



Case report

Enterolithiasis: An unusual cause of large bowel obstruction, a case report

Yohannis Derbew Molla^{*}, Mequanint Tiruneh Tassew, Temesgen Agegnehu Abebe, Amare Getachew Gete

Department of Surgery, University of Gondar, College of Medicine and Health Sciences, Gondar, Ethiopia

ARTICLE INFO

Keywords:

Enterolithiasis

Large bowel obstruction

Surgery

Conservative management

Case report

ABSTRACT

Background: Large bowel obstruction is a common surgical condition encountered in the surgical emergency department. Large bowel obstruction due to primary enterolithiasis is an extremely uncommon condition. Enterolithiasis i.e. formation of gastrointestinal concretions is an uncommon medical condition that develops in the setting of intestinal stasis due to various pathologies and can present in different clinical pictures to challenge a clinician.

Clinical presentation: a 60-year-old male farmer who had sigmoid resection and anastomosis six years back, currently presented with a complaint of recurrent abdominal cramps, progressive abdominal distension, vomiting, and constipation of 08 days duration. An examination showed a distended soft and non-tender abdomen. A plain abdominal x-ray showed an obstruction caused by enteroliths located at the proximal rectum. The patient was diagnosed with large bowel obstruction due to an impacted enterolith at the stenosed previous anastomotic site. Later, the patient was operated on, impacted enteroliths were removed, and was discharged improved.

Conclusion: definitive preoperative diagnosis of bowel obstruction due to enterolithiasis is not always possible. A high index of suspicion is very important to avoid misdiagnosis and delay in treatment. Most patients with enterolithiasis can be managed conservatively. However, surgery is the mainstay of treatment once conservative management fails.

1. Introduction

The term “enterolith” is applied to the calculi that form within the intestinal lumen. Though common in the equine population, these are cases of a rarity in humans. The first reported case was that by Chomelin J in 1710 in *Historie de l'Academie Royal* in an autopsy report on a duodenal diverticulum. Gut hypo-motility or stasis is thought to be the causal factor for this condition [1]. Enterolithiasis, i.e. presence of stones within the intestinal tract, is a rare entity. Enteroliths could be primary (formed within the intestine) or secondary (such as gallstones and urinary stones, formed outside and migrating into the intestinal tract through a fistula). Primary stones may be true (formed by the precipitation of contents of the chyme) or false (formed from insoluble foreign substances, such as bezoar) [2]. Enterolithiasis usually occurs as a result of stasis in the intestinal tract, as in the intestinal diverticula or proximal to a stenosed lesion. The stenotic lesions associated with enterolithiasis can have a variety of causes, such as tuberculosis, Crohn's disease, or strictures after surgery like our case [3]. Although enteroliths are rare, knowledge of their presentations, complications, and treatment

is important to surgeons handling the case. Here we present a large bowel obstruction due to enterolithiasis in a 60-year-old male farmer. The patient was managed with surgical removal of the stones.

‘This case report has been reported in line with the SCARE Criteria Agha RA, Franchi T, Sohrabi C, Mathew G, for the SCARE Group. The SCARE 2020 Guideline: Updating Consensus Surgical Case REport (SCARE) Guidelines, International Journal of Surgery 2020;84:226-230’ [4].

2. Case presentation

A 60-year-old male Ethiopian farmer presented with a history of recurrent colicky abdominal pain for 08 days followed by progressively increasing distention of the abdomen, vomiting, and constipation for the same duration. He underwent abdominal surgery for the diagnosis of large bowel volvulus due to sigmoid volvulus 6 years ago, for which sigmoid resection and anastomosis were done, and was discharged improved. Otherwise, the patient has no history of any psychiatric illness, drug intake diabetes, hypertension, smoking or any other illness. He has no family history of colonic cancer. He lives with his wife and has

^{*} Corresponding author.

E-mail address: yderbew73@gmail.com (Y.D. Molla).

<https://doi.org/10.1016/j.ijscr.2023.107889>

Received 28 October 2022; Received in revised form 30 December 2022; Accepted 9 January 2023

2210-2612/© 2023 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Abbreviations

CT	Computer tomography
IV	Intravenous
NG tube	Naso-gastric tube

7 children.

On examination, he was afebrile; his heart rate was 88/min; his blood pressure was 100/72 mmHg; his respiratory rate was 22/min, and his oxygen saturation was 96 % in room air. His abdomen was hugely distended but was soft and non-tender on palpation. Hyperactive intestinal sounds were present. Per-rectal examination showed an empty rectum. The rest of the examinations were unremarkable.

