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Single Case

Intussusception due to an Inverted Meckel's Diverticulum Diagnosed by Double-Balloon Enteroscopy

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Keywords

Meckel's diverticulum · Double-balloon enteroscopy · Intussusception · Small intestine

Abstract

An 18-year-old man presented after undergoing multiple investigations for abdominal pain. Retrograde double-balloon enteroscopy showed a protruding red lesion in the ileum with small ulcers, approximately 75 cm proximal to the ileocecal valve, resulting in an intussusception. An inverted Meckel's diverticulum was strongly suspected. Pressure was applied to the protruding lesion using contrast medium injection after wedging the lumen with a balloon. The intussusception partially reduced, avoiding the need for emergent surgery. Endoscopic tattooing was performed to mark the lesion for subsequent resection. Elective laparoscopy-assisted surgery with minimum laparotomy revealed an inverted Meckel's diverticulum, which was resected.

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Introduction

The development of double-balloon enteroscopy (DBE) revolutionized the diagnosis and treatment of small bowel disease, since prior to DBE, the small bowel was essentially “off

limits” to endoscopic examination and intervention [1]. DBE enables visualization of the entire small intestine as well as the performance of therapeutic interventions such as hemostasis and dilation. In a retrospective study including 402 patients with Meckel's diverticulum, 17% had obstructive symptoms, signs of inflammation or bleeding [2]. We previously reported the utility of DBE for the evaluation of bleeding from an ulcer associated with a Meckel's diverticulum [3]. The main etiology of intussusception of the small intestine in adults is tumors and postoperative adhesions [4]. In these patients, intussusception usually requires emergency surgical intervention. We previously reported the endoscopic reduction of small intestinal intussusception using DBE [5, 6]. We present a patient with an ileal intussusception due to an inverted Meckel's diverticulum that was partially reduced by DBE.

Case Presentation

An 18-year-old man presented following multiple episodes of abdominal pain of unknown etiology. He had been followed in his local hospital for 2 years, with no specific treatment. He was then referred for further evaluation because of an exacerbation of the abdominal pain and hematochezia. A contrast-enhanced computed tomography scan showed a long ileal intussusceptum, resulting in bowel obstruction (Fig. 1). Retrograde DBE showed a protruding red lesion in the ileum with small ulcers, approximately 75 cm proximal to the ileocecal valve (Fig. 2). A contrast study showed a coiled-spring appearance. Pressure was applied to the protruding lesion using contrast medium injection after wedging the lumen with a balloon at the tip of the endoscope, to prevent distal flow. Consequently, the intussusception was partially reduced and contrast media flowed to the proximal side (Fig. 3). Abdominal symptoms resolved and the need for emergent surgery was avoided. Based on the clinical presentation, endoscopic findings, and location of the lesion, an inverted Meckel's diverticulum was suspected. Endoscopic tattooing was performed to mark the lesion for subsequent resection. Elective laparoscopy-assisted surgery with minimum laparotomy was performed, and it showed an inverted Meckel's diverticulum, which was resected (Fig. 4). The pathological specimen showed ectopic gastric mucosa.

Discussion

Adult intussusception is comparatively rare [7, 8]. Since Meckel's diverticula are usually 70–100 cm from the ileocecal valve, DBE can pave the way to establish the diagnosis of an inverted Meckel's diverticulum resulting in intussusception. The endoscopic findings of an inverted Meckel's diverticulum with ulceration and intussusception in this report are consistent with a previous publication [9]. The intussusception was partially reduced by injecting contrast medium after wedging the balloon to prevent distal flow, which relieved the obstruction. Consequently, emergent surgery was avoided. This wedging with the endoscope balloon is a unique advantageous feature of DBE over single-balloon endoscopy. Endoscopic tattooing guided the laparoscopy-assisted surgery with minimum laparotomy. Endoscopic resection of an inverted Meckel's diverticulum mimicking an ulcerated pedunculated polyp has been reported [10, 11], suggesting the need for care in the diagnosis and treatment of large pedunculated polyps in the ileum. In conclusion, retrograde DBE is useful for the investigation of ileal intussusception, and may facilitate both diagnosis and treatment. However, this unusual therapeutic approach should be performed only by experienced endoscopists,

with close clinical monitoring, and with a multidisciplinary approach involving the surgery team.

