



Gastrointestinal Bleeding Caused by Meckel's Diverticulum Diagnosed by Double Balloon Enteroscopy: Three Cases and a Brief Literature Review

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Abstract

Meckel's diverticulum is a small bulge in the small intestine present at birth and is the most frequent malformation of the gastrointestinal tract. Although Meckel diverticulum is usually of no medical significance, a tendency to gastrointestinal bleeding can require clinical attention. Despite the availability of modern imaging techniques, diagnosis is still challenging. We herein report three cases of undiagnosed gastrointestinal bleeding despite use of a number of imaging techniques. In all of these cases, double balloon enteroscopy was successfully used and the diagnosis of Meckel's diverticulum was established. We discuss the use of this successful technique in obscure gastrointestinal (GI) bleeding caused by Meckel's diverticulum in relation to the pertinent literature.

Key Words: Gastrointestinal Bleeding, Meckel's Diverticulum, Double Balloon Endoscopy

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Introduction

Meckel's diverticulum (MD) is the most common congenital abnormality of the small intestine. It is caused by an incomplete obliteration of the vitelline duct of the gastrointestinal system, with an incidence of 0.3% - 4% in autopsy series. The diverticulum is usually located 40 - 130 cm from the ileocecal valve and MD is the cause of bleeding in 4.7-8.7% of patients with small intestinal bleeding [1-3]. Although imaging techniques for detecting the source of bleeding in the small intestines have small diagnostic benefits, double balloon enteroscopy (DBE) enables examination of the whole small intestine with real time tissue sampling and a variety of therapeutic interventions [4]. To date, a small number of case reports have been published in which this technique was used successfully in obscure gastrointestinal (GI) bleeding caused by MD. We report here three cases of MD as the cause of GI bleeding diagnosed successfully with this novel method.

Cases

Case 1: A 38 year-old man presented to a university hospital with a 2-week history of vertigo and hematochezia. He had lower GI bleeding for 9 months and had been administered a total of 6 units of blood transfusion. He was on no medications and denied a history of drug or alcohol use. There was no history of trauma, chronic illness, injection, or surgical operations, except for an inguinal hernia operation three years ago. Physical examination revealed pallor, tachycardia and hypotension (blood pressure 90/45 mmHg), but no abdominal signs. His laboratory analyses were within normal ranges except for decreased hemoglobin, 7.7 g/dl (14-18 g/dl); hematocrit, 22.1% (40-55%); and iron 17 mcg/dl (80-170 mcg/dl). Upper gastrointestinal endoscopy demonstrated no bleeding and colonoscopy revealed blood clots but no source of bleeding. Technetium-99m pertechnetate scintigraphy and angiography failed to detect the source of bleeding. The patient was transferred to our clinic for further investigation. We performed DBE via the oral route. Although DBE revealed a normal mucosa till the mid-distal part of the ileum, a large diverticulum, 5 cm in size, localized to the distal ileum and ulcerated mucosa were seen (Figure 1). Multiple biopsies were taken for analysis. Histological findings from biopsy samples showed ectopic gastric mucosa surrounding the ulcer scar. The patient underwent partial resection of the small intestine.