Investigations, his hematological and biochemical investigations were unremarkable. The erect plain abdominal x-ray showed dilated small and large bowel loops with multiple air fluid levels. There were multiple radio-opaque stones on the right iliac fossa. They were found to be mobile on follow-up x-rays and the distal rectal gas shadow was also

visible (Figs. 1, 2, 3). The plan was to have a CT scan; unfortunately, the CT scan was not working at that time.

With the assessment of partial large bowel obstruction due to post-op adhesion, the patient was managed with hydration, serial abdominal examination, electrolyte correction, and NG tube suction and was observed for 24 h. However, despite the above management, the abdominal distension worsened and the pain and the vomiting persisted. Therefore, the patient was operated on under general anesthesia and in a supine position. Intraoperatively, there were hugely distended and edematous small and large bowel loops starting from the previous surgical anastomosis site. There was a narrowing of the previous anastomosis site. In addition, there were multiple hard enteroliths impacted at the previous anastomosis site and proximal bowel causing an obstruction. Removal of the enteroliths through the stenosed segment was difficult and the stones were hard to crash. Therefore, resection of the stenotic segment was done and the proximal segment was exteriorized as end colostomy, and the enteroliths were removed with forceps with gentle external pressure on the bowel (Fig. 4). The procedure was performed by a senior general surgeon and general surgery residents. After the operation, the patient passed multiple stones as well. Post-operatively, he was admitted initially to the recovery and later to the



Fig. 1. Erect plain abdominal x-ray showing dilated small and large bowel loops with air fluid levels.



Fig. 2. Enterolith on the right iliac fossa.

surgical ward and was commenced on ceftriaxone 1 g IV twice a day, metronidazole 500 mg IV three times a day, and tramadol 50 mg IV twice a day for 7 days (because the patient had pain and he had a history of dyspepsia, NSAIDs differed). The patient's recovery was uneventful and he was discharged on the seventh postop day and appointed for follow-up. At discharge, he was advised about diet, stoma associated complications and stoma care. On a follow-up visit after two weeks, the patient was doing well and the stoma was functional. Later, the patient was appointed after a month (six weeks after the procedure) for stoma closure. Our patient claimed he was satisfied with the service he got.

3. Discussion

Enterolith, the enterogenous foreign bodies, are rare clinical and radiological entities in humans, although they are very common in animals such as horses. There are two kinds of enteroliths: primary are formed in the small or large intestine, while secondary enteroliths are formed in the associated organs like the gall bladder or urinary bladder. Primary enterolithiasis mostly occurs in association with pathological conditions leading to hypo-motility and stasis [5]. Primary enteroliths develop in locations of intestinal stasis such as within small bowel

diverticula, regions located by stricture formation, and blind-ending pouches following surgery. They can also occur in those with an intestinal motility disorder in the absence of structural abnormality [6,7].

Enteroliths may occur in any portion of the intestinal tract. Recorded with the highest frequency are those in the stomach (bezoar), the appendix (coprolith), and the colon (fecalith) [8]. True primary enteroliths are formed from chemical elements that are already present in the bowel in anatomically compromised areas of stasis, and their composition can vary depending on the location. Secondary enteroliths are formed outside the gastrointestinal tract proper and then migrate into the bowel, causing an obstruction such as gallstone in patients with cholecysto-enteric fistula [7].

Clinical presentation of enterolithiasis varies according to the etiology, age, location, chemical composition, finally, dimensions of the stone. Primary enterolithiasis should be suspected in a younger patient with underlying inflammatory bowel disease (developed countries) or tuberculosis (developing countries) or an older patient with intestinal surgery like our patient. The clinical presentations include: abdominal pains, distention, nausea, and vomiting of occasionally sudden but often fluctuating sub-acute nature which occurs as a result of the enterolith tumbling through the bowel lumen. Small enteroliths are usually

