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Case Report

Surgery Section

Meckel's Diverticulum Enterolith: An Extremely Rare Cause of Intestinal Obstruction

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ABSTRACT

Meckel's diverticulum is usually asymptomatic but occasionally presents with complications. Formation of an enterolith inside a Meckel's diverticulum is very uncommon and dislodgement of such a stone causing obstruction is extremely rare. We herein present a case of a 48-year-old man who presented with small bowel obstruction. Preoperative radiologic studies revealed a stone-like lesion in the right lower quadrant. Upon laparotomy, an inflamed Meckel's diverticulum was found as well as a 2.5 cm stone obstructing the terminal ileum. The stone was removed and the diverticulum was excised. The differential diagnosis of acute intestinal obstruction should include this extremely rare clinical entity especially when the combination of small bowel obstruction with radiopaque stone-like finding on preoperative x-rays is present.

Keywords: Intestinal stone, Meckelitis, Small bowel obstruction

CASE REPORT

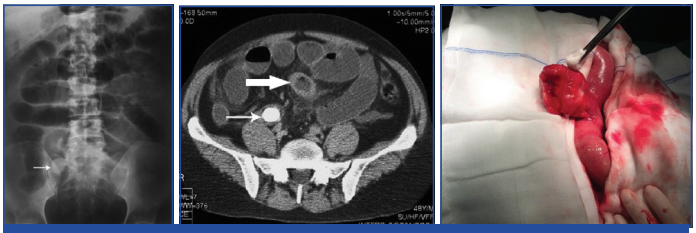
A 48-year-old male presented to the emergency department with a 48-hour history of diffuse abdominal discomfort, which progressed to colicky right lower quadrant pain accompanied with abdominal distention, bilious vomiting and lack of flatulence.

He was afebrile, with normal vital signs. Physical examination revealed increased bowel sounds and tenderness on the right iliac fossa.

No hernias were detected and digital rectal examination was normal. Past history included an appendectomy during childhood. White blood cell count was elevated (16340/ μL). Abdominal X-ray showed dilatation of small bowel loops and a radiopaque lesion in the right lower quadrant [Table/Fig-1].Computed Tomography (CT) scan confirmed the obstruction of small bowel, with thickening of jejunal and ileal loops and a transition point in the distal ileum, after which the colon appeared collapsed.

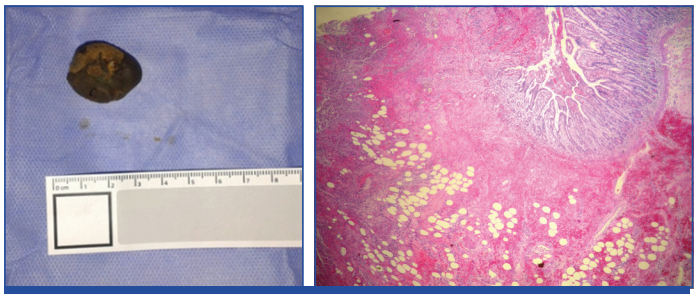
Just proximal to this point, a radio-opaque high-density lesion with radiolucent center was found, measuring approximately 2.5 cm in diameter. An inflamed blind intestinal pouch was also visible, suggestive of the presence of a Meckel's diverticulum [Table/Fig-2]. Upon laparotomy, an inflamed Meckel's diverticulum was found approximately 40 cm from the caecum [Table/Fig-3] and an enterolith was palpated downstream impacted in the ileocecal junction causing the obstruction.

The enterolith was milked upstream and removed from an incision made at the site of excision of the Meckel's diverticulum, just above its base [Table/Fig-4]. The diverticulum was excised with the application of a linear stapler at its base, below the diverticulotomy.



[Table/Fig-1]: Abdominal X-ray showing dilated small bowel loops and the radiopaque lesion (enterolith) in the right lower quadrant. **[Table/Fig-2]:** CT scan showing dilated small bowel loops, presence of a radiopaque lesion with radiolucent center (small arrow) and a Meckel's diverticulum (big arrow). **[Table/Fig-3]:** The inflammed Meckel's diverticulum.

