CASE REPORT

Dieulafoy's lesion of the colon and rectum: a case series and literature review

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SUMMARY

Dieulafoy's lesion is a dilated, aberrant, submucosal vessel that erodes the overlying epithelium without obvious ulceration. It is most commonly located in the lesser curvature of the stomach but rare occurrences in extragastric sites have also been reported. Herein, we describe a case series of three patients who presented with lower gastrointestinal bleeding. Colonoscopy revealed a caliber-persistent tortuous submucosal artery protruding into the lumen of the colon or rectum. The patients were diagnosed with Dieulafoy's lesion and primary haemostasis was achieved with the endoscopic haemoclip application. The purpose of this review is to summarise the available data on the pathophysiology, epidemiology, clinical presentation, diagnosis and management of patients with Dieulafoy's lesion of the colon and rectum.

BACKGROUND

Although Dr MT Gallard first reported the Dieulafoy's lesion in 1884, it was named after the French surgeon, Paul Georges Dieulafoy since publication of his work in 1898.¹ He reported fatal gastrointestinal bleeding in three, asymptomatic, young, male patients. Autopsy revealed small superficial ulcers consisting of large, submucosal arterioles in the stomach. Therein, he concluded that the lesion was not a typical form of gastric ulcer and identified it as 'exulceratio simplex', which later became known as Dieulafoy's lesion. At one time, it was thought that an aneurysm of the gastric wall in combination with other factors like atherosclerosis may be the cause of the lesion.² Acquired and congenital malformations of the gastrointestinal vessels were also considered as the possible aetiologies. However, it is now discovered that the lesion is caused by an abnormally dilated vessel, up to 1–3 mm in diameter that runs under the mucosa of the gastrointestinal tract and may cause life-threatening bleeding due to the erosion.³

Dieulafoy's lesion accounts for 1%–2% of all gastrointestinal haemorrhage; however, it has been considered to be one of the most under-recognised conditions due to the subtlety of the lesion.³ Endoscopy remains the first diagnostic test. Contrast-enhance CT, angiography and surgical interventions are other diagnostic approaches in patients with a Dieulafoy's lesion, which at times can be more successful in difficult-to-diagnose cases.³ Although there are no standard guidelines, endoscopy has significantly

impacted the management of the Dieulafoy's lesion, with methods like endoscopic injection sclerotherapy, thermocoagulation and mechanical therapy.^{3,4} Surgery is needed in about 3% to 16% of cases, mostly in patients with rebleeding after endoscopic therapies.⁵

CASE PRESENTATION**Case 1**

A 76-year-old man presented to the Emergency Department with haematochezia for the last 5 days. His medical history was significant for prostate cancer treated with radiation therapy. Six months prior to presentation, an upper endoscopy and small bowel capsule endoscopy were normal while a colonoscopy was significant only for the radiation proctitis. He denied any fever, fatigue, abdominal pain, abdominal distension, haematemesis or weight changes.

On admission, the patient was tachycardic with a heart rate of 110 beats/min and blood pressure of 80/40 mm Hg. He was pale with anicteric sclerae. The rest of the systemic examination was unremarkable.

Laboratory evaluation revealed haemoglobin level of 6.4 g/dL (normal, 13.5–17.5 g/dL). He had blood urea nitrogen at 94 mg/dL (normal, 7–20 mg/dL) and serum creatinine of 1.7 mg/dL (normal, 0.6–1.2 mg/dL). On day 2 of admission, the patient became haemodynamically stable and a colonoscopy was performed. It revealed pools of bright red blood with a vessel protruding from a small mucosal defect in the right ascending colon that was spurting fresh blood (figure 1). No mucosal abnormality surrounding the lesion was noted.

Case 2

An 88-year-old man presented to our medical centre with fresh rectal bleeding for the last 2 days. The patient denied any nausea, haematemesis, abdominal pain or distention. He had no history of gastrointestinal or liver disease, no history of alcohol, smoking or drug abuse, and was negative for *Helicobacter pylori* infection.