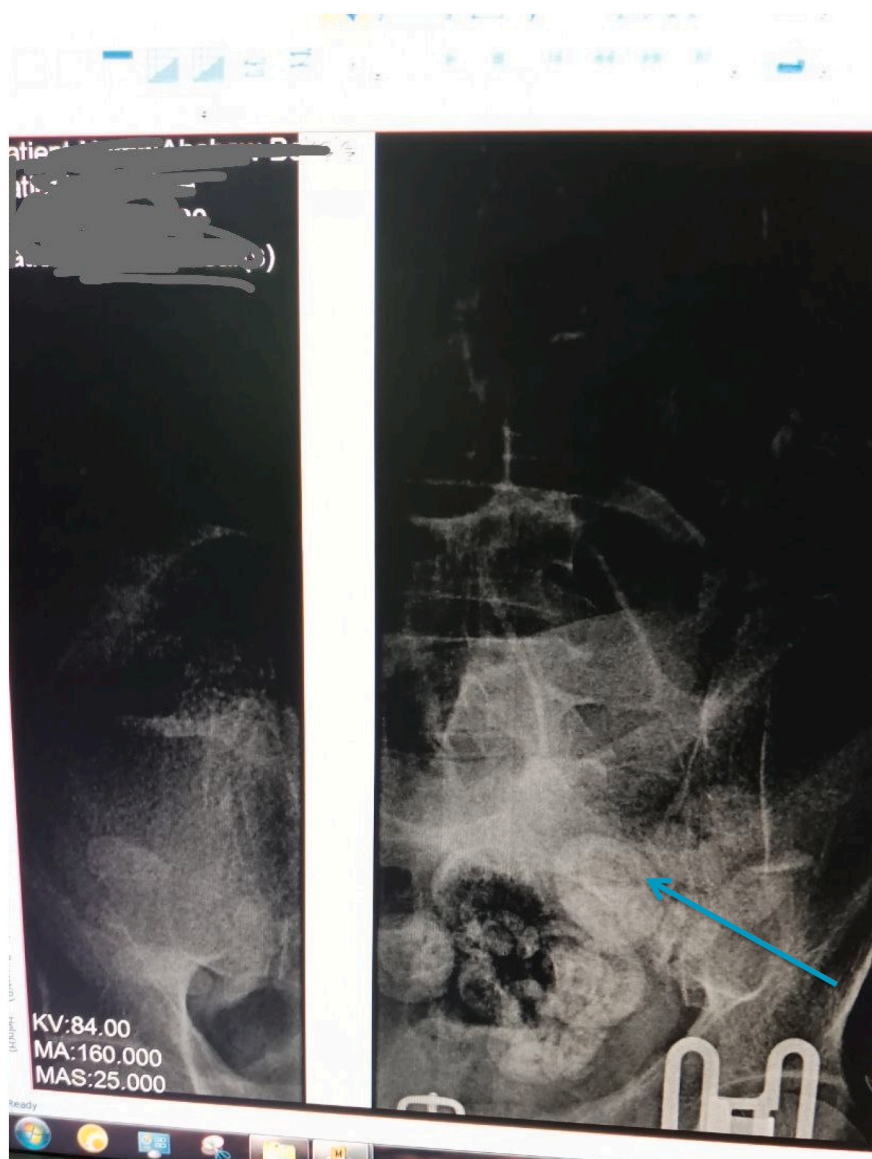


Fig. 3. Enteroliths at the upper rectum on follow-up x-ray.

asymptomatic and pass spontaneously [9]. One study done in India showed that most cases of idiopathic enteroliths present with acute/subacute intestinal obstruction (classical “Tumbling obstruction”) and rarely with perforation [2]. Another study showed the clinical manifestation of enterolithiasis can vary from subacute to acute intestinal obstruction, even perforation [5].

Like every surgical condition, detailed history and physical examination are necessary in the evaluation of a patient with suspected enterolithiasis. Correct diagnosis is established in an appropriate clinical setting after excluding other common pathologic processes. The differential diagnosis is typically wide and may include common surgical conditions such as hernia, adhesion, infectious conditions, tumors, or other inflammatory conditions.

On diagnostic investigations, abdominal radiography is, traditionally, the first step in identifying enteroliths. It can detect stones in up to a third of the cases. The calcium content determines the visibility on the abdominal x-ray. Calcium salts enteroliths are more radiopaque than choleic acid enteroliths. On radiographic studies, enteroliths usually appear oval or round with dense rims, and a pale center and are usually mobile on the serial examination like our patient [10]. Calcifications at abdominal radiography can have multiple differential diagnoses

including biliary and urinary calculi, calcified lymph nodes, mesenteric teratoma, fat necrosis, calcified fibroids, and enteroliths [11]. Enteroliths may be mistaken for renal, ureteral, or bladder calculi according to their various locations and can cause a diagnostic problem, in such cases of diagnostic dilemma CT scan can be helpful [12].

