Emboloization of a Life-Threatenng Hemorrhage from Meckel’s Diverticulum in an Adult

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INTRODUCTION

Meckel’s diverticulum is the most common congenital anomaly of the gastrointestinal tract, occurring in 1–3% population (1, 2). Resulting from the incomplete obliteration of the vitelline or omphalomesenteric duct (1), it is a true diverticulum, containing all layers of the ileal wall, and usually arising from the antimesenteric border. Meckel’s diverticulum is usually asymptomatic and found incidentally, and has a lifetime risk of complications reported to be 4–6% (2). The major complications include ulceration, hemorrhage, intestinal obstruction (or intussusception), and neoplasm (1, 2). Of these, hemorrhage from Meckel’s diverticulum is common in children but relatively rare in adults (3, 4). Only a few cases have been reported (3-8). Accordingly, Meckel’s diverticulum is usually overlooked as a possible cause of lower gastrointestinal hemorrhage in adults. However, the hemorrhage can be acute and massive, thereby necessitating a prompt diagnosis and management of hemorrhage. Currently, transcatheter arterial embolization (TAE) with mesenteric angiography is a feasible diagnostic and therapeutic management of this condition (4, 7-9). Here, we report a case of life-threatening hemorrhage from Meckel’s diverticulum treated by emergent TAE, in a 29-year-old man.

CASE REPORT

A 29-year-old man presented with a one-day history of hematochezia associated with lower abdominal pain. The patient had no significant past medical or surgical history. Abdominal examination was unremarkable, while digital rectal examination showed bright red stool with no evidence of hemorrhoids. At the time of admission, the blood pressure was 151/68 mm Hg, hemoglobin level was 10.0 g/dL, and hematocrit was 28.4%.

Emergency esophagogastroduodenoscopy and colonoscopy...
did not reveal a definite source of bleeding. However, after continued episodes of hematochezia, the patient suddenly became hypotensive (60/40 mm Hg with pulse of 135 beats per minute) and the hemoglobin level fell to 6.7 g/dL. Two units of packed red blood cells were immediately transfused. Computed tomography (CT) performed at an outside hospital revealed a blind-ending intestinal pouch with enhancing mucosa arising from the pelvic ileum in the right lower abdomen (Fig. 1). A Meckel’s diverticulum was suspected and seemed to be the bleeding focus, although evidence of active bleeding, such as extravasation of contrast medium, was not seen on CT images.

Emergent superior mesenteric angiography showed an abnormally enlarged but unbranched artery arising from the ileal branch (Fig. 2). This artery, being of embryonic origin, showed a dense capillary stain and extravasation of contrast medium at the distal end. The angiographic findings established a diagnosis of bleeding Meckel’s diverticulum. Using a 2.0F microcatheter (Progreat; Terumo, Tokyo, Japan), superselection of the bleeding vitellointestinal artery was performed. The bleeding focus was successfully embolized using n-butyl cyanoacrylate (NBCA, Histoacryl; B. Braun, Melsungen, Germany) mixed with iodized oil (Lipiodol; Andre Guerbet, Aulnay-Sous-Bois, France) in a 1:2 ratio, with no further episodes of hematochezia. Vital signs and hemoglobin levels remained stable. After TAE, a Meckel scan was performed using a 99mTc-Pertechnetate. However, no significant uptake was observed in the lower abdomen, which was probably because of impaired vascularity in the diverticulum as a result of TAE.

The patient underwent elective laparoscopy-assisted segmental ileal resection 2 days after emergent TAE. During laparoscopy, a 6 cm-long Meckel’s diverticulum was found about 50 cm proximal to the ileocecal valve. The surgical specimen showed the diverticulum associated with an ulcer, and transmural acute inflammation at the antimesenteric margin of the ileum (Fig. 3). The patient recovered uneventfully, and was discharged on the 7th postoperative day.

**DISCUSSION**

Hemorrhage from Meckel’s diverticulum usually occurs in...
children, but is very rare in adults (1). In adults, Meckel's diverticulum most commonly presents as hemorrhage, caused by acute inflammation or peptic ulceration. Meckel's diverticulum is the most common site of heterotopic gastric mucosa, which may cause gastrointestinal bleeding (2). As this condition can be acute and massive, it should not be overlooked as a possible cause of gastrointestinal bleeding (8). In this case, the histologic specimen showed Meckel's diverticulum with transmural acute inflammation associated with an ulcer. The bleeding ulcer resulted in hemodynamic instability.

Since there are limited published case reports, there is no consensus regarding the optimal management for Meckel's diverticular hemorrhage in the emergency setting (3-8). In view of the potential for life-threatening hemorrhage, prompt diagnosis and management is of utmost importance. Mesenteric angiography plays a dominant role in localizing the site of bleeding, and simultaneously enables the effective treatment by means of TAE (8, 10). The decision to perform angiography instead of primary surgery must be based on the patient's vital signs. Rapid deterioration may occur while preparing the patient for surgery, requiring additional resuscitation and blood transfusion, which is costly and has inherent risks. Furthermore, an ongoing bleed compromises the anesthesia, leading to a complicated intraoperative and postoperative course (8). Although not the standard of care, TAE has several advantages. First, it can be a safer and faster approach in a hemodynamically unstable patient, without the need for general anesthesia. Second, it can prove to be definitive in patients who are high-risk candidates for emergency surgery. Third, it can allow for planned elective surgery after stabilizing a hemodynamically unstable patient. The complication rate from elective surgery is between 1% and 8%, but can substantially increase in emergency surgery (1).

The angiographic diagnosis is based on visualization of a vitellointestinal artery supplying the diverticulum, the presence of dense capillary staining, and extravasation of contrast in actively bleeding patients. In particular, the vitellointestinal artery as a remnant of the omphalomesenteric artery lying within the mesodiverticular band is diagnostic of Meckel's diverticulum; the artery originates from an ileal branch or from the ileocolic artery of the distal superior mesenteric artery (SMA) (9, 10). In this case, a single, enlarged, elongated vitellointestinal artery, showing contrast extravasation at its distal end, was identified on SMA angiography, and was selectively embolized with use of NBCA.

In conclusion, we report the case of a life-threatening hemorrhagic Meckel's diverticulum in a 29-year-old male, diagnosed by emergent mesenteric angiography and treated with selective TAE followed by laparoscopic surgery. Although hemorrhage from Meckel's diverticulum in adults is extremely rare, the possibility should always be considered. In such cases, angiography can reveal the bleeding site and simultaneously enable effective treatment of hemorrhage by embolization.

REFERENCES

성인에서 발생한 멕켈 게실의 생명을 위협하는 출혈에 대한 색전술

김창래1·김종우2·변성수1·김정호1

멕켈 게실에 의한 출혈은 성인에서는 매우 드물지만, 성인에서 급성으로 대량 출혈을 유발할 수 있기 때문에 위장관 출혈의 한 원인으로 고려되어야 한다. 이에 저자들은 멕켈 게실로 인해 생명을 위협하는 출혈이 발생한 29세 남자 환자의 증례를 보고하고자 한다. 이 증례는 멕겔 게실에 의해 발생한 대량의 출혈에 대해 조기 발견 및 적절한 치료에 있어 경동맥 색전술의 잠재적인 역할을 제시한다.

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