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Case Report

Appendiceal hemorrhage: An uncommon cause of lower gastrointestinal tract bleeding and intraluminal contrast extravasation ^{☆,☆☆}

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ABSTRACT

Lower gastrointestinal tract bleeds due to appendiceal hemorrhage are extremely rare. This emergency condition requires a multidisciplinary approach to not only give a prompt diagnosis and exclude differential diagnosis but also crucial to proceed with proper intervention and cause of bleeding. In this paper, we report a case of appendiceal hemorrhage in a young male patient who presented with lower gastrointestinal bleeding. The patient was diagnosed with appendiceal hemorrhage by an abdominal computed tomography scan and gastrointestinal tract endoscopy. Postsurgical follow-up was uneventful, and the histopathology confirmed hemorrhagic and no typical inflammatory signs. It suggested that although appendiceal hemorrhage was rare, this condition should be considered one of the causes of lower gastrointestinal bleeding.

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Introduction

Lower gastrointestinal (GI) tract bleeding is defined as hemorrhage originating from the GI tract segment below the Treitz ligament, which is usually life-threatening [1]. Various diagnostic modalities have been used to diagnose appropriately, including angiography, multidetector computed tomography (MDCT), and colonoscopy. However, making an accurate diagnosis with further interventions is still tricky. Despite several advances in radiology and colonoscopy modalities and techniques, pinpointing the source of bleeding remains a significant challenge in daily clinical practice, especially in severe or nonactive bleeding. The origin cannot be identified in an estimated 10% of lower GI tract bleeding cases [2]. The typical causes include vascular disease, Crohn's, neoplasm, inflammation, hemorrhoids, and ischemic colitis [3]. Lower GI tract bleeds due to appendiceal hemorrhage are rare and only occasionally reported. This paper reports an appendiceal hemorrhage in a young male patient. He was diagnosed using an abdominal computed tomography (CT) scan and GI tract endoscopy.

Case report

A 32-year-old man with no medical history was admitted to our hospital for a sudden onset of hematochezia in the past 3 days. The patient had neither abdominal pain, vomiting, fever, nor weight loss, and he did not take any medicine like corticosteroid or nonsteroid anti-inflammatory drugs recently. On examination, the patient was awake with a Glasgow coma scale of 15 points, there were no signs of anemia, and his blood pressure was 110/70 mmHg. The complete blood count showed a slight decrease in hemoglobin levels (114 g/dL) and white blood cell count (9.63 g/L), and an average platelet count (190 g/L). The patient underwent a colonoscopy, highlighting bright red blood flowing along the colonic folds from the ileocecal angle to the rectum. The root of the appendix showed active bleeding without any signs of ulcers or warts (Fig. 1). No ulcers, polyps, or diverticula were detected along the colonic framework.

Computed tomography of the abdomen with intravenous contrast injection was performed the day after the colonoscopy, revealing extravasation of contrast material in the appendix (with no oral or rectal contrast administration). In addition, no appendiceal wall thickening or pericecal fatty stranding was found (Figs. 2A and B). The cecum wall was regularly thickened, mainly in the submucosal layer. The post-contrast image showed enhancement of the mucosal layer, consistent with chronic inflammation (Fig 2B; arrow).

The patient subsequently underwent an endoscopic appendectomy. The surgical report documented that the small intestine, colon, and appendix appeared normal. A 6.0 cm in-length appendix with a typical GI tract layer appearance was noted, with a small bleeding ulcer node in the lumen of the root (Fig 3). The histopathological result revealed erosion of the mucosa with hemorrhage. No granuloma formation or

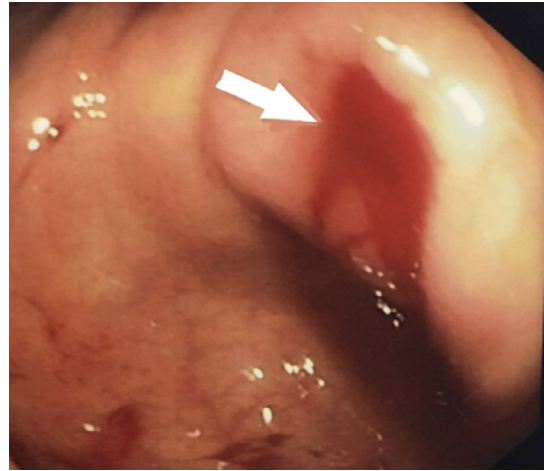


Fig 1 – Colonoscopy image showing the bleeding root of the appendix (arrow).

vascular lesion was documented (Fig 4). The postoperative follow-up was uneventful, and the patient was discharged 2 days later. A routine checkup after 2 months detected no recurrence of hematochezia.

