

## CASE REPORT

# Successful Endoscopic Clipping of Appendiceal Orifice Bleeding: A Technical Maneuver to Convert an Emergency to an Elective Procedure

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**Objective:** We report a rare case of an elderly man with appendiceal bleeding successfully treated with endoscopic placement of hemoclips.

**Methods:** We describe the patient's clinical presentation, laboratory test results, imaging, and treatment.

**Results:** An 89-year-old man presented with two episodes of bloody diarrhea that occurred two hours apart. Colonoscopy revealed active bleeding from the appendiceal orifice. Hemostasis was achieved with epinephrine injections followed by placement of five hemoclips to effectively close the appendiceal orifice. An abdominal computed tomography (CT) showed an irregular thickening of the appendix wall, raising the possibility of an

appendiceal mass. On hospital day 4, the patient underwent appendectomy and partial cecectomy. Pathology revealed focal ulceration of the mucosa without malignancy. The remainder of the patient's hospital course was uneventful.

**Conclusion:** The endoscopic methods used in our case proved effective in achieving hemostasis and allowed the patient to be stabilized prior to surgery. It is unclear whether longer monitoring would reveal any possible long-term complications after endoscopic closure of the appendix. It would be of interest to further investigate this approach to assess the long-term safety and efficacy of this procedure.

## INTRODUCTION

Gastrointestinal bleeding (GIB) is a common and potentially life-threatening condition that accounts for more than 300,000 hospitalizations per year (Lin & Rockey, 2005). Appendiceal hemorrhage is an extremely rare cause of GIB, with few cases reported in the scientific literature. We report a rare case of an elderly man with appendiceal bleeding and describe how hemostasis was successfully achieved with endoscopic placement of hemoclips.

## CASE

An 89-year-old Chinese-speaking man with a medical history of hypertension and a remote history of peptic ulcer disease presented with bloody diarrhea. He reported two episodes that occurred two hours apart, but denied having abdominal pain, preceding diarrhea, or recent illness. He reported no prior episodes of bloody diarrhea. His medications included daily aspirin and amlodipine. The patient reported having a normal colonoscopy three years earlier. On physical examination he was afebrile, with blood pressure 119/80 mmHg, pulse 113 beats/min, respiratory rate 22 breaths/min, and oxygen saturation 100% on room air. Abdominal exam was benign and digital rectal exam revealed bright red blood and prolapsed internal hemorrhoids. Initial laboratory data revealed hematocrit 44.1%, but two hours later the repeat hematocrit was 24.2%. The remainder of his physical exam and labs was unremarkable. Gastric lavage produced bilious, nonbloody aspirate. He was resuscitated with intravenous fluids and packed red blood cell transfusions. Upper endoscopy did not reveal any source of bleeding. The patient was rapidly prepared with polyethylene glycol and underwent colonoscopy, which revealed active bleeding from

the appendiceal orifice (Figure 1). The exact etiology of the appendiceal bleeding could not be ascertained. Hemostasis was achieved with epinephrine (diluted 1:10,000) injections to the periphery of the appendiceal orifice, followed by placement of five hemoclips to effectively close the appendiceal orifice (Figure 2). It was expected that closure of the orifice would provide some tamponade effect and allow for clot formation, since it was not possible to get to the actual lesion inside the appendix. Postcolonoscopy, the patient's hemoglobin and hemodynamics remained stable without any further bleeding. An abdominal CT showed an unusual course of the colon, with the cecum being in the left side of the abdomen (Figure 3) and an irregular thickening of the appendix wall (Figures 3, 4), raising the possibility of an appendiceal mass. On hospital day 4, the patient underwent appendectomy and partial cecectomy. Pathology revealed focal ulceration of the mucosa without malignancy (Figures 5, 6). The remainder of the patient's hospital course was uneventful and he was discharged.

## DISCUSSION

The annual incidence of lower GIB is around 0.03% in the adult population, with a mean age ranging from 63 to 77 years (Bounds & Kelsey, 2007). Lower GIB makes up one third of GIBs, approximately 80% of which are attributed to colorectal origin (Chiang, Tu, Liao, Shieh, & Sung, 2011). Bleeding from the appendiceal orifice is an extremely rare condition (Park, Kwon, Ko, Hong, & Park, 2010). Various etiologies of appendiceal bleeding exist, including benign erosions and ulcers, endometriosis, appendicitis, lymphomas, carcinoids, aortoappendiceal fistulae, and diverticular