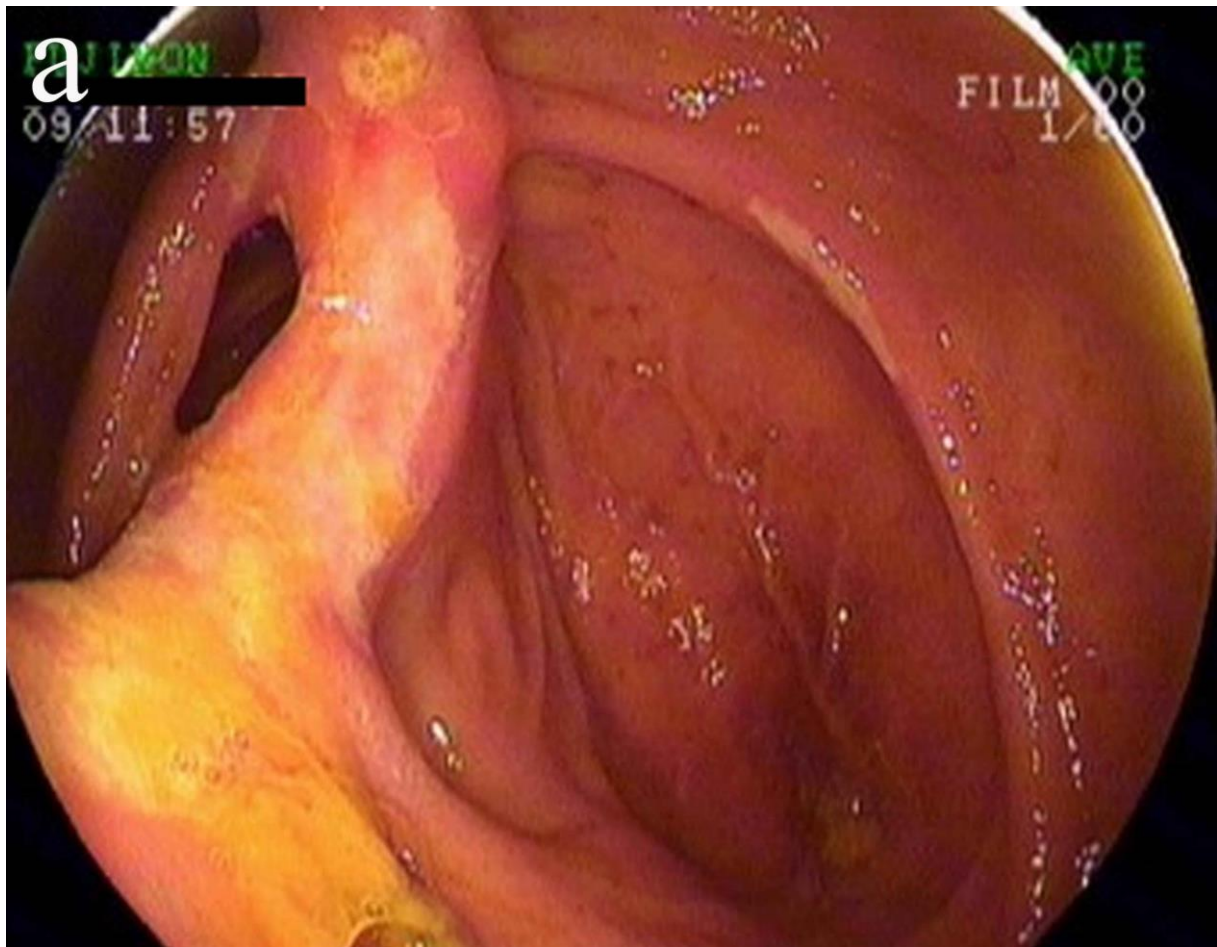


Figure 1. Enteroscopic image of the first case showing Meckel's diverticulum localized to the distal part of the ileum.

Case 2: A 28 year-old patient was admitted to our clinic with a complaint of rectal bleeding for 5 months. His relatives reported that he had made several emergency service admissions in which he had taken multiple red blood cell transfusions. Initial evaluation with upper and lower gastrointestinal endoscopy showed no signs of bleeding. Capsule endoscopy, small-bowel barium study, and technetium-99m pertechnetate scintigraphy were also normal. We detected Meckel diverticulum with DBE via the oral route in the distal part of the small bowel. There was no sign of bleeding on the surface of the diverticulum (Figure 2). The patient underwent surgery with these DBE findings.



Figure 2. Enteroscopic image of the second case showing Meckel's diverticulum localized to the distal part of the ileum.