The patient had an uneventful recovery and was discharged on the sixth postoperative day. Histology showed mucosal ulceration and diverticular wall necrosis [Table/Fig-5].



[Table/Fig-4]: The impacted enterolith. **[Table/Fig-5]:** Transmural ischaemic haemorragic necrosis of the Meckel's diverticulum (H&E ×250).

DISCUSSION

Meckel's diverticulum represents the most common congenital malformation of the gastrointestinal tract, with a reported incidence of 2-4% [1]. It is a remnant of the omphalomesenteric duct and as a true diverticulum, it contains all layers of the intestinal wall. It arises from the antimesenteric border of the small intestine, usually located 40-60 cm proximally to the ileocecal valve [1]. Meckel's diverticulum in the majority of the cases is asymptomatic. Occasionally it manifests in the form of a complication such as bleeding (28%), intussusception (13%), obstruction (11%), diverticulitis (8%) and volvulus (5%). Bleeding is the most common presentation in the pediatric population [2]. Enterolithiasis is an uncommon medical condition with a reported prevalence of 0, 3-10% [3]. In the setting of Meckel's diverticulum, enteroliths are present in 3-10% of the patients, with a 3:1 male to female ratio [4]. Patients with a Meckel's diverticulum have a lifetime risk of complications ranging from 4-6.4% the most common of which are hemorrhage, inflammation and intestinal obstruction [5]. Small bowel obstruction in the presence of a Meckel's diverticulum usually happens due to local inflammation, external compression of adjacent loops (Mirizzi-type) [6], volvulus, intussusception, adhesions, fibrous bands or internal herniation. However, dislodgement of an enterolith from a Meckel's diverticulum causing intestinal obstruction is an extremely rare

occurrence. Literature search with Pubmed, Embase and Google Scholar using the MeSH terms Meckel's diverticulum, enterolith or faecolith, intestinal obstruction revealed only 13 similar cases previously reported [Table/Fig-6] [7-19].

Author	Age	Sex	Diagnosis	Radiopaque
Field RJ et al., [7]	53	M	Intraoperative	NO
Danzis M [8]	N/A	N/A	N/A	N/A
Grosdidier J et al., [9]	N/A	N/A	N/A	N/A
Benhamou G et al., [10]	N/A	N/A	N/A	N/A
Grant AB et al., [11]	65	M	Intraoperative	NO
Lopez PV et al., [12]	85	M	X-Ray/Intraoperative	YES
Rudge FW[13]	N/A	N/A	N/A	N/A
Trésallet C et al., [14]	37	M	CT	YES
Rice RD et al., [15]	73	M	CT	YES
McCallion WA et al.,[16]	37	F	INTRAOPERATIVE	NO
Garrigós G et al., [17]	62	M	X-Ray/US	YES
Gamblin TC et al., [18]	24	M	Intraoperative	NO
Demetriou et al., [19]	30	F	X-Ray/CT	YES
Symeonidis et al., [present case]	48	M	X-Ray/ CT	YES

[Table/Fig-6]: Previously reported cases of intestinal obstruction caused by a Meckel's enterolith. N/A: data not available.

Enteroliths formed in a Meckel's diverticulum represent primary intestinal stones. Predisposing factors for their creation include intestinal stasis, inflammation and extreme alkaline or acidic intraluminal environment, which result in precipitation of calcium or bile salts respectively. 30-50% of enteroliths are radiopaque and therefore easily detected with abdominal x-rays or CT scan. They are typically depicted as round or triangular with dense periphery and radiolucent center or they can appear laminated [3]. Differential diagnosis includes gallstones, which occasionally can present with intestinal obstruction, as well as other abdominal and pelvic calcified lesions like kidney stones, swallowed foreign bodies, phleboliths, fecaliths, calcified lymph nodes, teratomas, etc.

Management of Meckel's stone ileus is mainly surgical. Treatment options include bowel resection with primary anastomosis, digital fragmentation of the enterolith and manual guiding (milking) of the fragments towards the large intestine or removal of the stone through a proximal enterotomy. Laparoscopic approach has been deemed safe and effective both as a diagnostic and therapeutic tool in symptomatic Meckel's diverticulosis [17], but there have been no reports of cases in which intestinal obstruction due to a Meckel's enterolith was treated laparoscopically.