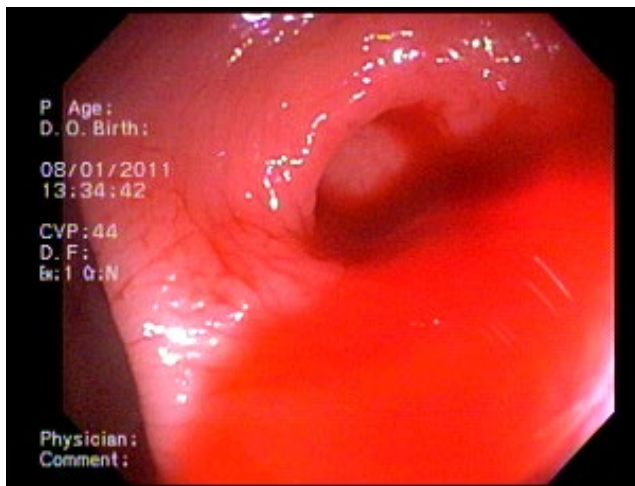


Figure 1 | Active bleeding from appendiceal orifice.

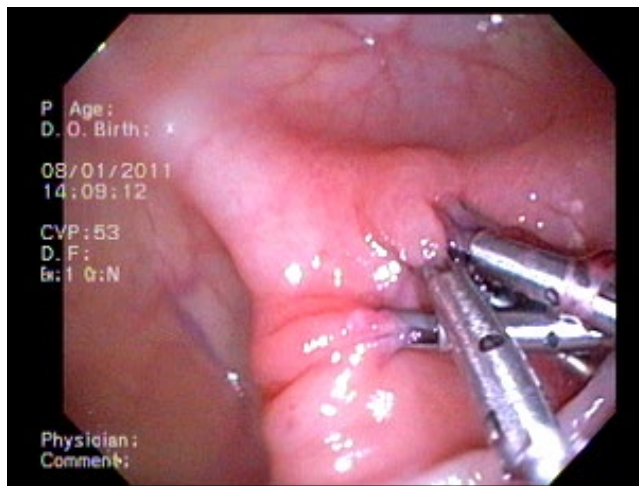


Figure 2 | No bleeding evident after epinephrine injection and appendiceal clipping.

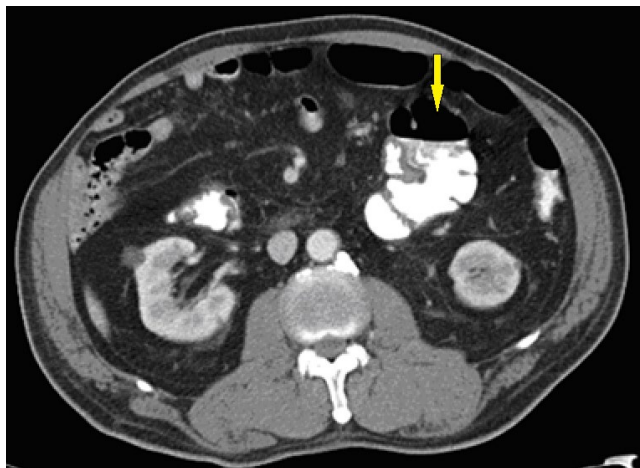


Figure 3 | CT of the abdomen and pelvis shows unusual course of the colon with the cecum in the left side of the abdomen.

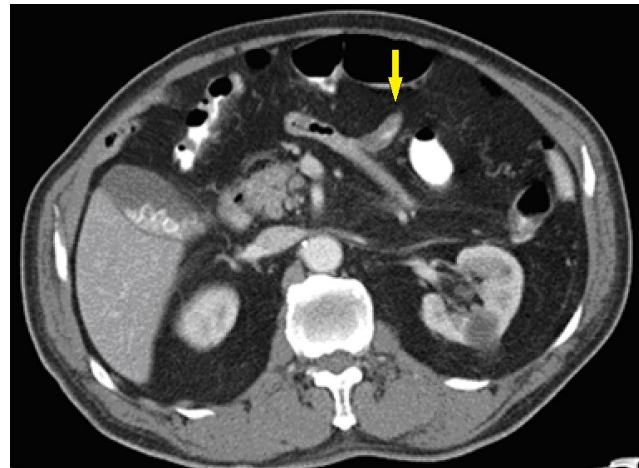


Figure 4 | CT of the abdomen and pelvis shows left-sided appendix with irregular thickening of the appendix wall.

