



Case Report

Journal Homepage: <http://crp.tums.ac.ir>

Adult Presentation of Meckel's Diverticulum: A Case Report



Queeneth Uwandu , Ogheneyoma Akpoviro

Geisinger Wyoming Valley Medical Center, Internal Medicine Department, Wilkes-Barre, PA, USA



Citation Uwandu Q, Akpoviro O . Adult Presentation of Meckel's Diverticulum: A Case Report . Case Reports in Clinical Practice. 2023; 8(4): 150-154.

Running Title Meckel's Diverticulum in an Adult Patient.

**Article info:****Received:** July 8, 2023**Revised:** July 19, 2023**Accepted:** August 21, 2023**Keywords:**

Adult meckel's diverticulum;
Congenital diverticulum; Rectal
bleeding; Painless rectal bleeding;
Gastroenterology

ABSTRACT

Meckel's diverticulum (MD) is a congenital outpouching or bulge in the lower part of the small intestine. It is the most common congenital defect of the gastrointestinal tract. MD is usually asymptomatic but when symptomatic, typically presents in childhood. A case is presented of a 33-year-old Caucasian man who presented with multiple episodes of bright red blood per rectum prior to hospital admission, with associated weakness and nausea. The patient denied abdominal discomfort, fevers, or vomiting. Eventually, it was found that the patient had a Meckel's diverticulum with an associated focus of active extravasation from a dilated mesenteric vein. The feeding artery was successfully embolized with cessation of flow to the draining vein. Colonoscopy and computed tomography (CT) scan were inconclusive, and the patient ultimately underwent diagnostic laparoscopy and small bowel resection of the Meckel's diverticulum to prevent further bleeding by removing aberrant tissue

Introduction

Meckel's diverticulum (MD) is derived from the incomplete obliteration of the omphalomesenteric duct in developing embryos; this occurrence is the most frequent gastrointestinal (GI) tract aberration in embryology. Due to the incomplete obliteration of the omphalomesenteric duct, a diverticulum forms in the small intestine. MD is more common in

patients with other GI, neurological, or cardiovascular malformations [1].

Most individuals have silent Meckel's diverticula; this refers to the asymptomatic nature of MD. If symptoms do exist, they usually develop before the age of two. Meckel's diverticulum can imitate milk allergy, gastroenteritis, biliary colic, colonic diverticulitis, and peptic ulcer disease [2]. Intestinal blockage, volvulus, and intussusception are the three most frequent presenting

*** Corresponding Author:****Ogheneyoma Akpoviro****Address:** Geisinger Northeast, 1000 East Mountain Boulevard Wilkes Barre, Pennsylvania 18711, United States**E-mail:** O.Akpoviro@gmail.com

symptoms, followed by painless rectal bleeding, such as melaena-like black feces [3].

Case presentation

A 33-year-old Caucasian male patient presented to the emergency department (ED) after a few episodes of bright red blood per rectum [BRBPR] starting at home in January 2022. The patient stated that bright-red blood was present in the stool without any abdominal pain. A fall was reported while attempting to stand from a sitting position prior to admission; this fall was associated with BRBPR. Any previous similar episodes were denied. The rectal exudate was described as copious with clots. On review of systems, weakness and nausea were reported but abdominal pain, fevers, or vomiting were denied. The past medical history was significant for bipolar disorder, Cushing's disease, pituitary adenoma status post resection, generalized anxiety disorder, and a newly diagnosed meningioma which was planned for tumor embolization and resection.

At the ED, the patient was afebrile and hemodynamically stable; physical examination was pertinent for tachycardia and a large amount of blood in the rectum. A CT scan of the abdomen/pelvis showed no active gastrointestinal hemorrhage. A colonoscopy revealed perianal findings of blood and clots, and Grade I internal hemorrhoids [i.e., hemorrhoids that do not prolapse]. Clotted and dark blood was found in the entire colon. Red blood mixed with clotted blood was seen in the cecum and noted to be coming from the terminal ileum. The terminal ileum contained red blood.