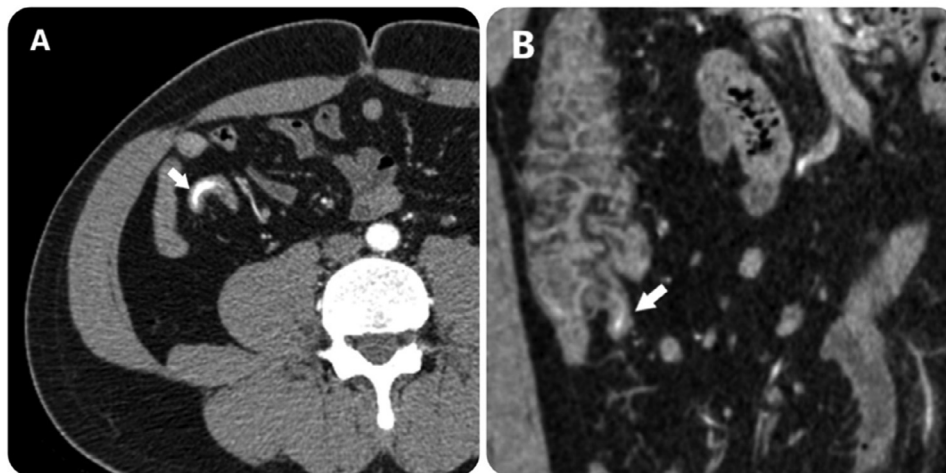
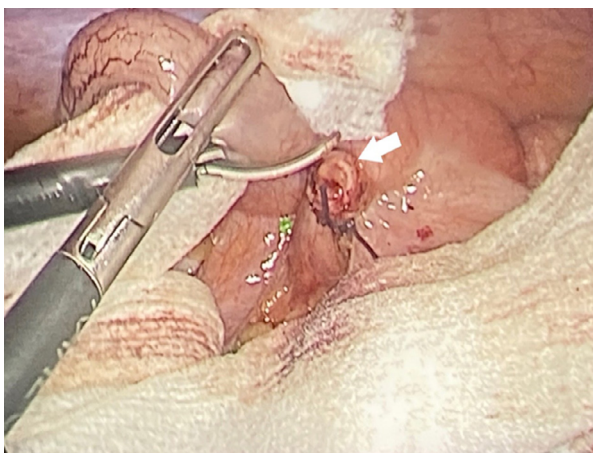
Discussion

Lower GI tract bleeding is uncommon, with an annual prevalence of 20.5 in 100,000, and often occurs in older male patients with average age ranges from 63 to 77 years. The colorectal region is the bleeding source in 80% of cases [4]. The many causes include diverticulitis, hemorrhoids, neoplasm, vascular dysplasia, colonic polyps, and ischemic colitis; infection is present in the vast majority of cases [3]. Appendiceal hemorrhage is an infrequent cause of lower GI tract bleeding. It is believed to relate to Crohn's disease, appendicitis, intussusception, vascular dysplasia, neoplasm, endometriosis, or focal sloughing of the mucosa. Table 1 illustrates the origin of 13 appendiceal hemorrhage cases. Hematochezia dominated, and abdominal pain was reported in 2 cases. Cases in women were less frequent than in men and young, and middle-aged patients were more common than in the elderly.

Focal sloughing of the mucosa is not a typical presentation. This paper is the third report of appendiceal hemorrhage with this cause. In 2011, Chiang et al. [5] reported an appendiceal hemorrhage in a 25-year-old man. Multislice CT was used to diagnose, and a good outcome was documented. The histopathologic result showed focal sloughing of the mucosa [5]. In 2010, Baek et al. [6] reported a 42-year-old man with appendiceal hemorrhage. The active bleeding point was detected at the tip of the appendix on the CT scan. An endoscopic appendectomy was performed, and no bleeding was reported in the postoperative examination. Microscopic examination revealed sloughing mucosa, focal inflammation, and no submucosal vascular malformation [6].

Table 1 – Information from the 13 published articles about appendiceal bleeding.

