

Single Case

Endoscopic Vacuum Therapy for Iatrogenic Rectal Perforation

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Keywords

Case report · Rectal perforation · Endoscopic vacuum therapy

Abstract

Serious iatrogenic bowel injuries during screening colonoscopy are rare events. If a perforation is detected during colonoscopy, endoscopic therapy can be attempted depending on the size and type as well as local endoscopic experience. We report the case of a 54-year-old female patient who was treated by endoscopic vacuum therapy (EVT) for a rectal perforation she had suffered during an outpatient screening colonoscopy. Two hours after the complication, an emergency endoscopy was performed. A perforation of the lower third of the rectum with a longitudinal diameter of 4 cm and a depth of 2.5 cm was detected. Due to the deep defect and the suspected increased risk of abscess formation after mechanical perforation closure with endoclips, we decided to perform EVT. The therapy was performed over a total period of 7 days. The patient was symptom free at all times. On the 2nd and 5th day, the endoscopic findings were re-evaluated and the inserted endosponges were changed. The sponge was adjusted to the wound conditions at each check and its length was gradually shortened. The endoscopic findings improved steadily. The EVT was completed after 7 days with the result of complete wound closure. The inflammatory parameters dropped continuously from day 1. On day 8, the patient could be discharged from inpatient treatment. No complications occurred in the post-inpatient course. This case is an example of successful EVT after iatrogenic rectal perforation. EVT should be considered for iatrogenic rectal perforation when signs of systemic inflammation are present and primary mechanical wound closure appears critical due to the depth of the defect and the presumed risk of abscess formation.

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Introduction

Serious iatrogenic bowel injuries during screening colonoscopy are rare events [1–3]. The incidence of perforation during diagnostic colonoscopies is 0.03–0.8% [4, 5]. Therapeutic colonoscopies, including standard polypectomy and endoscopic mucosal resection, have a higher risk of perforation (0.07–2.1%) [6]. The timing of detection of a perforation is critical for further management and prognosis [7, 8]. If a perforation occurs, careful documentation of the location, size, and timing is essential [5]. Therapeutic options for colonoscopy-associated rectal perforation include conservative treatment strategies, various endoscopic procedures, and a primary surgical approach depending on the individual clinical situation [9]. If the perforation is detected during colonoscopy, endoscopic therapy can be attempted depending on the size and type as well as local endoscopic experience [5]. Different endoscopic techniques for defect coverage can be considered [10]. Most of the data on this approach come from work that involved immediate closure of defects created by therapeutic procedures. However, the technique has also been applied to perforations identified during or immediately after diagnostic procedures. Through-the-scope endoscopic clips offer the advantage of widespread availability but are limited to smaller defects. Larger over-the-scope clips have been shown to effectively close larger defects, but their availability is not as widespread and expertise with their use is consequently limited. If surgery is required, minimally invasive techniques and repair rather than resection are often successful [6]. Endoscopic vacuum therapy (EVT) is an endoscopic option for the treatment of transmural gastrointestinal defects. This endoscopic approach is based on the negative pressure wound therapy for treatment of non-healing wounds. The healing effect of this technique occurs through multiple mechanisms, including changes in perfusion, microdeformation, macrodeformation, exudate control, and bacterial control [11]. EVT is used successfully in other situations, e.g., to treat insufficiencies after colorectal surgery but is currently not a standard therapy for colonoscopy-associated rectal perforation [12, 13].

Case Presentation

We report on a 54-year-old female patient who sustained a lower third rectal perforation during an outpatient screening colonoscopy. The perforation was noticed peri-interventionally and the examination was aborted. The patient was immediately referred to our hospital for further diagnosis and therapy. Antibiotic intravenous therapy with ceftriaxone and metronidazole had already been initiated prehospital. Apart from arterial hypertension controlled by medication, no previous diseases were known. On initial presentation, the patient showed stable cardiorespiratory status, no fever, and no abdominal complaints. Physical examination revealed unremarkable abdominal findings. Laboratory chemistry on the day of presentation showed a marked leucocytosis of 21.1 G/L (norm: 3.9–10.2 G/L) with an only slightly elevated CRP level of 6.4 mg/L (norm: <5 mg/L).