Statement of Ethics

The authors have no ethical conflicts to disclose.

Disclosure Statement

H.Y. has patents for DBE produced by FUJIFUIM Corporation. He also has a consultant relationship in FUJIFUIM Corporation and has received honoraria, grants and royalties from the company. T.Y. have received honoraria from FUJIFILM Corporation. No other authors have personal financial relationships with a commercial entity producing healthcare-related products and/or services relevant to this article.

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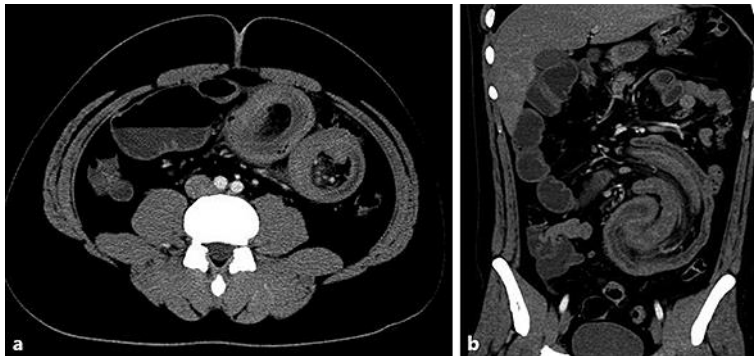


Fig. 1. Findings of the computed tomography scan. **a** Target sign at the ileum including a fatty layer on the cross-sectional image. **b** The total length of the intussusception is about 30 cm without findings of ischemia on the coronal image.

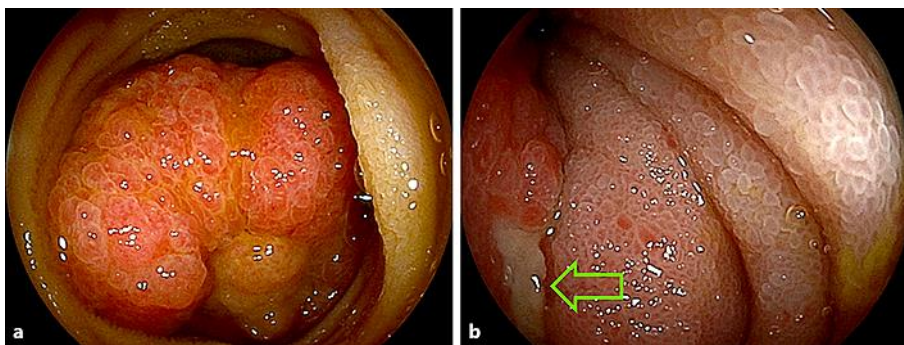


Fig. 2. Endoscopic findings using double-balloon enteroscopy. **a** A red protruding lesion in the ileum. **b** A small ulcer at the surface of the lesion (arrow).



Fig. 3. Contrast study. **a** Selective contrast study shows a coiled-spring appearance. **b** The contrast medium flows past the lesion to the proximal side after partial reduction.

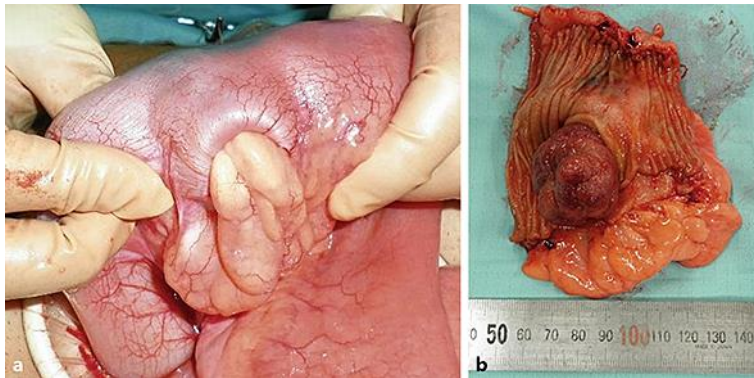


Fig. 4. **a** Intraoperative findings. An inverted Meckel's diverticulum from the serosal surface of the ileum.
b Resected specimen from the mucosal surface of the ileum.