Year	Age/Sex	Clinical symptoms	Definitive diagnosis	Reference
2017	46/Male	Abdominal pain	Appendicitis	[7]
2017	33/Male	Abdominal pain	Diverticulitis of the appendix	[8]
2016	72/Male	Hematochezia	Vascular malformation	[9]
2016	22/Male	Rectal bleeding	Granulomatous appendicitis	[10]
2015	68/Male	Hematochezia	Dieulafoy lesion of the appendix	[11]
2014	44/Male	Hematochezia	Diverticulitis	[12]
2014	51/Male	Hematochezia	Dieulafoy lesion of the appendix	[13]
2013	71/Male	Hematochezia	Ulcerated mucosa of the appendix	[14]
2013	41/Male	Hematochezia	Non-appendiceal vascular hyperplasia	[15]
2011	25/Male	Hematochezia	Focal sloughing of the mucosa	[5]
2010	42/Male	Hematochezia	Focal sloughing of the mucosa	[6]
2001	76/Female	Hematochezia	Vascular malformation	[9]
1985	32/ Female	Hematochezia	Ulcerated mucosa of the appendix	[16]

**Fig 2 – Postcontrast computed tomography image on the axial plane (A) and coronal plane (B) showing intraluminal contrast extravasation at the root of the appendix (arrow).****Fig 3 – Laparoscopic appendectomy image showing a normal appendix with a bleeding ulcer at the root portion (arrow).**

The advent of multi-slice CT has facilitated GI tract bleed evaluation, especially with non-invasive, prompt, and accurate diagnosis (88.5%) [17]. Combining colonic endoscopy and abdominal CT has been proven to enhance diagnostic accuracy. Furthermore, multi-slice CT is crucial in pinpointing the bleeding source [9].

The treatment modality is personalized based on disease type and clinical status. Although endoscopic hemostasis can be useful in lower GI tract bleeding, no publication has reported successful endoscopic hemostasis in appendiceal hemorrhage. Surgery was the modality of choice for almost all focal appendiceal lesions. Extended resection, including cecectomy, ileostomy, or hemicolectomy, has been reported for hemostasis. Previous report revealed their experiences with temporary hemostasis in appendiceal dysplasia using an angiography (coil) intervention. Unfortunately, hemorrhage occurred after 2 weeks, and surgical resection was performed [9].

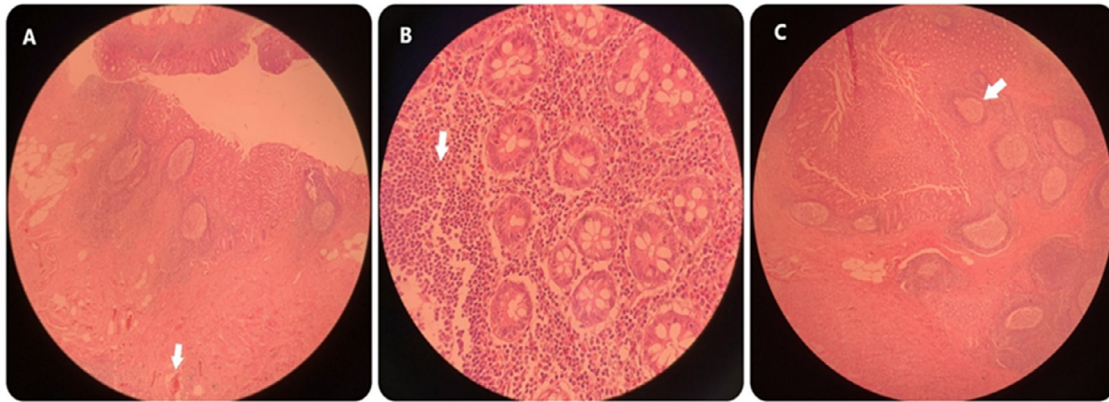


Fig 4 – (A) Pathological examination revealed focal sloughing of the mucosa with hemorrhage (arrow), H&E, magnification $\times 10$. (B, C) Mild infiltration of polymorphonuclear lymphocytes (white arrows), H&E, magnification $\times 40$ (B), magnification $\times 10$ (C).

Conclusion

Our patient was successfully treated by surgical resection. This article highlights the importance of appendiceal assessment in lower GI tract hemorrhage, especially in young patients. Combining endoscopy and CT can improve the efficacy of appendiceal hemorrhage diagnosis.

Authors' contributions

Le TD and Nguyen DH contributed equally to this article as first authorship. Le TD and Nguyen DH: Case file retrieval and case summary preparation. Nguyen DH and Nguyen MD: preparation of manuscript and editing. All authors read and approved the final manuscript.