Two hours after the complication, an emergency endoscopy was performed. An extraperitoneal perforation of the lower third of the rectum was found. The injury was located on the anterior wall of the rectum. The length measured with the flexible endoscope was approximately 4 cm and the depth 2.5 cm. Due to the deep defect and the expected risk of abscess formation after mechanical perforation closure with endoclips, we decided to perform an EVT. The antibiotic therapy already started preclinically was continued. The EVT was performed for a total of 7 days with –175 mm Hg and high intensity. On day 2 and day 5, the endoscopic findings were evaluated (shown in Fig. 1) and the inserted endosponges were

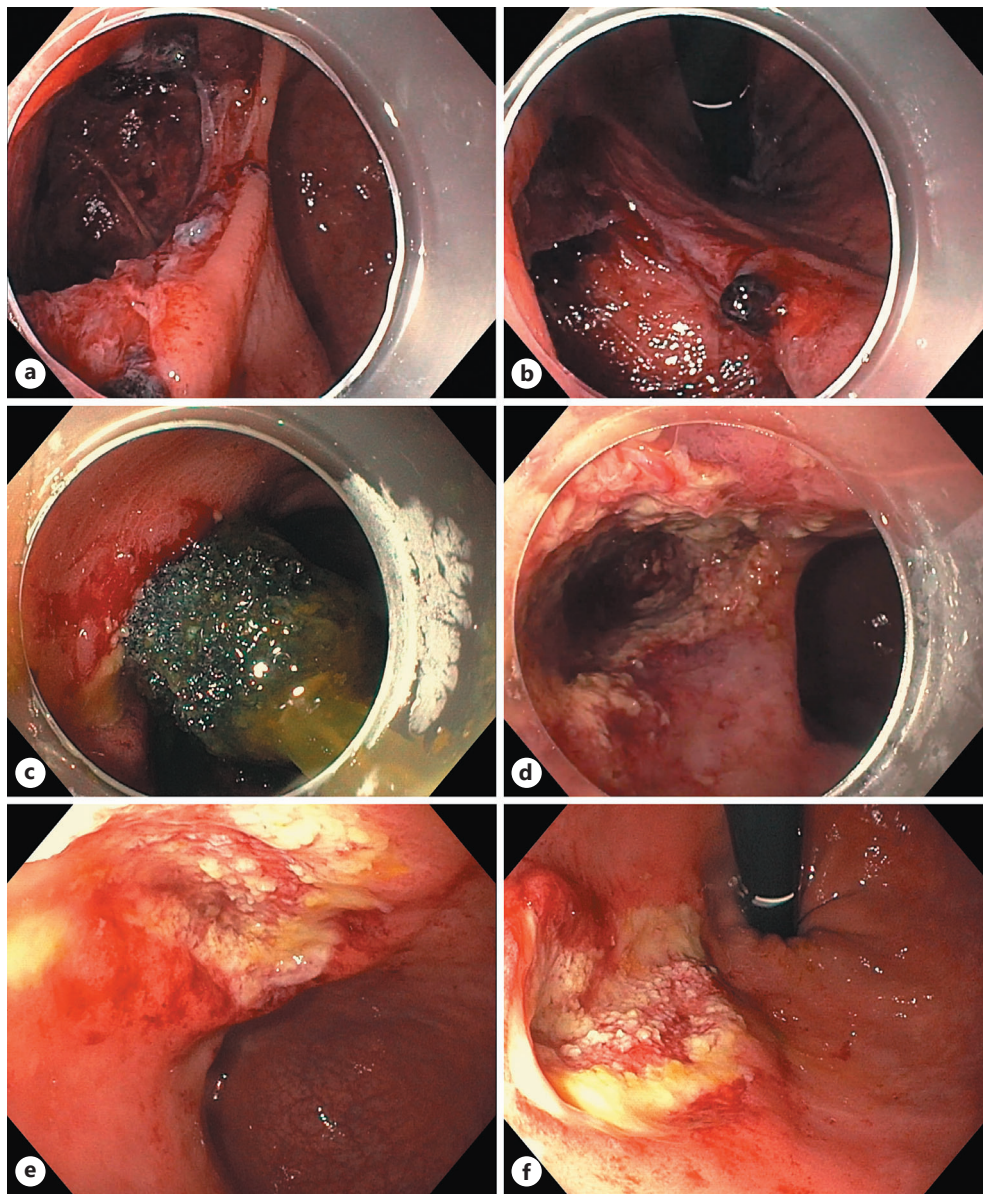


Fig. 1. Endoscopic findings on day 0 in antegrade (a) and inverted (b) view, on day 2 with endosponge in situ (c) and after removal of the endosponge in antegrade view (d), on day 7 in antegrade (e) and inverted (f) view.