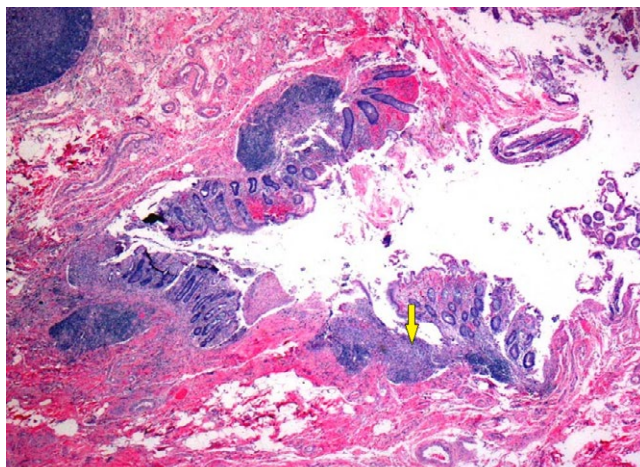


Figure 5 | Histopathology (magnification 40x) revealed appendix with focal ulceration.

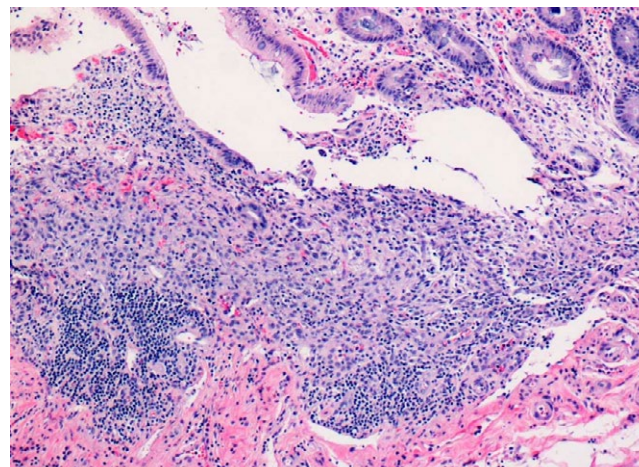


Figure 6 | Magnified histopathology (magnification 400x) of the appendiceal focal ulceration.

disease (Vesa, Hosseini-Carroll, & Manas, 2014). We suspect that our patient's appendiceal bleed originated from an ulcer most likely related to his use of aspirin. Intestinal and colonic ulcers induced by nonsteroidal anti-inflammatory drugs have a tendency to occur in the terminal ileum and proximal colon, where pills are stagnant for an extended period of time. The expected finding on colonoscopy and histology would be nonspecific ulcerations of the small and large bowel, similar to the focal ulceration of the appendiceal mucosa seen in our patient's histopathology specimen (Bounds & Kelsey, 2007). Of interest is the unusual course of the large bowel, with the cecum being found on the left side. This was likely an incidental finding, congenital in etiology, and probably unrelated to the etiology of the bleeding.

Management of any GIB, including from the appendix, is accomplished by various methods such as endoscopic therapy, arterial embolization, or surgery. Baek, Kim, & Kim (2009) conducted an analysis of the medical literature on appendiceal bleeding. All 20 cases reviewed underwent surgical treatment. Surgery is an invasive procedure, and arterial embolization is associated with complications such as rebleeding and ischemia (Chung & Gao, 2011). Endoscopic approaches to treatment, such as endoclips, epinephrine injections, cauterizations, or argon plasma coagulation, are less invasive than surgical approaches; therefore, endoscopic approaches are the preferred primary modality. Endoscopic management of appendiceal bleeding allows for further patient stabilization and, if needed, more-definitive surgical intervention on an elective basis, rather than emergently.

The endoscopic methods of appendiceal clipping used in our case proved effective in achieving hemostasis, and allowed the patient to be stabilized prior to surgery. Furthermore, metal clips can serve as radiographic markers for possible angiographic intervention if colonoscopic attempts fail or if

bleeding recurs (Park, Kwon, Ko, Hong, & Park, 2010). In our particular case, the patient underwent definitive surgical intervention during the same admission due to suspicion of a possible mass on imaging. Nevertheless, it would be of interest to further investigate endoscopic appendiceal clipping as a definitive therapy in lieu of surgery and to test the long-term safety and efficacy of this endoscopic procedure. However, considering the rarity of appendiceal bleeding, any such investigation on a large scale is unlikely.

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**Author Contributions:** SY and EA researched data and wrote the manuscript. RR, IM, and YT contributed to the discussion and reviewed/edited the manuscript.

**Conflict of Interest Disclosure:** The authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. No conflicts were noted.

**Previous Presentation:** The case was presented at the annual meeting of the American College of Gastroenterology, Las Vegas, NV, in October 2012. The authors of this case report acknowledge that all facts and descriptions are authentic as written.

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