



Brief Report

MECKEL'S DIVERTICULUM ENTEROLITH PRESENTING AS SMALL BOWEL OBSTRUCTION

Matthew Mason, MD,* Nicholas C. Neel, MD,† Jared Matson, MD,† Benjamin Abbadessa, MD,† and Alicia B. Minns, MD*

*Department of Emergency Medicine, University of California, San Diego School of Medicine, San Diego, California, and †Department of Surgery, University of California, San Diego School of Medicine, San Diego, California

Reprint Address: Alicia B. Minns, MD, Department of Emergency Medicine, University of California, San Diego School of Medicine, 200 West Arbor Drive, MC 8676, San Diego, CA 92103

INTRODUCTION

Meckel's diverticulum (MD) is a common embryologic abnormality occurring in roughly 2% of the population. Although most symptomatic patients will present in the first 2 years of life, a large subset of patients will be asymptomatic into adulthood. Of those patients, a few will present with symptomatic disease with a variety of abdominal symptoms (1,2). We discuss the rare event of an MD enterolith causing a small bowel obstruction with associated intraluminal hemorrhage and the diagnostic imaging that can be used to better come to a definitive diagnosis.

revealed a white blood cell count of 12.4 (1000/mm³), but otherwise was within normal limits. Computed tomography (CT) of the abdomen and pelvis with IV contrast (100 mL, 250 Omnipaque; GE Healthcare) was obtained, which revealed numerous dilated loops of small bowel with air-fluid levels and a discrete transition point in the ileum consistent with small bowel obstruction (Figure 1, transition point not shown). Just proximal to the transition point were two small radiodense objects in the lumen surrounded by hyperdense layering material (Figure 2), which possibly represented ingested organic material, such as a small animal bone.

CASE REPORT

A 46-year-old man with a history of chronic hepatitis B and peptic ulcer disease presented with 12 h of epigastric abdominal pain. His vital signs were a temperature of 98.7°F, blood pressure (BP) of 103/68 mm Hg, heart rate of 100 beats/min, respiratory rate of 16 breaths/min, and oxygen saturation of O₂ 99% on room air. Physical examination was notable for diffuse abdominal tenderness with maximal pain in the epigastric area. Laboratory analysis

Shortly after CT, the patient had a syncopal event, associated with hypotension (BP 91/55 mm Hg) and hemochezia, while trying to stand up to use the restroom. He was brought emergently to the operating room, where an 8 × 5 cm MD was identified (Figure 3, yellow arrow) with acute diverticulitis and surrounding serosal adhesions. A small bowel resection, including the diverticulum was performed and roughly 1 L of intraluminal blood was removed, along with the two calcified lesions, which pathology later revealed to be fecaliths. Postoperative course was largely unremarkable, notable only for delayed return of bowel function, and he was discharged on postoperative day 10.

RECEIVED: 27 October 2022; FINAL SUBMISSION RECEIVED: 2 February 2023;
ACCEPTED: 7 March 2023

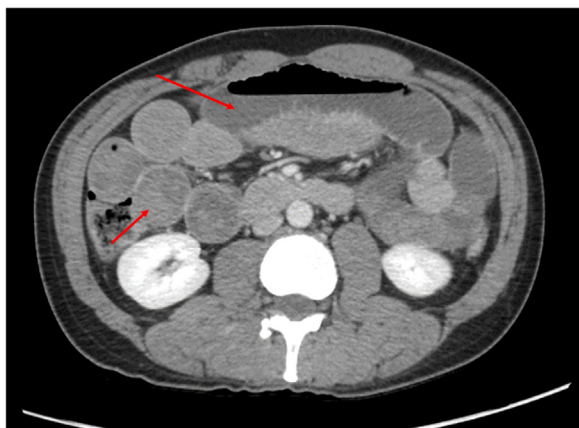


Figure 1. Computed tomography abdomen/pelvis scan showing dilated loops of small bowel with small amounts of layering of hyperdense contents concerning for hemorrhage vs. ingested material (red arrows).

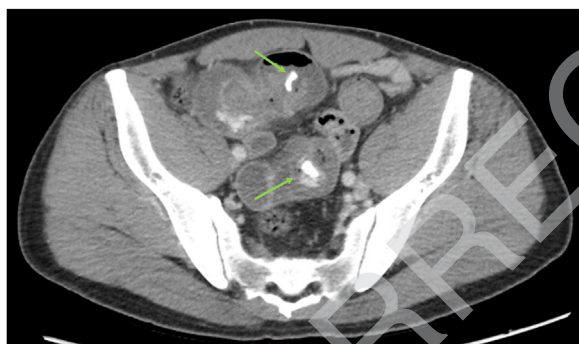


Figure 2. Computed tomography abdomen/pelvis showing two curvilinear radiopaque densities measuring approximately 1.5 cm (green arrows).



Figure 3. Surgical exploration of abdomen indicating roughly 8 x 5 cm Meckel's diverticulum (yellow arrow) with associated transmural hemorrhage diffusely throughout small bowel.