An angiogram was performed by interventional radiology, with findings including early filling and dilatation of a draining mesenteric vein fed by a branch of the ileocolic artery. This finding was indicative of angiodysplasia versus persistent omphalomesenteric artery as in Meckel's diverticulum. Angiography also showed a focus of active extravasation from the dilated mesenteric vein. The feeding artery was successfully embolized with cessation of flow to the draining vein. A repeat colonoscopy was planned for the following day, but the hemoglobin dropped from 12.7g/dL to 7.5g/dL with associated hypotension, a fever of 101F and seizure-like activity. Subsequently, 4 units of packed red blood cells were received and a CT scan of the abdomen and pelvis with intravenous contrast was undergone, which showed focal distal small bowel hemorrhage within the lumen, for which general surgery was consulted. An emergent diagnostic laparoscopy and resection of the small bowel segment containing the Meckel's diverticulum

were performed.

Discussion

Meckel's diverticulum has a frequency of about 1-3% in the general population. It is the most prevalent congenital defect of the small intestine and is a genuine diverticulum containing all intestinal wall layers [4, 5]. The size of the diverticula typically ranges from 1-10cm and may be as large as 100cm [6]. These diverticula are often variable in location but typically occur within 100 cm of the ileocecal valve [7]. It has been suggested that age may affect the average distance of the diverticula from the ileocecal valve, with children under 2 years having an average distance of 34 cm [8], and adults about 67 cm. In most patients, the diverticula are asymptomatic, and the lifetime risk of complications is around 4% [9].

The arterial blood supply to MD is via the vitelline artery, which is a remnant of the embryologic omphalomesenteric system [10]. Up to 55% of Meckel's diverticula include ectopic tissue, with a predominance of gastric and pancreatic tissues when ectopic foci exist within the diverticula [11].

Some of the complications associated with Meckel's diverticula include hemorrhage, intestinal obstruction, intussusception, diverticulitis, perforation [5], and even malignancy [12]. Obstruction may be caused by diverticular-attached fibrous bands, extension of diverticula into a hernia sac, a diverticular volvulus around a mesodiverticular band, and the entrapment of a bowel loop by a mesodiverticular band [13]. Meckel's diverticulum can sometimes be associated with dilation of the mesenteric vein. This is known as Meckel's diverticulum with dilated mesenteric vein, or MDDMV. The cause of dilation of the mesenteric vein in this condition is not well understood, but it is thought to be due to increased blood flow through the diverticulum [10]. Symptoms of MDDMV may include abdominal pain, bloating, and rectal bleeding, but often there are no symptoms at all [14]. The patient had a MDDMV with only BRBPR and no associated abdominal or other GI symptoms. When MDDMV is symptomatic, surgery has been indicated as the definitive treatment [14, 15].

Children under the age of five most frequently have painless rectal bleeding, as in the case of the patient, although the patient was an adult. This BRBPR typically results from ulceration of the small intestinal mucosa by hydrochloric acid secreted by ectopic gastric mucosa of MD [16]. Nausea, vomiting, and cramps in all ages may arise when obstruction is caused by MD [17].

Differential diagnoses

Bright red blood per rectum in a young adult would raise concern for diagnoses such as inflammatory bowel disease (IBD), hemorrhoids, anal fissures, and less commonly, colorectal carcinoma, angiodysplasia, and diverticular disease [18]. Although IBD (Crohn's disease and ulcerative colitis) could present with BRBPR, this disease spectrum is often associated with other gastrointestinal manifestations, especially diarrhea and abdominal cramps, which may be mixed with blood, mucus, and pus. Furthermore, colonoscopy helped to rule out a diagnosis of IBD in the patient, as the typical findings such as mucosal friability, edema, erythema, loss of vascular markings, and the typical rectal involvement of ulcerative colitis were absent, as were the typical findings in Crohn's disease such as discontinuous longitudinal ulcers and cobblestoning [19]. Furthermore, neither physical examination nor the patient's symptoms were consistent with hemorrhoids, although the patient did present with BRBPR. The patient denied any anal or perianal pain, pruritus, irritation, or swelling or lump-like collections, which would have supported a diagnosis of hemorrhoids [20]. Although colorectal cancer may present with BRBPR, the patient's demographics, specifically the age, caused this diagnosis to be one that was considered to be unlikely, and even more so with the CT scan of the abdomen and pelvis and then a colonoscopy not revealing any suspicious lesions or masses [21].