changed. The sponge was adjusted to the wound conditions at each check and its length was gradually shortened. The patient was given a liquid diet.

With these measures, the endoscopic findings improved steadily during the course of the treatment, so EVT could be terminated after 7 days with complete wound closure. The inflammatory parameters decreased continuously from day 1 (shown in Fig. 2). The patient was always free of symptoms. On day 8, the patient could be discharged from inpatient treatment. After discharge, the patient was given oral antibiotic therapy for another 5 days and the inflammatory parameters were checked by the general practitioner. No complaints occurred in the post-inpatient course. The inflammatory parameters did not increase. The control colonoscopy performed after 3 months showed the expected scarring changes in the area of the former perforation localization. There was no evidence of stenosis. The patient was symptom-free.

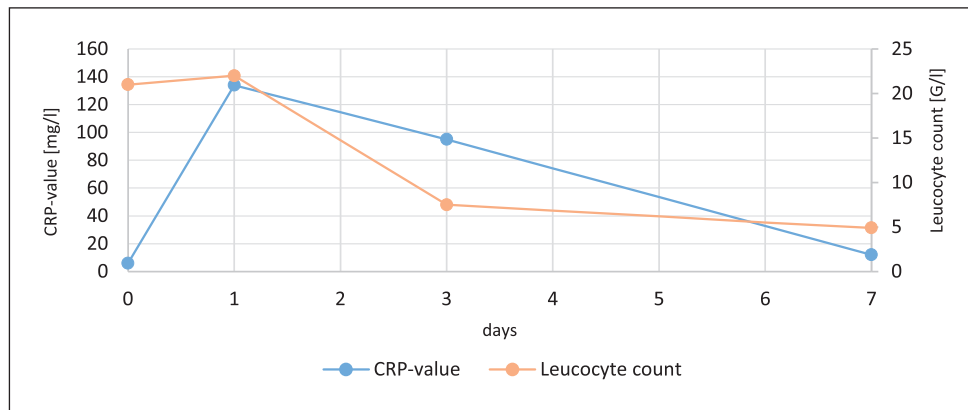


Fig. 2. Course of inflammatory parameters during hospital treatment.

Discussion

The case presented here is an example of a successful EVT after iatrogenic rectal injury. This therapy is currently not a standard. EVT is an established treatment option for anastomotic insufficiencies after colorectal surgery [14, 15]. So far, only casuistic reports on EVT for iatrogenic rectal perforations have been published [12, 13].

Certainly, patients with colonoscopy-associated rectal injury and no evidence of peritonitis or signs of systemic inflammation can be managed conservatively with antibiotic therapy, bowel rest, and regular clinical re-evaluation. Emergency surgery for colonoscopy-associated rectal perforation should only be performed in exceptional cases and under critical consideration depending on the clinical situation. EVT should be considered for iatrogenic rectal perforation when signs of systemic inflammation are present and primary mechanical wound closure appears critical due to the depth of the defect and the presumed risk of abscess formation. Whether EVT can shorten hospitalization for iatrogenic rectal injury compared to a conservative approach needs to be investigated in further studies. Currently, the clinical benefit of EVT for iatrogenic colonoscopy-associated rectal perforations cannot be evaluated in an evidence-based manner due to insufficient data. Further research on this topic is needed to assess the clinical benefits of EVT in this situation.

Statements of Ethics

Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images. Research was conducted ethically in accordance with the World Medical Association and Declaration of Helsinki. This study protocol was reviewed and approved by the Ethics Committee of the University of Marburg (Institutional Review Board [IRB], approval number RS 21/79).

Conflict of Interest Statement

All authors have no conflicts of interest or financial ties to declare.

