Abstract / Povzetek predavanja

Dilemmas of surgical treatment of acute diverticulitis

Jurij Janež
Department of Abdominal Surgery, University Medical Centre Ljubljana, Slovenia
Faculty of Medicine, University of Ljubljana, Slovenia
Correspondence: jurij.janez@kclj.si

Slovenian Journal of Gastroenterology / Gastroenterolog 2025; supplement 1: 69–71

***Keywords**: acute diverticulitis, surgery, laparoscopy, stoma formation.*

Acute diverticulitis is an acute inflammation of the colonic diverticula. Management and treatment approaches depend on severity (uncomplicated and complicated) and complexity (i.e. abscess, fistula, etc.) of the condition. Hinchey classification is the most widely and commonly used classification of acute colonic diverticulitis, that helps us to decide, how to manage the condition. Hinchey I and Hinchey II acute diverticulitis is usually managed conservatively with antibiotics and percutaneous drainage. In some cases of Hinchey II diverticulitis with large distant abscess, that does not respond to antibiotics and is not accessible to percutaneous drainage, should be managed with surgical drainage. Otherwise, surgical management is reserved for perforated colonic diverticulitis (Hinchey III and IV). Surgical options are resection with stoma formation (Hartmann's procedure - HP), resection with primary anastomosis with or without diverting ileostomy or in selected cases only laparoscopic lavage and drainage of the abdominl cavity without resection.

HP has been considered the procedure of choice in patients with generalized peritonitis and remains a safe technique for emergency colectomy in diverticular peritonitis, and is especially useful in critically ill patients and in patients with multiple comorbidities. However, restoration of bowel continuity after HP is associated with significant morbidity and resource utilization. As a result, many of these patients do not undergo stoma reversal surgery and remain with a permanent stoma. In recent years, some authors have reported the role of primary resection and anastomosis with or without a diverting stoma, in the treatment of acute diverticulitis, even in the presence of diffuse peritonitis. The decision regarding the surgical choice in patients with diffuse peritonitis is generally left to the judgement of the surgeon, who takes into account the clinical condition and the comorbidities of the patient. Studies comparing mortality and morbidity of the HP versus primary anastomosis did not show any significant differences. However, most studies had relevant selection biases, as demonstarted by some systematic reviews.

A comparison of primary resection and anastomosis with or without defunctioning stoma to the HP as the optimal operative strategy for patients presenting with Hinchey stage III-IV was published by Constantinides *et al.* A total of 135 primary resections with anastomosis, 126 primary anastomosis with defunctioning stoma, and 6619 HPs were considered in the study Morbidity and mortality were 55% and 30% for primary resection and anastomosis, 40% and 25% for primary anastomosis with defunctioning stoma, and 35% and 20% for HP. Stoma remained permanent in 27% of HPs and in 8% of primary anastomoses with defunctioning stoma. The authors concluded that primary anastomosis with defunctioning stoma may be the optimal strategy for selected patients with

diverticular peritonitis and may represent a good compromise between postoperative adverse events, long-term quality of life, and risk of permanent stoma.

A small randomized trial of primary anastomosis with ileostomy versus a HP in patients with diffuse diverticular peritonitis was published by Oberkofler *et al.* in 2012. 62 patients with acute perforated left-sided colonic diverticulitis (Hinchey III-IV) from 4 centers were randomized to Hartmann procedure (n=30) and to primary anastomoses with diverting ileostomy (n=32). A planned stoma reversal operation was performed after 3 months in both groups. The study reported no difference in initial mortality and morbidity (mortality 13% vs. 9% and morbidity 67% vs. 75% in the HP vs. primary anastomosis), but a reduction in length of stay, lower costs, fewer serious complications, and greater stoma reversal rates in the primary anastomosis group.

A multicenter randomized control trial (RCT) conducted between June 2008 and May 2012, the DIVERTI trial (Primary vs. Secondary Anastomosis for Hinchey Stage III-IV Diverticulitis) was published in 2017. All 102 patients enrolled were comparable for age, sex, Hinchey stage III vs. IV, and Mannheim Peritonitis Index (MPI). Overall mortality did not differ significantly between the HP (7.7%) and primary anastomosis (4%) groups. Morbidity for both resection and stoma reversal operations was comparable (39% in the HP arm vs. 44% in the primary anastomosis arm). At 18 months, 96% of primary anastomosis patients and 65% of the HP patients had a stoma reversal. Although mortality was similar in both groups, the rate of stoma reversal was significantly higher in the primary anastomosis group. This trial provides additional evidence in favor of primary anastomosis with diverting ileostomy over the HP in patients with diverticular peritonitis.

In 2019, the results of the LADIES study demonstrated that in hemodynamically stable, immunocompetent patients younger than 85 years, primary anastomosis is preferable to the HP as a treatment for perforated diverticulitis (Hinchey III or Hinchey IV).

The World Society of Emergency Surgery (WSES) guidelines recommend HP for the managing diffuse peritonitis in critically ill patients and in selected patients with multiple comorbidities. In clinically stable patients with no comorbidities, they suggest primary resection with anastomosis with or without a diverting stoma.

