Foreign body perforation acute abdomen in Meckel's diverticulum

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Benedito Dario Murad Mouchrek[1], Rennan Abud Pinheiro Santos[2], Marcelo Lima Rocha[3], Orlando José dos Santos[4], Lucas Marques de Mesquita[5], Eduardo Medeiros de Araújo[6] and Adriana Oliveira Dias de Sousa Morais[7]

ABSTRACT

The present report describes an incidental finding of Meckel's diverticulum due to fish spine drilling in a 28-year-old male patient, where the technique used was videolaparoscopic diverticulectomy with an endoscope clamper, and the removal of the foreign body successfully in the treatment, guaranteeing a good post-operative recovery.

Keywords: Acute Abdomen, Meckel's Diverticulum, Foreign Body (Fishbone).

[1] Highest education: Physician, surgeon and specialist in surgery of the digestive system.
Institution: Presidente Dutra University Hospital
[2] Highest education: Physician, surgeon and specialist in surgery of the digestive system.
Institution: Presidente Dutra University Hospital
[3] Highest education: Physician, surgeon and specialist in surgery of the digestive system.
Institution: Presidente Dutra University Hospital
[4] Highest education: Doctor in Biotechnology
Institution: Presidente Dutra University Hospital
[5] Highest education: Medical student
Institution: Federal University of Maranhão
[6] Highest education: Medical Doctor, Radiology specialist
Institution: Presidente Dutra University Hospital
[7] Highest education: Doctor in Public Health
Institution: Federal University of Maranhão

INTRODUCTION

Meckel's diverticulum (DM) is the most common congenital gastrointestinal anomaly, with a prevalence ranging from 1% to 4% of the general population. It is twice as common in men as in women and is usually located 60 to 90 cm from the ileocecal valve, at the antimesenteric border1. The first description of a diverticulum in the small intestine was made by Fabricius Hildanus in 1598. In 1742, a small diverticulum strangled in an inguinal hernia was reported by Littré; in 1809, Johann Friedrich Meckel published his observations on the anatomy and embryology of the diverticulum that bore his name2. In approximately 50% of cases, there are ectopic tissues, and the most common are those of gastric and pancreatic origin. It is generally presented as a short, broad-based diverticulum with its own blood supply, originating from a terminal branch of the superior mesenteric artery that crosses the ileum to the diverticulum2,3.

The diverticulum represents a persistent remnant of the omphalomesenteric duct, which connects the midgut to the upper yolk sac. The omphalomenenteric duct normally involutes between the fifth and sixth week of human gestation when the intestine settles in its permanent position within the abdominal cavity4.

Most individuals with Meckel's diverticulum remain asymptomatic for life. The appearance of symptoms suggests complications such as gastrointestinal bleeding, which is more common in children, and obstructive, inflammatory, or neoplastic phenomena, which are more frequent in adults. DM is a relevant cause of lower gastrointestinal bleeding in the pediatric population1. Acute diverticulitis is one of the main complications of DM, making the differential diagnosis of acute appendicitis5. It is estimated that the probability of the disease becoming symptomatic is between 4% and 6% at some point in life3.

The diagnosis of DM is difficult and remains a major challenge in medical practice. The vast majority of complementary tests show alterations resulting from complications, such as diverticulitis, obstruction of the intestinal lumen, hemorrhage or perforation. The clinical presentation of DM includes abdominal pain, vomiting, and constipation. It is difficult to diagnose and its main differential diagnosis is acute appendicitis. Complicated DM should be considered when an apparently normal appendix is found in a patient with clinical suspicion of acute appendicitis1. Some tests, combined with the clinical manifestations, help in the correct diagnosis, such as abdominal ultrasound, abdominal computed tomography, scintigraphy and abdominal angiography, and technetium 99 (T99) scintigraphy is the most used method for diagnosing DM. On the other hand, exploratory laparoscopy is considered an effective method for inspecting the cavity and has the advantage of simultaneously performing diagnosis and treatment1.