Case 3: A 35-year-old patient was referred to our clinic for a recurrent rectal bleeding history for the past 5 years. He had taken multiple red blood cell transfusions in that time period. Upper and lower gastrointestinal endoscopy were normal. Technetium-99m pertechnetate scintigraphy and a small-bowel barium study were normal. DBE via the oral route revealed Meckel diverticulum in the distal part of the ileum (Figure 3). We took a biopsy from the diverticular area, however histologically there was no gastric tissue in the biopsy samples.



Figure 3. Enteroscopic image of the third case showing Meckel's diverticulum localized to the distal part of the ileum.

Discussion

This case report illustrates the successful use of DBE in three patients with MD as a cause of obscure gastrointestinal bleeding. All of these patients had been diagnosed negative for a source of bleeding on more than one colonoscopy and gastroscopy, as well as other imaging techniques such as scintigraphy with 99m-Techetium labeled red blood cells and video capsule endoscopy (VCE).

MD, the most common congenital anomaly of the GI tract, was first reported in 1809. Its frequency in autopsy series has been reported to range from 0.2% to 3.0% [5]. In patients with small intestinal bleeding, MD is the cause of bleeding in 4.7-8.7% of cases [3]. Gastric mucosa has been found to be present in 62.4% of patients with ectopic mucosa [6]. Similarly, one of our three cases had gastric mucosa in biopsy specimens. The percentage of patients

with ectopic gastric mucosa among those with diverticular bleeding has been reported to range from 77.8% to 98.0% [7]. Although it has varied clinical presentations, early diagnosis is still one of the most challenging issues in clinical practice. GI bleeding is a rare but important complication, usually being a result of peptic ulceration from ectopic gastric mucosal secretions, which is commonly seen in MD. Only one patient had such an ulcer in the present case series. Interestingly, he was the only one who had ectopic gastric tissue on biopsy.

The literature contains a small number of case reports of MD patients with obscure GI bleeding and who were diagnosed with DBE. Gasbarrini et al.[8] reported the first case of MD diagnosed with DBE. Since then, several case reports have been published on the superiority of this novel technique for diagnosis of obscure GI bleeding caused by MD [9-13]. In the present study, prior to DBE we had performed other novel techniques that were unsuccessful in detecting MD. Hence, DBE seems to be superior to other diagnostic procedures.

Investigation and management of small intestinal bleeding depend on both clinical factors, such as the patient's symptoms, general condition, coexisting diseases and current medications, and technical factors, such as the patient preferences, the sensitivity and specificity of the investigative techniques and the risks of conscious sedation, so it is quite hard to choose the best approach [14]. Moreover, current imaging techniques for detecting the source of bleeding in the small intestines have low diagnostic yields [15]. Technetium-labeled red blood cell scintigraphy is one diagnostic option for the diagnosis. Its sensitivity as well as its specificity for localization of bleeding seems to be high, with a result of 93% to 95% at a rate of 0.04 mL/min for red blood cell scans [16]. Its accuracy is between 41%- 97% in several reports, when the results are verified by endoscopy, angiography or surgery.

DBE was developed recently to visualize the entire small intestine and has become available for clinical practice. It was first described in 2001 by Yamamoto et al. [4]. Previous studies show that it has both a high success rate (86%) for total enteroscopy and a high diagnostic yield (76%) for patients with obscure bleeding [18]. Despite the technical challenges of the procedure and the resources required, it is obviously the preferred method for treating bleeding lesions in the small bowel and obtaining tissue for definitive diagnosis. It has also been used safely and effectively for dilatation of strictures, retrieval of impacted capsules, and

a variety of other indications [4]. Compared with VCE, it has several advantages. It is much better adjusted because the movement of the scope can be handled according to the viewing angle, it can provide high-quality pictures, biopsy availability if needed and therapeutic endoscopy [18-20]. DBE can be considered the gold standard if the whole small intestine is to be inspected.

In conclusion, with these case reports the usefulness of DBE was demonstrated. This technique allows endoscopists to access intestinal areas that were until recently inaccessible with conventional endoscopes. Through this technique, obtaining a precise diagnosis is much more possible than with other techniques, including VCE.

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