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Author Contributions

Malte Zumblick wrote the manuscript. Petros Stathopoulos, Thomas Mathias Gress, and Ulrike Walburga Denzer edited the manuscript and provided intellectual input. All the authors approved the final version of the manuscript.

Data Availability Statement

All data generated or analysed during this study are included in this article. Further enquiries can be directed to the corresponding author.

References

- 1 Regula J, Rupinski M, Kraszewska E, Polkowski M, Pachlewski J, Orłowska J, et al. Colonoscopy in colorectal-cancer screening for detection of advanced neoplasia. *N Engl J Med*. 2006 Nov 2;355(18):1863–72.
- 2 Bokemeyer B, Bock H, Hüppe D, Düffelmeyer M, Rambow A, Tacke W, et al. Screening colonoscopy for colorectal cancer prevention: results from a German online registry on 269,000 cases. *Eur J Gastroenterol Hepatol*. 2009 Jun;21(6):650–5.
- 3 Castro G, Azrak MF, Seeff LC, Royalty J. Outpatient colonoscopy complications in the CDC's colorectal cancer screening demonstration program: a prospective analysis. *Cancer*. 2013 Aug 1;119(Suppl 15):2849–54.
- 4 Rabeneck L, Saskin R, Paszat LF. Onset and clinical course of bleeding and perforation after outpatient colonoscopy: a population-based study. *Gastrointest Endosc*. 2011 Mar;73(3):520–3.
- 5 Paspatis GA, Dumonceau JM, Barthet M, Meisner S, Repici A, Saunders BP, et al. Diagnosis and management of iatrogenic endoscopic perforations: European Society of Gastrointestinal Endoscopy (ESGE) position statement. *Endoscopy*. 2014 Aug;46(8):693–711.
- 6 Thompson EV, Snyder JR. Recognition and management of colonic perforation following endoscopy. *Clin Colon Rectal Surg*. 2019 May;32(3):183–9.
- 7 Raju GS, Saito Y, Matsuda T, Kaltenbach T, Soetikno R. Endoscopic management of colonoscopic perforations (with videos). *Gastrointest Endosc*. 2011 Dec;74(6):1380–8.
- 8 Baron TH, Wong Kee Song LM, Zielinski MD, Emura F, Fotoohi M, Kozarek RA. A comprehensive approach to the management of acute endoscopic perforations (with videos). *Gastrointest Endosc*. 2012 Oct;76(4):838–59.
- 9 Cai SL, Chen T, Yao LQ, Zhong YS. Management of iatrogenic colorectal perforation: from surgery to endoscopy. *World J Gastrointest Endosc*. 2015 Jul 10;7(8):819–23.
- 10 Zwink N, Holleczeck B, Stegmaier C, Hoffmeister M, Brenner H. Complication rates in colonoscopy screening for cancer. *Dtsch Arztebl Int*. 2017 May 5;114(18):321–7.
- 11 Lalezari S, Lee CJ, Borovikova AA, Banyard DA, Paydar KZ, Wirth GA, et al. Deconstructing negative pressure wound therapy. *Int Wound J*. 2017 Aug;14(4):649–57.
- 12 Rosati E, Valeri M, Graziosi L, Amato L, Avenia S, Donini A. Rectal perforation and perirectal abscess following stapled hemorrhoidectomy for prolapsed hemorrhoids successfully managed with Endo-SPONGE endoluminal vacuum-assisted wound closure system. *Ann Coloproctol*. 2021 Jun 9.
- 13 Slater NR, Loomes DE. Endoscopic vacuum-assisted wound closure of a rectal perforation in the setting of active ulcerative colitis. *Am J Gastroenterol*. 2021 Sep 1;116(9):1826.
- 14 van Koperen PJ, van Berge Henegouwen MI, Rosman C, Bakker CM, Heres P, Slors JF, et al. The Dutch multi-center experience of the endo-sponge treatment for anastomotic leakage after colorectal surgery. *Surg Endosc*. 2009 Jun;23(6):1379–83.
- 15 Kuehn F, Janisch F, Schwandner F, Alsfasser G, Schiffmann L, Gock M, et al. Endoscopic vacuum therapy in colorectal surgery. *J Gastrointest Surg*. 2016 Feb;20(2):328–34.