In addition, the patient did not report any symptoms consistent with an underlying malignancy or specifically, a colon or rectal malignancy, such as weight loss, night sweats, generalized fatigue, abdominal fullness, or rectal tenesmus [22]. Angiodysplasia and diverticular disease, specifically diverticulosis, may present with painless BRBPR; however, these diagnoses are less likely in a young patient. Gastrointestinal infectious manifestations such as gastroenteritis and acute hemorrhagic colitis that may be associated with inflammatory diarrhea caused by agents such as *Escherichia coli*, *Clostridium difficile*, *Shigella* and *Yersinia* species, amongst other etiologic agents including viral and parasitic organisms, may result in bloody loose stools. Although the patient's history did not divulge pertinent information indicating an infectious agent, infectious workup was performed and resulted negative for common gastrointestinal infectious agents [23]. Furthermore, the patient did not provide a history consistent with anorectal trauma preceding rectal bleeding and physical examination was not consistent with traumatic injury.

Diagnosis and Treatment

The diagnosis of Meckel's diverticulum in adults has been established using a variety of imaging techniques, including CT, scintigraphy, and ultrasonography [24-26]. It is possible to diagnose and treat Meckel's diverticulum through laparoscopy, which allows for direct visualization. Laparoscopy offers several advantages over traditional open surgery, such as less pain, a shorter recovery time, less scarring, and a reduced risk of infections and bleeding [27]. The treatment for symptomatic MD is typically surgical, and there is a consensus against the treatment of asymptomatic MD [27, 28].

Conclusion

Meckel's diverticulum is a congenital defect that may cause symptoms at any age, although it is rare when symptomatic in adults. There may be dilation of the mesenteric vein, as in the case that is presented, and there may also be focal hemorrhages. BRBPR may be a manifestation in adults with symptomatic MD. Colonoscopy and CT scan can aid in diagnosis, and symptomatic diverticula are treated surgically. Due to the rarity of symptomatic MD in adults, early diagnosis can be challenging. Early diagnosis is paramount to prevent complications and delayed surgical intervention.

DECLARATIONS

ABBREVIATIONS

BRBPR: bright red blood per rectum
 CT: computed tomography
 MD: Meckel's diverticulum
 MDDMV: Meckel's diverticulum with dilated mesenteric vein

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this article.

Funding

There was no financial support provided by any enti-

ties for the preparation of this manuscript.

Conflict of Interests

The author[s] declare that they have no competing interests.

Authors Contributions

QU and OA were responsible for design, literature review and manuscript writing. All authors were responsible for the final approval of the version to be published.

All authors contributed equally to this case report.