Physical examination revealed pallor. Abdominal examination was unremarkable; however, rectal examination showed fresh bleeding but no mass or lesion could be felt. The patient was well oriented with normal vital signs. Cardiovascular, gastrointestinal and chest examinations were unremarkable.

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Figure 1 Colonoscopy revealing a vessel protruding into the lumen of the ascending colon surrounded by the pool of blood demarcated by the yellow arrow.

He had a normal platelet and white cell counts but his haemoglobin levels dropped from 10 to 8.4 g/dL (normal, 13.5–17.5 g/dL) during his hospital stay. The coagulation profile was within normal limits and hepatitis serologies were negative. Colonoscopy revealed bleeding vessels in the left lower colon, without an evidence of surrounding ulceration (figure 2).

Case 3

A 79-year-old Caucasian woman presented to the hospital with two episodes of melaena followed by one episode of moderate-volume bright red blood per rectum. She denied nausea, abdominal pain or previous similar episodes. The patient was non-alcoholic, non-smoker and drug-free. She had no history of any pre-existing gastrointestinal, liver or bleeding disorders.

On physical examination, she had heart rate of 70 beats/min, blood pressure 120/80 mm Hg and respiratory rate of 20/min. Physical examination was unremarkable and she was lying comfortably in bed. Her systemic examination was insignificant.

Figure 2 A vessel protruding into the lumen of the colon without surrounding ulceration consistent with a Dieulafoy's lesion. The lesion site is shown by the yellow arrow.

Figure 3 Colonoscopy demonstrating a protruding vessel in the rectum pointed out by the yellow arrow.

Laboratory studies revealed a normal metabolic and renal profile. Her liver function tests and urinalysis were also within normal limits. Hepatitis serologies were negative. She had a haemoglobin level of 14 g/dL (normal, 12.0–15.5 g/dL). Her platelet and white cell counts were at 250×10^9 (normal, $150\text{--}450 \times 10^9$ /L) and 7.0×10^9 (normal, $3.5\text{--}10.5 \times 10^9$ /L), respectively. Colonoscopy revealed fresh bleeding from a pulsatile vessel in the rectum, with a normal mucosa surrounding the bleeding vessel (figure 3).

DIFFERENTIAL DIAGNOSIS

On presentation, the differentials were broad and included peptic ulcer disease, portal hypertension, bleeding disorders, vascular malformation of the gut vessels and malignancy. However, negative hepatitis serologies, normal coagulation profile and endoscopy findings ruled out all these possibilities.

TREATMENT

All three patients were initially resuscitated with an intravenous fluid. Additionally, 2 units of packed red blood cells were transfused to cases 1 and 2. They were kept 'nil-per-oral' in anticipation of an endoscopic management. On endoscopy, after careful inspection and irrigation, two to four haemoclips were deployed at the base of the bleeding vessels to stop bleeding (figure 4). No rebleeding was evident after the procedure.

OUTCOME AND FOLLOW-UP

On day 4 of admission, all the patients had a repeat colonoscopy which revealed haemoclips in position with no new bleeding. The patients were discharged home in a stable condition and were advised to have a close follow-up with the gastroenterologist. During the 6-month follow-up period, no recurrence of haematochezia was noted in any of the patients included in the present study.

DISCUSSION

Dieulafoy's lesion is a relatively rare clinicopathological entity. This disease is characterised by small submucosal arteriole that erodes the overlying mucosa and cause severe gastrointestinal bleeding without an evidence of primary ulcer, erosion or aneurysm.^{1 2} It frequently involves the male patient population at the fifth decade of life without any familial predisposition.³ The most common and classic location for this lesion is fundus area of

Figure 4 Two haemoclips deployed at the bases of the bleeding vessels.

stomach.³ There are reports of the lesion involving the oesophagus, duodenum, ileum and jejunum.⁴⁻¹¹ However, a Dieulafoy's lesion involving the colon and rectum is extremely uncommon. In this paper, we present a series of three cases and review the literature for the previously reported cases of Dieulafoy's lesion of the colon and rectum published to date. A structured literature search of the medical databases consisting of MEDLINE and relevant publications found on PubMed (National Library of Medicine, Bethesda, MD) were accessed and reviewed. Search criteria consisted of a combination of terms, including 'Dieulafoy's lesion', 'hemorrhage', 'bleeding', 'colon', 'rectum' and 'gastrointestinal' which helped retrieving several updated and accessible works from the medical database.