Surgical treatment is indicated when symptomatic and/or in case of complications, consisting of removal of the diverticulum by simple diverticulectomy or segmental ileal resection with end-to-

end anastomosis. However, the real benefit of surgical intervention in asymptomatic patients with an incidental diagnosis of DM is discussed, since the complication rates are low and the risks inherent to the surgical procedure are considerable1. The objective of this study is to report a case of acute perforative abdomen caused by a foreign body (fishbone) in DM.

The aim of this study is to report a rare case of Meckel's diverticulum complicated with herringbone perforation, as a differential diagnosis of an inflammatory abdomen due to acute appendicitis, highlighting the quality of the postoperative period in a minimally invasive approach. This study was approved by the Research Ethics Committee of the University Hospital of the Federal University of Maranhão/HU/UFMA under opinion number: 6274116 of 08/31/2023 (CAAE: 73341123.6.0000.5086).

METHODOLOGY

The present work consists of a descriptive study, of the case report type, developed at Hospital São Domingos, located in São Luís (MA) in the period of April 2023.

The information contained in this study was obtained through a review of the medical records, photographic records of the imaging exams and surgical procedures to which the patient was submitted.

Subsequently, a literature review was carried out, covering case reports, case studies, review articles and originals, with exact and explicit methodology, in Portuguese and English, searched in PUBMED and SCIELO in the last 23 years (2000 - 2023), using the following keywords as searches: "Meckel's diverticulum", "acute abdomen", "fishbone", "Meckel diverticulum", "acute abdomen", "intestinal perforation".

This study was carried out according to the standards of the International Committee of Medical Journal Editors (Vancouver Standards) for the submission of manuscripts.

RESULTS

CASE REPORT

Patient R.P.F.R., male, 28 years old, was admitted to Hospital São Domingos, São Luís, on April 15, 2023, from home. The patient reported ingestion of a foreign body (fishbone) for 48 hours, evolving with periumbilical abdominal pain, which later was located in the hypogastric region and right iliac fossa, associated with two episodes of vomiting. He denied fever.

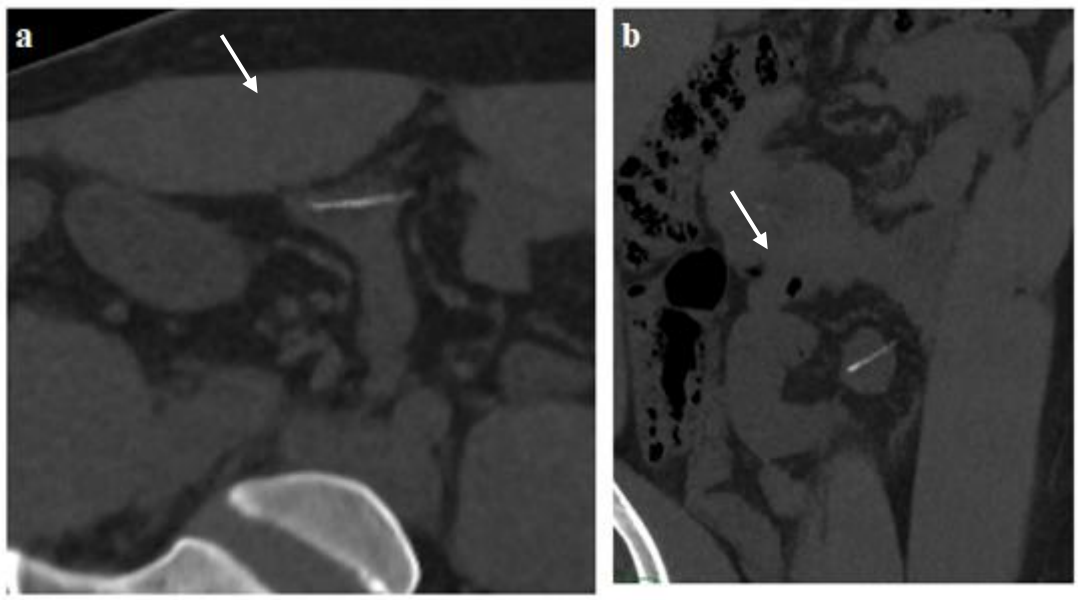
At the time of admission, the patient was in good general condition, lucid, oriented in time and space, normostained, anicteric, acyanotic, hydrated and eupneic in room air. Slightly distended abdomen, with peristalsis present, flaccid, painful on deep palpation in the hypogastric region, without defense or peritoneal irritation

Examination of the respiratory and cardiovascular systems showed no abnormalities.