Acknowledgements

Not applicable

REFERENCES

- [1] Martin JP, Connor PD, Charles K. Meckel's diverticulum. *Am Fam Physician*. 2000;61(4):1037-1044.
- [2] Dumper J, Mackenzie S, Mitchell P, Sutherland F, Quan ML, Mew D. Complications of Meckel's diverticula in adults. *Can J Surg*. 2006;49(5):353-357. <https://pubmed.ncbi.nlm.nih.gov/17152574>
- [3] Hong SN, Jang HJ, Ye BD, et al. Diagnosis of Bleeding Meckel's Diverticulum in Adults. *PLoS One*. 2016;11(9):e0162615. <https://doi.org/10.1371/journal.pone.0162615>
- [4] Leijonmarck CE, Bonman-Sandelin K, Frisell J, Räf L. Meckel's diverticulum in the adult. *Br J Surg*. 1986;73(2):146-149. <https://doi.org/10.1002/bjs.1800730225>
- [5] Sagar J, Kumar V, Shah DK. Meckel's diverticulum: a systematic review. *J R Soc Med*. 2006;99(10):501-505. <https://doi.org/10.1177/014107680609901011>
- [6] Sumer A, Kemik O, Olmez A, et al. Small Bowel Obstruction due to Mesodiverticular Band of Meckel's Diverticulum: A Case Report. *Case Rep Med*. 2010;2010:901456. <https://doi.org/10.1155/2010/901456>
- [7] Elsayes KM, Menias CO, Harvin HJ, Francis IR. Imaging manifestations of Meckel's diverticulum. *AJR Am J Roentgenol*. 2007;189(1):81-88. <https://doi.org/10.2214/AJR.06.1257>
- [8] Skarpas A, Siaperas P, Zoikas A, et al. Meckel's Diverticulitis. A rare cause of small bowel obstruction. *J Surg Case Rep*. 2020;2020(9):rjaa339. <https://doi.org/10.1093/jscr/rjaa339>
- [9] Hansen CC, Søreide K. Systematic review of epidemiology, presentation, and management of Meckel's diverticulum in the 21st century. *Medicine (Baltimore)*. 2018;97(35):e12154. <https://doi.org/10.1097/MD.00000000000012154>
- [10] Al-Khayat H, Hayati H, Al-Khayat H, Sadeq A, Groof A, Zarka ZA. Portal-mesenteric vein thrombosis as an unusual presentation of Meckel's diverticulum complication. *Ann Saudi Med*. 2007;27(1):45-48. <https://doi.org/10.5144/0256-4947.2007.45>
- [11] Platon A, Gervaz P, Becker CD, Morel P, Poletti PA. Computed tomography of complicated Meckel's diverticulum in adults: a pictorial review. *Insights Imaging*. 2010;1(2):53-61. <https://doi.org/10.1007/s13244-010-0017-8>
- [12] Kabir SA, Raza SA, Kabir SI. Malignant neoplasms of Meckel's diverticulum; an evidence-based review. *Ann Med Surg (Lond)*. 2019;43:75-81. <https://doi.org/10.1016/j.amsu.2019.05.017>
- [13] Fu T, Xu X, Geng L, Huang Y, Ding G, Ji H. The Clinical Manifestation Variety and Management Choice of Meckel's Diverticulum with Complication: A Single Center Experience. *Gastroenterol Res Pract*. 2021;2021:6640660. <https://doi.org/10.1155/2021/6640660>
- [14] Marconato R, Nezi G, Capovilla G, et al. Primary mesenteric vein thrombosis: a case series. *J Surg Case Rep*. 2020;2020(3):rjaa016. <https://doi.org/10.1093/jscr/rjaa016>
- [15] Groebli Y, Bertin D, Morel P. Meckel's diverticulum in adults: retrospective analysis of 119 cases and historical review. *Eur J Surg*. 2001;167(7):518-24. <https://doi.org/10.1080/110241501316914894>
- [16] An J, Zabbo CP. Meckel Diverticulum. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2022 Jan-.
- [17] Martin JP, Connor PD, Charles K. Meckel's diverticulum. *Am Fam Physician*. 2000;61(4):1037-1044.
- [18] Ellis BG, Thompson MR. Factors identifying higher risk rectal bleeding in general practice. *Br J Gen Pract*. 2005;55(521):949-955.
- [19] Lee JM, Lee KM. Endoscopic Diagnosis and Differentiation of Inflammatory Bowel Disease. *Clin Endosc*. 2016;49(4):370-375. <https://doi.org/10.5946/ce.2016.090>
- [20] Ng KS, Holzgang M, Young C. Still a Case of "No Pain, No Gain"? An Updated and Critical Review of the Pathogenesis, Diagnosis, and Management Options for Hemorrhoids in 2020. *Ann Coloproctol*. 2020;36(3):133-147. <https://doi.org/10.3393/ac.2020.05.04>
- [21] Howlader N, Noone AM, Krapcho M, et al. *SEER Cancer Statistics Review, 1975-2013*. Bethesda, MD: National Cancer Institute, 2016.
- [22] Wolpin BM, Mayer RJ. Systemic treatment of colorectal cancer. *Gastroenterology*. 2008;134(5):1296-310. <https://doi.org/10.1053/j.gastro.2008.02.098>
- [23] Sabry AO, Sood T. Rectal Bleeding. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2023 Jan-.
- [24] Farrell MB, Zimmerman J. Meckel's Diverticulum Imaging. *J Nucl Med Technol*. 2020;48(3):210-213. <https://doi.org/10.2967/jnmt.120.251918>
- [25] Elsayes KM, Menias CO, Harvin HJ, Francis IR. Imaging manifestations of Meckel's diverticulum. *AJR Am J Roentgenol*. 2007;189(1):81-88. <https://doi.org/10.2214/AJR.06.1257>

- [26] Kovacs M, Botstein J, Braverman S. Angiographic diagnosis of Meckel's diverticulum in an adult patient with negative scintigraphy. *J Radiol Case Rep.* 2017;11(3):22-29. <https://doi.org/10.3941/jrcr.v11i3.2032>
- [27] Rivas H, Cacchione RN, Allen JW. Laparoscopic management of Meckel's diverticulum in adults. *Surg Endosc.* 2003;17(4):620-622. <https://doi.org/10.1007/s00464-002-8613-4>
- [28] Blouhos K, Boulas KA, Tsalis K, et al. Meckel's Diverticulum in Adults: Surgical Concerns. *Front Surg.* 2018;5:55. <https://doi.org/10.3389/fsurg.2018.00055>