A total of 25 articles consisting of case reports and case series of the Dieulafoy's lesion involving the unusual site of rectum and colon were found while 14 cases were available in the full-text form.¹²⁻²⁵ A comprehensive review of the previously reported cases showed that >90% patients with Dieulafoy's lesion of the colon and rectum were men. In 10 out of 14 cases, patients were ≥ 50 years old. In our case series, all three patients were above the age of 70 years. Therefore, it can be safely assumed that Dieulafoy's lesion of the colon and rectum has the predilection for the older male patient population in accordance with the cases from the upper gastrointestinal tract. More than 80% of the patients had hypertension or diabetes mellitus as the underlying disease suggesting vascular pathologies as an inciting factor. Furthermore, one relatively young patient had a history of anal receptive intercourse who did not have any other comorbidity.²⁵ Almost half of the patients were hospitalised for causes other than haematochezia and the Dieulafoy's lesion was diagnosed on incidental colonoscopy. Urgent banding, haemoclipping and/or epinephrine injection around the lesion were successful in all cases, with an exception of one case that was treated with surgical excision of the lesion. The patients in our case series were successfully treated with the endoscopic haemoclip application (table 1).

Patients with a Dieulafoy's lesion are usually asymptomatic or they can present with painless gastrointestinal bleeding without associated prodrome of gastric complaints observed in patients with the ulcer disease. On an average, 44% of the symptomatic Dieulafoy's lesions present with melaena, 30% with haematemesis, 18% with both melaena and haematemesis, 6% with haematochezia and 1% with iron-deficiency anaemia.²⁶ The

amount of bleeding secondary to the Dieulafoy's lesion varies. It ranges from self-limiting, mild bleeding episodes to recurrent, massive life-threatening haemorrhage. The patients with pre-existing comorbidities like diabetes mellitus, hypertension, cardiovascular disease, chronic kidney disease and alcoholism are at a higher risk for massive bleeding.^{26 27} It is evident that many such patients require non-steroidal anti-inflammatory drugs (NSAIDs) and/or anticoagulants for various comorbid disorders and concomitant administration of these agents may prolong the duration and increase the severity of bleeding.

The exact pathophysiology of a Dieulafoy's lesion is unknown. However, it is hypothesised that large caliber-persistent submucosal arteries cause microtrauma and ischaemia of the overlying mucosa due to their pulsatility leading to thinning of the mucosal wall. Over time, artery gets exposed to the contents of the stomach or bowel. Due to the abnormal exposure of this vessel, even minor mechanical trauma from a food bolus can lead to erosion of this artery causing severe acute gastrointestinal haemorrhage.²⁸ Some correlation of gastric lesions with NSAIDs and aspirin use has also been suggested possibly by causing mucosal atrophy and an ischaemic injury.²⁹ Furthermore, a few studies implicate advanced liver disease as a notable risk factor for bleeding in patients with the Dieulafoy's lesion. Alcohol consumption may also promote bleeding in these lesions because alcohol may weaken the arteriolar wall leading to vessel rupture that precipitates the bleeding.²⁹ In patients with a colonic Dieulafoy's lesion, constipation or cancer may play a role in the causation of these lesions by adding to the mechanical factors. While in the rectum, anal receptive intercourse should be considered as a risk factor.^{25 29}

