative adverse events in comparison with primary resection and anastomosis. To minimize the prevalence of such adverse events, patients who undergo Hartmann's reversal need careful preoperative evaluation and close monitoring in their postoperative period.

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variables and anastomotic leakage. Multiple logistic regression analysis showed a significant influence of hypertension, smoking and ASA grade on complications. CONCLUSIONS: About 40% of patients who undergo Hartmann's procedure will not have a reversal. Reversal is a feasible operation for selected patients, but there is a high complication rate.

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24. Laparoscopic restoration of intestinal continuity after Hartmann's procedure.

Author(s): Rosen MJ, Cobb WS, Kercher KW, Sing RF, Heniford BT

Citation: American Journal of Surgery, June 2005, vol./is. 189/6(670-4), 0002-9610;0002-9610 (2005 Jun)

Publication Date: June 2005

Abstract: BACKGROUND: Colostomy closure after a Hartmann's procedure typically requires a laparotomy. It also carries the risk of significant morbidity including anastomotic leak, wound infection, and incisional hernia. The aim of this study was to review our experience with laparoscopic restoration of intestinal continuity after Hartmann's procedure. METHODS: After institutional review board approval, we retrospectively reviewed the medical records of patients undergoing laparoscopic colostomy reversal between July 1997 and July 2004. RESULTS: Twenty-two patients were identified; all patients had left colon colostomies. A laparoscopic technique was used in 21 patients, and 1 patient underwent hand-assisted colostomy reversal concurrently with right radical nephrectomy. The laparoscopic approach was successful in 20 cases, and there were 2 conversions to open (9%) secondary to dense adhesions around the rectal stump. The mean time to closure of the colostomy was 168 days (range 69-385 days). The mean operative time was 158 minutes (range 84-356 minutes). The estimated blood loss averaged 114 mL (range 30-250 mL). The average length of hospitalization was 4.2 days (range 2-6 days). Bowel function returned on an average of 3.5 days (range 2-5 days). Three patients (14%) developed postoperative wound infections. There were no anastomotic leaks and no mortality. At a mean follow-up of 14.7 months, the only long-term complication has been a small hernia at a colostomy site. CONCLUSIONS: Laparoscopic colostomy reversal after Hartmann's procedure can be performed with low morbidity and a short hospital stay.
The need for conversion to open surgery is uncommon despite patients' previous surgeries. A laparoscopic approach to colostomy takedown is safe and feasible and may result in a reduction in complications and length of stay as has been seen with other minimally invasive procedures.

Source: MEDLINE

25. Reversal of Hartmann's procedure after surgery for complications of diverticular disease of the sigmoid colon is safe and possible in most patients.

Author(s): Oomen JL, Cuesta MA, Engel AF

Citation: Digestive Surgery, 2005, vol./is. 22/6(419-25), 0253-4886;0253-4886 (2005)

Publication Date: 2005

Abstract: BACKGROUND: Although evidence is growing that most patients who need an operation for diverticular disease of the sigmoid colon can be treated by a single-stage procedure, a two-stage procedure will still be necessary in some patients because of significant sepsis or technical difficulties. The outcomes of 65 patients who underwent secondary restoration after a Hartmann procedure for complicated diverticulitis were studied and the factors leading to complications and mortality were identified. PATIENTS AND METHODS: Of 91 patients, in a consecutive 12-year period, whose primary operation was a Hartmann procedure, 72 survived longer than 3 months after discharge. Sixty-five underwent an attempted reversal of the Hartmann procedure. The POSSUM scores were calculated in all patients as well as the morbidity and mortality rates. RESULTS: In 63 (96.9%) patients the bowel continuity could be restored with a morbidity of 38.5% and a mortality of 3.1%. The POSSUM and p-POSSUM scores adequately predicted the mortality in this series. CONCLUSION: This series shows that when surgical treatment for complicated diverticular disease of the sigmoid colon is necessary, the Hartmann procedure is still a valid indication. In a high percentage of patients the Hartmann procedure could be restored with a low mortality.

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