DISCUSSION

47

MD is a congenital diverticulum on the ileum resulting from incomplete atrophy of the vitelline duct in the embryo. It was first described by the German anatomist Johann Friedrich Meckel in the early 19th century (1). Complications from MD are rare occurrences in the adult population and can present with variable and vague abdominal symptoms, making it difficult to discern from more common abdominal pathologies. However, given the high prevalence of MD in the general population, it should be included in the differential diagnosis of patients presenting with nonspecific abdominal pain without clear etiology. In addition, the various potential complications from MD should be considered, including intussusception, hemorrhage, small bowel obstruction, and, in rare cases, enteroliths (1). The major risk factors for adult complications include male sex and age, with a 1% chance of complications at age 40 years, subsequently decreasing to 0% by age 70 years (3). There is currently no definitive imaging modality that is sensitive or specific enough to detect all cases of MD. Abdominal plain films may show radiopaque stones and ultrasound has the potential to show intussusception in children, but its utility in adults is unclear (2,4). CT can provide the most useful information but it may be hard to differentiate MD from normal loops of small bowel (5). Intraluminal hemorrhage and small bowel obstruction are the most common complications of MD and can be seen on CT scan as fluid collecting in the small bowel and change in luminal diameter, respectively (6). Enteroliths are rare complications of MD. Ectopic gastric tissue seen in most cases can lead to extreme acidic environments in the intestinal tract, causing precipitation of calcium or bile salts, leading to stone formation. They can be seen as calcified hyperdense intraluminal material on CT, but are rare and nonspecific for MD (7). Other studies have shown that they are more likely to be present in the right lower quadrant, have peripheral calcifications with radiolucent centers, and range from 1 to 5 cm in diameter (8,9). However, no one specific finding is sensitive or specific enough to definitely diagnose an MD enterolith. In our case, the idea of organic material ingestion (chicken bone) was entertained because the patient endorsed eating chicken wings the night prior, although had no recollection of accidentally swallowing a bone. Ultimately, final diagnosis and treatment depends on surgical intervention. As seen in our patient, enteroliths causing obstruction can lead to large-volume intraluminal bleeding that requires critical care and rapid intervention. A high level of suspicion is necessary, given the nonspecific abdominal signs, although certain findings on imaging, as mentioned above, can provide insight that MD with associated enteroliths may be the diagnosis.

48

49

50

51

52

53

54

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100 **WHY SHOULD AN EMERGENCY PHYSICIAN**
101 **BE AWARE OF THIS?**

102 Although complications from MD in the adult population
103 are rare, the most common etiologies of symptomatic MD
104 are intestinal obstruction, gastrointestinal hemorrhage,
105 and inflammation of the MD with or without perfora-
106 tion. Common symptoms of symptomatic MD include
107 abdominal pain, vomiting, and bloody stools. However,
108 MD remains a diagnostic challenge because these symp-
109 toms are not unique to MD and, in general, the sensitivity
110 and specificity of imaging modalities available in the ED
111 are low.

112 **REFERENCES**

113 1. Hansen CC, Søreide K. Systematic review of epidemiology, presen-
114 tation, and management of Meckel's diverticulum in the 21st century.
115 *Medicine (Baltimore)* 2018;97(35):e12154.

2. Kotecha M, Bellah R, Pena AH, Jaimes C, Mattei P. Multimodality 116
imaging manifestations of the Meckel diverticulum in children. *Ped-* 117
iatr Radiol 2012;42:95–103. 118
3. Leijonmarck CE, Bonman-Sandelin K, Frisell J, Räf L. Meckel's di- 119
verticulum in the adult. *Br J Surg* 1986;73:146–9. 120
4. Choi SY, Hong SS, Park HJ, et al. The many faces of Meckel's 121
diverticulum and its complications. *J Med Imaging Radiat Oncol* 122
2017;61:225–31. 123
5. Platon A, Gervaz P, Becker CD, Morel P, Poletti PA. Computed to- 124
mography of complicated Meckel's diverticulum in adults: a pictorial 125
review. *Insights Imaging* 2010;1:53–61. 126
6. Elsayes KM, Menias CO, Harvin HJ, Francis IR. Imaging manifes- 127
tations of Meckel's diverticulum. *AJR Am J Roentgenol* 2007;189:
81–88. 129
7. Thurley PD, Halliday KE, Somers JM, Al-Daraji WI, Ilyas M, Brod- 130
erick NJ. Radiological features of Meckel's diverticulum and its
complications. *Clin Radiol* 2009;64:109–18. 132
8. Gurvits GE, Enterolithiasis Lan G. *World J Gastroenterol* 133
2014;20:17819–29. 134
9. Pantongrag-Brown L, Levine MS, Buetow PC, Buck JL, El- 135
sayed AM. Meckel's enteroliths: clinical, radiologic, and pathologic
findings. *AJR Am J Roentgenol* 1996;167:1447–50. 137

138