The diagnosis of a Dieulafoy's lesion poses a significant challenge as it is usually small, relatively inconspicuous, may cause bleeding only intermittently and is often confused with the more commonly occurring vascular lesions, such as arteriovenous malformations, vascular aneurysms and even Mallory-Weiss tears.²⁹ When there is no active bleeding, occasionally it may be seen as a nipple-like raised structure or a visible vessel that is not associated with any ulceration. Aberrant blood vessels, however, are usually visualised only during active bleeding.²⁹ Occasionally, the lesion might be covered with a clot or obscured by active bleeding making it difficult to identify. This forms a diagnostic dilemma that may result in increased mortality in patients compared with other forms of gastrointestinal haemorrhage. Endoscopy is primarily preferred modality and following diagnostic criteria may be employed to establish a diagnosis in patients with a Dieulafoy's lesion: (1) active arterial spurting or micropulsatile bleeding from small (<3 mm) mucosal defects surrounded by normal mucosa; (2) the presence of protruding vessels; (3) fresh, adherent clots with a small point of attachment to the mucosal defect or to normal mucosa.³⁰

Although the final yield of diagnostic upper endoscopy is 70% for the Dieulafoy's lesion, the initial diagnostic value is low. According to Reilly and Al-Kawas, only 49% of Dieulafoy's lesions were identified during the initial endoscopic examination, 33% of patients required a second examination and 18% required exploratory laparotomy for accurate diagnosis.³¹ It can be easily missed on endoscopy due to the lack of mucosal inflammation and ulceration. Furthermore, push enteroscopy and capsule endoscopy have their limitations as well. Therefore, it is important to suspect a Dieulafoy's lesion in all patients with no clear source of gastrointestinal bleed and an endoscopic ultrasonography should be considered to confirm the diagnosis in the equivocal cases.³² Other radiological techniques including contrast-enhanced CT or mesenteric angiography are

Table 1 Literature review of the Dieulafoy's lesion of the colon and rectum

Author	Country	Publication year	Age/Gender	Clinical presentation	Comorbidity	Endoscopy findings	Treatment	Outcome	Reference
Yeoh <i>et al</i>	Singapore	1996	66/M	Stroke, haematochezia	HTN, RAS, CAD, AAA and COPD	Protuberant blood vessel in the rectum	Epinephrine injection	Died	12
Amaro <i>et al</i>	USA	1999	73/M	Toe gangrene, BRBPR	DM, HTN, COPD, CRF and PVD	An adherent clot in an ulcerated area with blood oozing	Heater probe and epinephrine injection	Recovered	13
Rajendra <i>et al</i>	Japan	2000	78/M	Haematochezia	HTN and CRF	Protuberant vessel in the rectum	Epinephrine injection and thermocauterisation	Recovered	14
Mizukami <i>et al</i>	Japan	2002	85/F	Haematochezia	None	A 5 mm shallow mucosal defect with an exposed blood vessel in lower rectum	Band ligation	Recovered	15
Nomura <i>et al</i>	Japan	2002	82/M	Haematochezia	Internal haemorrhoids	A small mucosal punched-out lesion with blood oozing in the rectum at 7 cm from anal verge	Two endoscopic clips	Recovered	16
Lee <i>et al</i>	USA	2004	73/M	Haematochezia	None	Protuberant blood vessel in the rectum	Epinephrine injection and band ligation	Recovered	17
Chiu <i>et al</i>	Taiwan	2004	81/M	Pneumonia	CRF and HTN	Small, adherent clot and normal-appearing mucosa	Band placement	Died	18
Yoshikumi <i>et al</i>	Japan	2006	44/M	Stroke, haematochezia	DM and HTN	Protuberant vessel in rectum at 5 cm above the anal verge	Band ligation	Recovered	19
Nishimuta <i>et al</i>	Japan	2011	50/M	Pharyngeal cancer, haematochezia	Hepatic cirrhosis, laryngeal cancer	Protruding artery with adherent clots in the lower third of rectum	Transcatheter arterial embolisation	Recovered	20
Kim <i>et al</i>	South Korea	2012	89/M	Haematochezia	DM and HTN	Pulsatile fresh bleeding from exposed vessel in the rectum at 10 cm from anal verge	2 mL of 1/10 000 epinephrine and three haemostatic clips	Recovered	21
Fukita <i>et al</i>	Japan	2013	39/M	Massive haematochezia, dizziness	None	An abnormal visible vessel with an adherent clot in the ascending colon	Application of two haemostatic clips	Recovered	22
Dogan <i>et al</i>	Turkey	2014	75/F	Acute, massive rectal bleeding	DM, HTN and chronic renal insufficiency	An active Dieulafoy's lesion at 5–6 cm from the anal verge observed intraoperatively	2 mL (1/1000) epinephrine injection, sutured	Recovered	23
Eltawansy <i>et al</i>	USA	2015	43/F	Haematochezia	ITP, hepatitis C and DM	An active bleeding site in the proximal ascending colon	Two endoclips	Recovered	24
Wang <i>et al</i>	China	2017	21/M	Haematochezia	Anal receptive intercourse	A hyperemic nipple-like protuberance located at 5 cm away from the anal verge in the rectum	Two haemostatic clips	Recovered	25
Inayat, <i>et al</i>	USA	2017	76/M, 88/M, 79/F	Haematochezia	None	Protuberant vessel in the colon and/or rectum	Endoscopic haemoclip application	Recovered	The present case series