Availability of data and materials

Data and materials used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Our institution does not require ethical approval for reporting individual cases or case series. Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

Patient consent

Informed consent for patient information to be published in this article was obtained.

REFERENCES

- [1] Oakland K, Chadwick G, East JE, Guy R, Humphries A, Jairath V, et al. Diagnosis and management of acute lower gastrointestinal bleeding: guidelines from the British Society of Gastroenterology. *Gut* 2019;68(5):776–89. doi:10.1136/gutjnl-2018-317807.
- [2] Genesis and pathophysiology of lower gastrointestinal bleeding | SpringerLink. <https://link.springer.com/article/10.1007/s004230000194>. [accessed 10.02.23].
- [3] Lower gastrointestinal bleeding: diseases of the Colon & Rectum. https://journals.lww.com/dcrjournal/Abstract/1997/40070/Lower_gastrointestinal_bleeding.21.aspx. [accessed 10.02.23].
- [4] EBSCOhost | 16016446 | epidemiology and outcome of patients hospitalized with acute lower gastrointestinal hemorrhage: a population-based study. <https://web.p.ebscohost.com/abstract/>. [accessed 10.02.23].
- [5] Chiang CC, Tu CW, Liao CS, Shieh MC, Sung TC. Appendiceal hemorrhage – an uncommon cause of lower gastrointestinal bleeding. *J Chin Med Assoc* 2011;74(6):277–9. doi:10.1016/j.jcma.2011.04.009.
- [6] Baek SK, Kim YH, Kim SP. Acute lower gastrointestinal bleeding due to appendiceal mucosal erosion. *Surg Laparosc Endosc Percutan Tech* 2009;19(5):e211. doi:10.1097/SLE.0b013e3181ba83de.
- [7] Shen Z, Zhi HY, min NL, cheng GH, Wang W. A case of lower digestive tract hemorrhage caused by appendicitis in China. *Int J Surg Case Rep* 2017;39:34–5. doi:10.1016/j.ijscr.2017.06.038.
- [8] Ur Rehman M, Paulus F, Chew MH. Unexpected histopathology of acute appendicitis. *Int J Surg Case Rep* 2017;38:23–5. doi:10.1016/j.ijscr.2017.06.064.
- [9] Hematochezia due to angiodysplasia of the appendix - PMC. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4942527/> [accessed 10.02.23].
- [10] Magaz Martínez M, Martín López J, De la Revilla Negro J, González Partida I, de Las Heras T, Sánchez Yuste MR. Appendicular bleeding: an exceptional cause of lower hemorrhage. *Rev Esp Enferm Dig* 2016;108(7):437–9. doi:10.17235/reed.2015.3828/2015.
- [11] Cureus | an unusual cause of lower gastrointestinal bleeding: cecal Dieulafoy's lesion. <https://www.cureus.com/articles/19963-an-unusual-cause-of-lower-gastrointestinal-bleeding-cecal-dieulafoys-lesion#!/> [accessed 10.02.23].

- [12] Vesa TS, Hosseini-Carroll P, Manas K. Diverticular hemorrhage of the appendix. *Gastroenterol Hepatol* 2014;10(6):394–5. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4080878/> [accessed 10.02.23].
- [13] Dieulafoy lesion of the appendix - digestive and liver disease. [https://www.dldjournalonline.com/article/S1590-8658\(14\)00324-7/fulltext](https://www.dldjournalonline.com/article/S1590-8658(14)00324-7/fulltext). [accessed 10.02.23].
- [14] A therapeutic barium enema is a practical option to control bleeding from the appendix | SpringerLink. <https://link.springer.com/article/10.1186/1471-230X-13-152>. [accessed 10.02.23].
- [15] Atypical florid vascular proliferation in appendix: a diagnostic dilemma | Diagnostic Pathology | Full Text. <https://diagnosticpathology.biomedcentral.com/articles/10.1186/1746-1596-8-12>. [accessed 10.02.23].
- [16] Choi DY, Yuh JN, Reid JD. Rectal hemorrhage from ulcerated appendiceal stump nine years after appendectomy. *Dis Colon Rectum* 1985;28(6):454–6. doi:10.1007/BF02560236.
- [17] Acute massive gastrointestinal bleeding: detection and localization with arterial phase multi-detector row helical CT | Radiology. <https://pubs.rsna.org/doi/abs/10.1148/radiol.2383050175>. [accessed 10.02.23].