CONCLUSION

Meckel's enterolith causing intestinal obstruction is an extremely rare complication of Meckel's diverticulosis. It should be included in the differential diagnosis of acute intestinal obstruction, especially if an enterolith is found in preoperative radiology studies. However, diagnosis of this condition is usually made during exploratory laparotomy. The consulting surgeon should be aware that the combination of small bowel obstruction with radiopaque stone-like finding on preoperative x-rays is indicative of this extremely rare clinical entity, which warrants immediate surgical treatment.

REFERENCES

[1] Sagar J, Kumar V, Shah DK. Meckel's diverticulum: a systematic review. JR Soc Med. 2007;100(2):69.
[2] Kusumoto H, Yoshida M, Takahashi I, Anai H, Maehara Y, Sugimachi K. Complications and diagnosis of Meckel's diverticulum in 776 patients. Am J Surg. 1992;164(4):382-83.
[3] Gurvits GE, Lan G. Enterolithiasis. World J Gastroenterol. 2014;20:17819-29.
[4] Gadhia U, Raju D, Kapoor R. Large enterolith in a meckels diverticulum causing perforation and bowel obstruction: an interesting case with review of literature. Indian J Surg. 2013;75:177-79.
[5] Bani-Hani KE, Shatnawi NJ. Meckel's diverticulum: comparison of incidental and symptomatic cases. World J Surg. 2004;28(9):917-20.
[6] Jones RP, McWhirter D. Intermittent small bowel obstruction caused by Meckel's enterolith. Ann R Coll Surg Engl. 2010;92(5):W16-17.
[7] Field RJ Sr., Field RJ Jr. Intestinal obstruction produced by fecalith arising in Meckel's diverticulum. AMA Arch Surg. 1959;79(1):8-9.
[8] Danzis M. Intestinal obstruction in Meckel's diverticulum with report of a case with a large enterolith. J Med Soc N J. 1950;47(12):548-53.
[9] Grosdidier J, Rollin B, Richaume B. Intestinal obstruction caused by a coprolith originating in a Meckel's diverticulum. Sem Hop. 1972;48(41):2661-64.
[10] Benhamou G. Small intestinal obstruction by an enterolith from a Meckel's diverticulum. Int Surg. 1979;64(1):43-45.
[11] Grant AB. Meckel stone ileus: a case report. Aust NZJ Surg. 1981;51(1):77-78.
[12] Lopez PV, Welch JP. Enterolith intestinal obstruction owing to acquired and congenital diverticulosis. Report of two cases and review of the literature. Dis Colon Rectum. 1991;34(10):941-44.
[13] Rudge FW. Meckel's stone ileus. Mil Med. 1992;157:98-100.
[14] Trésallet C, Renard-Penna R, Nguyen-Thanh Q, Cardot V, Chigot JP, Menegaux F. Intestinal obstruction by an enterolith from a perforated giant Meckel's diverticulum: diagnosis with CT reconstructed images. Int Surg. 2007;92(3):125-27.
[15] Rice RD, Parker DM, Seery JM, Arciero CA. A small bowel obstruction secondary to a Meckel's enterolith. Am Surg. 2010;76(2):222-24.
[16] McCallion WA, Higgins PM, Dane TE. Enterolith obstruction of the small bowel. Ulster Med J. 1992;61:179-81.
[17] Garrigós G, Gómez SÁ, Peris N, Ripollés T, Martínez Abad M. Intestinal obstruction due to Meckel's diverticulum enterolithiasis. Cir Esp. 2012;90(10):674-76.
[18] Gamblin TC, Glenn J, Herring D, McKinney WB. Bowel obstruction caused by a Meckel's diverticulum enterolith: a case report and review of the literature. Curr Surg. 2003;60:63-64.
[19] Demetriou V, McKean D, Briggs J, Moore N. Small bowel obstruction secondary to a liberated Meckel's enterolith. BMJ Case Rep. 2013;31:2013.

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