AAA, abdominal aortic aneurysm; BRBPR, bright red blood per rectum; CAD, coronary artery disease; COPD, chronic obstructive pulmonary disease; CRF, chronic renal failure; DM, diabetes mellitus; HTN, hypertension; ITP, idiopathic thrombocytopenic purpura; PVD, peripheral vascular disease; RAS, renal artery stenosis.

also helpful, especially when the initial endoscopy is unable to provide a definitive diagnosis.^{33, 34} However, CT angiography may have higher accuracy in a Dieulafoy's lesion with colorectal involvement due to the contrast extravasation into the eroded artery. These patients may have poor bowel preparation, which can decrease diagnostic accuracy of colonoscopy.³⁵ Hence, it is important to thoroughly investigate the less common locations, like colon and rectum, as a possible site of the lesion, especially when no other source of bleeding is found on upper gastrointestinal endoscopies.

Traditionally, surgical resection procedures like proximal gastric resection or wedge resection were considered the treatments of choice for gastric Dieulafoy's lesions before 1990. However, recently endoscopic therapeutic procedures have replaced surgery to a large extent. Endoscopic procedures have been reported to have success rates exceeding 90%.³⁶ The modalities used to achieve endoscopic haemostasis include thermal or argon plasma coagulation, local injection of epinephrine or occasionally cyanoacrylate and mechanical therapy like banding and haemoclipping.³⁷ There is also some evidence that mechanical methods are more effective compared with injection or thermal treatment methods.³⁷ The risk of re-bleeding from the Dieulafoy's lesion has been reported to vary anywhere between 9% and up to 40% and has been found to be higher in endoscopic monotherapy compared with combined endoscopic therapies.³⁸ Band ligation, however, has been associated with a high risk of bowel perforation, especially in cases of small bowel and colon lesions.³⁹ Besides endoscopy, angiography with gel-foam embolisation is another treatment modality that has been reported to be successful in some cases.⁴⁰ On the other hand, surgical procedures are reserved for difficult-to-control bleeding. However, surgery has a higher mortality rate as often times these patients may already be haemodynamically unstable by the time surgical intervention is considered.⁴⁰ Therefore, a prompt and accurate diagnosis in patients with a Dieulafoy's lesion carries paramount importance because massive, uncontrolled bleeding from this lesion may culminate in death of the patient fairly quickly.

Learning points

- Dieulafoy's lesion is a potentially fatal cause of gastrointestinal hemorrhage. The pathogenesis of the lesion remains unknown and due to the intermittent nature of bleeding, diagnostic approaches have their limitations.
- Physicians should maintain a high index of clinical suspicion for this uncommon condition in unusual locations like colon and rectum. Familiarity with the lesion and its manifestations can help guide clinicians to make the correct diagnosis, which can then help improvise endoscopic and endovascular localisation and treatment, ultimately improving patient outcomes.
- There are no standard diagnostic or therapeutic guidelines for patients with a Dieulafoy's lesion. Future investigation needs to differentiate efficacy of various endoscopic methods to approach and manage this disease.