A minimally invasive approach using laparoscopic peritoneal lavage and drainage has been debated in recent years as an alternative to colonic resection. It can potentially avoid a stoma in patients with diffuse peritonitis. It consists of the laparoscopic aspiration of pus followed by abdominal lavage and the placement of abdominal drains, which remain for many days after the procedure. In 2013, a Dutch retrospective analysis of 38 patients treated by laparoscopic lavage was published highlighting some doubts about this procedure to treat critically ill patients. In seven patients, this approach did not control abdominal sepsis, two patients died of multiple organ failure and five ones required further surgical intervention (three Hartmann resections, one diverting stoma, and one perforation closure). One of these died from aspiration, and the remaining four experienced prolonged and complicated hospital stay. Multiple comorbidities, high C-reactive protein (CRP) level and/or high MPI were also predictors of a high risk of failure. The authors concluded that patient selection was of utmost importance and identification of an overt sigmoid perforation is of critical importance. Great debate is still open on this topic, mainly due to the discrepancy and sometime disappointing results of the latest prospective trials such as SCANDIV, LADIES, and DILALA trials.

In 2014, the first results from the RCT DILALA were published. Initial diagnostic laparoscopy showing Hinchey III disease was followed by randomization between laparoscopic lavage and colon resection and stoma. Morbidity and mortality after laparoscopic lavage did not differ when compared with Hartmann procedure. Laparoscopic lavage resulted in shorter operating time, shorter time in the recovery unit, and shorter hospital stay with the avoidance of stoma.

In this trial, laparoscopic lavage as treatment for patients with perforated Hinchey III disease was feasible and safe in the short-term. In 2015, the results of SCANDIV study were published. Among patients with likely perforated diverticulitis and undergoing emergency surgery, the use of laparoscopic lavage vs. primary resection did not reduce severe postoperative complications and led to worse outcomes in secondary endpoints. These findings do not support laparoscopic lavage for treatment of perforated diverticulitis. In the same years, the results of LADIES study were published. This showed that laparoscopic lavage was not superior to sigmoidectomy for the treatment of purulent perforated diverticulitis.

After their publication, the results of these three studies were summarized in six different meta-analyses, with similar findings. When compared with emergency surgery with resection, laparoscopic lavage in Hinchey III acute diverticulitis shows comparable mortality but is associated with a failure rate with a significantly augmented need for reoperation due to failure of the treatment and to intra-abdominal abscess formation. Long-term results were similar, with no difference in morbidity and mortality.

Several controversies remain about laparoscopic lavage and drainage. It may be acceptable alternative in selected patients, however it cannot be considered the first line treatment in patients with perforated diverticulitis.

The WSES guidelines suggest performing laparoscopic peritoneal lavage and drainage only in very selected patients with generalized peritonitis. It is not considered as the first line treatment in patients with peritonitis from acute colonic diverticulitis.

Laparoscopic surgery for diverticulitis had been initially reserved to the elective setting. However, in physiologically stable patients, laparoscopic sigmoidectomy may be feasible in the setting of purulent and fecal diverticular peritonitis. The WSES guidelines suggest to perform an emergency laparoscopic sigmoidectomy only if technical skills and equipment are available.

A damage control surgical strategy may be useful for patients in physiological extremis from abdominal sepsis. The initial surgery focuses on control of the sepsis, and subsequent operation deals with the anatomical restoration ot the gastrointenstinal tract, after a period of physiological resusitation. The strategy facilitates both the control of the severe sepsis as well as potentially improving the rate of primary anastomosis. Generalized diverticular peritonitis is a life-threatening condition requiring prompt emergency operation. To improve outcomes and reduce the rate of colostomy formation, a new algorithm for damage control operation, lavage, limited resection or closure of perforation, and second look surgery to restore intestinal continuity, was developed in recent years. Some patients may be physiologically deranged. These patients, who are hemodynamically unstable, are not optimal candidates for immediate complex operative interventions. After initial surgery, which should be limited to source control, the patient is taken to the intensive care unit (ICU) for physiologic optimization.

The WSES guidelines suggest damage control surgery (DCS) with staged laparotomies in selected unstable patients with diffuse peritonitis due to diverticular perforation.

References

1. Sartelli M, Weber DG, Kluger Y, *et al.* 2020 update of the WSES guidelines for the management of acute colonic diverticulitis in the emergency setting. World Journal of Emergency Surgery. 2020; 15: 32.
2. Bezerra RP, Costa AC, Santa-Cruz F, *et al.* Hartmann procedure or resection with primary anastomosis for treatment of perforated diverticulitis? Systematic review and meta-analysis. ABCD Arq Bras Cir Dikg. 2020; 33(3): e1546.
3. Halim H, Askari A, Nunn R, *et al.* Primary resection anastomosis versus Hartmann's procedure in Hinchey III and IV diverticulitis. World Journal of Emergency Surgery. 2019; 14: 32.
4. Kiely MX, Yao M, Chen L. Laparoscopic lavage in the management of Hinchey III/IV diverticulitis. Clin Colon Rectal Surg. 2021; 34: 104-112