Generally, most of the smaller stones are likely to pass down spontaneously. With rapid advances in medical and surgical technology and procedural skills, additional studies are needed to assess the success rate of new approaches to the removal of enteroliths in the twenty-first century. Single- and double-balloon endoscopy with carbon dioxide insufflation may provide additional benefit to the selected patients that were previously managed surgically. This tactic may potentially result in the future shift from surgical into the endoscopically feasible realm, thus decreasing morbidity and mortality associated with surgical intervention and improving patient's outcome [7]. However, large and impacted stones like our patient may require surgical intervention. The operative management includes enterolith fragmentation, milking into the proximal colon, and removal through an enterotomy as was in our case, or segmental resection and anastomosis. Surgical management is the base of therapy in case of small bowel obstruction secondary to enterolithiasis [11]. Mortality of uncomplicated primary enterolithiasis is



Fig. 4. Gross appearance of the enteroliths.

very low but may reach 3 % in patients with poor condition, significant obstruction, and delayed diagnosis [10].

4. Conclusion

Large bowel obstruction due to enteroliths is a rare condition. A plain abdominal x-ray of the abdomen can easily pick up these stones like our case. However, in radiolucent stones, a CT scan may be required. Although large obstructing stones require surgery, most of the smaller stones are likely to pass down spontaneously. Therefore, every effort should be attempted for non-operative management, in case of failure of other non-operative treatments, surgical removal will alleviate symptoms. Definitive diagnosis of obstruction due to enterolithiasis is not always possible and a high index of suspicion is required, especially in a setup like ours where imaging studies are not easily available.

Ethical clearance

The case report has been submitted to the School of Medicine at University of Gondar for Ethical Board Review and approved as ethically sound report.

Consent

Written informed consent was taken from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review for the editor-in-chief of this journal on request.

Funding

Not applicable.

Availability of data and materials

The authors of this manuscript are willing to provide any additional information regarding the case report.

CRediT authorship contribution statement

All authors contributed to the conception, writing and editing of the case report. All authors are agreed to be accountable for all aspects of it.

Declaration of competing interest

No potential conflict of interest relevant to this article was reported.

Acknowledgement

Not applicable.

References

- [1] A.L. Shrestha, P. Shrestha, Recurrent enterolithiasis small bowel obstruction: a case seldom described, *Case Rep. Gastrointest. Med.* 2017 (2017).
- [2] R. Gupta, M. Andley, S. Saha, A. Kumar, True primary “Idiopathic” enterolithiasis as an unusual cause of bowel perforation, *Trop. Gastroenterol.* 39 (4) (2020) 223–225.
- [3] L. Lantsberg, A. Eyal, J. Khodadadi, M. Hirsch, H. Adear, Enterolithiasis, *J. Clin. Gastroenterol.* 10 (2) (1988 Apr) 165.
- [4] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, A. Thoma, et al., The SCARE 2020 guideline: updating consensus Surgical CAse REport (SCARE) guidelines, *Int. J. Surg.* 84 (2020 Dec) 226–230.
- [5] B.M. Singhal, S. Kaval, P. Kumar, C.P. Singh, Enterolithiasis: an unusual cause of small intestinal obstruction, *Arch. Int. Surg.* 3 (2) (2013) 137.
- [6] B. Chaudhery, P.A. Newman, M.D. Kelly, Small bowel obstruction and perforation secondary to primary enterolithiasis in a patient with jejunal diverticulosis, *Case Rep.* 2014 (2014), bcr2014203833.
- [7] O. Sharma, D. Mallik, S. Ranjan, P. Sherwani, N. Kumar, S. Basu, Enterolith causing small bowel obstruction: report of a case and review of literature, *Clin. Exp. Gastroenterol.* (2022) 101–104.
- [8] D. Kia, L.R. Dragstedt, Enterolithiasis associated with side-to-side intestinal anastomosis, *Arch. Surg.* 95 (6) (1967) 898–901.
- [9] G.E. Gurvits, G. Lan, Enterolithiasis, *World J. Gastroenterol.* 20 (47) (2014 Dec 21) 17819–17829.
- [10] A. Jadb, H. Tabakh, L.C. El Ouazzani, K. Boumlik, R. Boutachali, A. Siwane, et al., Primary true enterolithiasis: a rare cause of acute small bowel obstruction, *Radiol. Case Rep.* 17 (3) (2022) 610–614.
- [11] U. Gadhia, D. Raju, R. Kapoor, Large enterolith in a Meckels diverticulum causing perforation and bowel obstruction: an interesting case with review of literature, *Indian J. Surg.* 75 (1) (2013) 177–179.
- [12] B.R. Javors, D. Bryk, Enterolithiasis: a report of four cases, *Gastrointest. Radiol.* 8 (1) (1983) 359–362.