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REFERENCES

- 1 Dieulafoy G. Exulceratio simplex. *Bull Acad Med* 1898;39:49–84.
- 2 Donaldson GA, Hamlin E. Massive hematemesis resulting from rupture of a gastric artery aneurysm; report of 3 cases. *N Engl J Med* 1950;243:369–73.
- 3 Khan R, Mahmud A, Gobrial M, et al. The Diagnostic Dilemma of Dieulafoy's Lesion. *Gastroenterology Res* 2015;8:201–6.
- 4 Veldhuyzen van Zanten SJ, Barteldsman JF, Schipper ME, et al. Recurrent massive haematemesis from Dieulafoy vascular malformations--a review of 101 cases. *Gut* 1986;27:213–222.
- 5 Inayat F, Ullah W, Hussain Q, et al. Dieulafoy's lesion of the oesophagus: a case series and literature review. *BMJ Case Rep* 2017;2017:bcr2016218100.
- 6 Stark ME, Gostout CJ, Balm RK. Clinical features and endoscopic management of Dieulafoy's disease. *Gastrointest Endosc* 1992;38:e50:545–50.
- 7 Chaer RA, Helton WS. Dieulafoy's disease. *J Am Coll Surg* 2003;196:290–6.
- 8 Morowitz MJ, Markowitz R, Kamath BM, et al. Dieulafoy's lesion and segmental dilatation of the small bowel: an uncommon cause of gastrointestinal bleeding. *J Pediatr Surg* 2004;39:e8.
- 9 Christoffersen RK, Nielsen TS, Vesterby A. Dieulafoy Lesion of the Esophagus Causing Massive Upper Gastrointestinal Bleeding and Death. *Am J Forensic Med Pathol* 2012;33:186–7.
- 10 Thimmapuram J, Shah M, Srour J. Esophageal Dieulafoy lesion: an unusual cause of GI bleeding. *Gastrointest Endosc* 2011;73:1055–6.
- 11 Scheider DM, Barthel JS, King PD, et al. Dieulafoy-like lesion of the distal esophagus. *Am J Gastroenterol* 1994;89:2080–1.
- 12 Yeoh KG, Kang JY. Dieulafoy's lesion in the rectum. *Gastrointest Endosc* 1996;43:614–6.
- 13 Amaro R, Petrucci CA, Rogers AI. Rectal Dieulafoy's lesion. *Diseases of the Colon & Rectum* 1999;42:1339–41.
- 14 Rajendra T, Chung YF, Ong HS. Rectal Dieulafoy's lesion: cause of massive lower gastrointestinal tract haemorrhage. *Aust N Z J Surg* 2000;70:746–7.
- 15 Mizukami Y, Akahoshi K, Kondoh N, et al. Endoscopic band ligation for rectal Dieulafoy's lesion: serial endoscopic images. *Endoscopy* 2002;34:1032.
- 16 Nomura S, Kawahara M, Yamasaki K, et al. Massive rectal bleeding from a Dieulafoy lesion in the rectum: successful endoscopic clipping. *Endoscopy* 2002;34:237.
- 17 Lee CS, Widjaja D, Siegel M, et al. Endoscopic band ligation of a rectal Dieulafoy's lesion. *J Clin Gastroenterol* 2004;38:828–30.
- 18 Chiu HH, Chen CM, Mo LR, et al. Rectal Dieulafoy's lesion. *Gastrointest Endosc* 2004;60:796.
- 19 Yoshikumi Y, Mashima H, Suzuki J, et al. A case of rectal Dieulafoy's ulcer and successful endoscopic band ligation. *Can J Gastroenterol* 2006;20:287–90.
- 20 Nishimura Y, Tsurumaru D, Komori M, et al. A case of rectal Dieulafoy's lesion successfully treated by transcatheter arterial embolization. *Jpn J Radiol* 2012;30:176–9.
- 21 Kim HH, Kim JH, Kim SE, et al. Rectal dieulafoy lesion managed by hemostatic clips. *J Clin Med Res* 2012;4:439.
- 22 Fukita Y. Treatment of a colonic Dieulafoy lesion with endoscopic hemoclipping. *BMJ Case Rep* 2013;2013:bcr2013009734.
- 23 Dogan U, Gomceli I, Koc U, et al. Rectal dieulafoy lesions: a rare etiology of chronic lower gastrointestinal bleeding. *Case Rep Med* 2014;2014:1–3.
- 24 Eltawansy SA, Thyagarajan B, Baig N. Dieulafoy lesion in the ascending colon presenting with gastrointestinal bleeding and severe anemia complicated by a coexisting severe resistant chronic idiopathic thrombocytopenic purpura. *Case Rep Gastrointest Med* 2014;2014:1–4.
- 25 Wang M, Bu X, Zhang J, et al. Dieulafoy's lesion of the rectum: a case report and review of the literature. *Endosc Int Open* 2017;5:E939–E942.
- 26 Baxter M, Aly EH. Dieulafoy's lesion: current trends in diagnosis and management. *Ann R Coll Surg Engl* 2010;92:e54.
- 27 Lara LF, Sreenarasimhaiah J, Tang SJ, et al. Dieulafoy lesions of the GI tract: localization and therapeutic outcomes. *Dig Dis Sci* 2010;55:3436–41.
- 28 Christoffersen RK, Nielsen TS, Vesterby A. Dieulafoy lesion of the esophagus causing massive upper gastrointestinal bleeding and death: a case report. *Am J Forensic Med Pathol* 2012;33:186–7.
- 29 Nojkov B, Cappell MS. Gastrointestinal bleeding from Dieulafoy's lesion: Clinical presentation, endoscopic findings, and endoscopic therapy. *World J Gastrointest Endosc* 2015;7:295–307.
- 30 Jeon HK, Kim GH. Endoscopic Management of Dieulafoy's Lesion. *Clin Endosc* 2015;48:112–20.
- 31 Reilly HF, Al-Kawas FH. Dieulafoy's lesion. *Dig Dis Sci* 1991;36:1702–7.
- 32 Barosa R, Pires S, Pinto-Marques P, et al. Dieulafoy's lesion: The role of endoscopic ultrasonography as a road map. *GE Port J Gastroenterol* 2017;24:95–7.

- 33 Penner RM, Owen RJ, Williams CN. Diagnosis of a bleeding Dieulafoy lesion on computed tomography and its subsequent embolization. *Can J Gastroenterol* 2004;18:525–7.
- 34 Durham JD, Kumpe DA, Rothbarth LJ, *et al.* Dieulafoy disease: arteriographic findings and treatment. *Radiology* 1990;174:e41:937–41.
- 35 Nunoo-Mensah JW, Alkari B, Murphy GJ, *et al.* Rectal Dieulafoy lesions. *J Am Coll Surg* 2008;206:388–9.
- 36 Dulic-Lakovic E, Dulic M, Hubner D, *et al.* Bleeding Dieulafoy lesions of the small bowel: a systematic study on the epidemiology and efficacy of enteroscopic treatment. *Gastrointest Endosc* 2011;74:573–80.
- 37 Lipka S, Rabbanifard R, Kumar A, *et al.* A single-center United States experience with bleeding Dieulafoy lesions of the small bowel: diagnosis and treatment with single-balloon enteroscopy. *Endosc Int Open* 2015;3:E339–E345.
- 38 Lee YT, Walmsley RS, Leong RW, *et al.* Dieulafoy's lesion. *Gastrointest Endosc* 2003;58:236–43.
- 39 Barker KB, Arnold HL, Fillman EP, *et al.* Safety of band ligator use in the small bowel and the colon. *Gastrointest Endosc* 2005;62:224–7.
- 40 Sathyamurthy A, Winn JN, Ibdah JA, *et al.* Culprit for recurrent acute gastrointestinal massive bleeding: "Small bowel Dieulafoy's lesions" - a case report and literature review. *World J Gastrointest Pathophysiol* 2016;7:296–9.

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