Underwent tests in the emergency room, on the date of admission to the hospital (04/15/2023): red blood cells = 4.85 106/µL; hemoglobin = 14.3 g/dL; hematocrit = 42.1%; MCV = 86.8 fL; HCM=29.5 pg; RDW = 12.3%; platelets = 281000; leukocytes = 12100/µL (6% rods); CRP = 3.97 mg/dL; urea: 35 mg/dL; creatinine = 1.35 mg/dL; ALT = 15 U/L. AST = 28 U/l.

The patient was admitted with a suspected diagnosis of acute appendicitis, but for diagnostic elucidation, a computed tomography (CT) scan of the abdomen was performed, which showed hyperdense linear material with partial transfixation of the intestinal loop wall in the hypogastric region, associated with densification of the adjacent mesenteric planes, without evidence of collection or pneumoperitoneum, compatible with perforation by a foreign body (Figure 1).

Figure 1 - Foreign body (fishbone) indicated by the arrow in figures a and b.

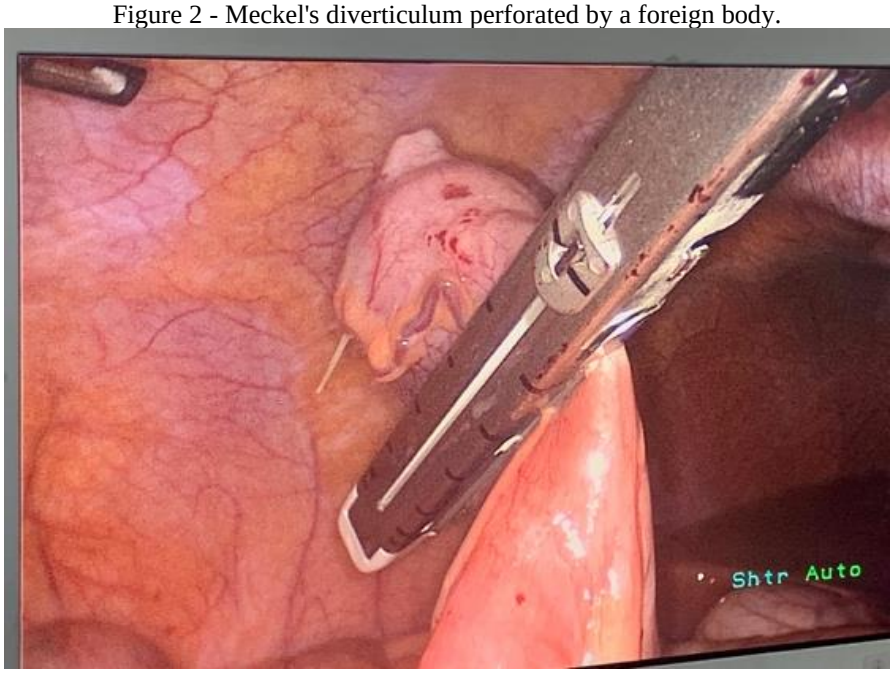


Source: personal archive.

An emergency surgery with a laparoscopic approach was indicated, in which a small amount of inflammatory fluid and a foreign body with distal perforation in Meckel's diverticulum were seen in the inventory of the cavity (Figure 2), in addition to a small blockage in the topography of the perforation, without purulent secretion. The DM was located approximately 90 cm from the ileocecal valve, with a length of approximately 5 cm and a wide base.

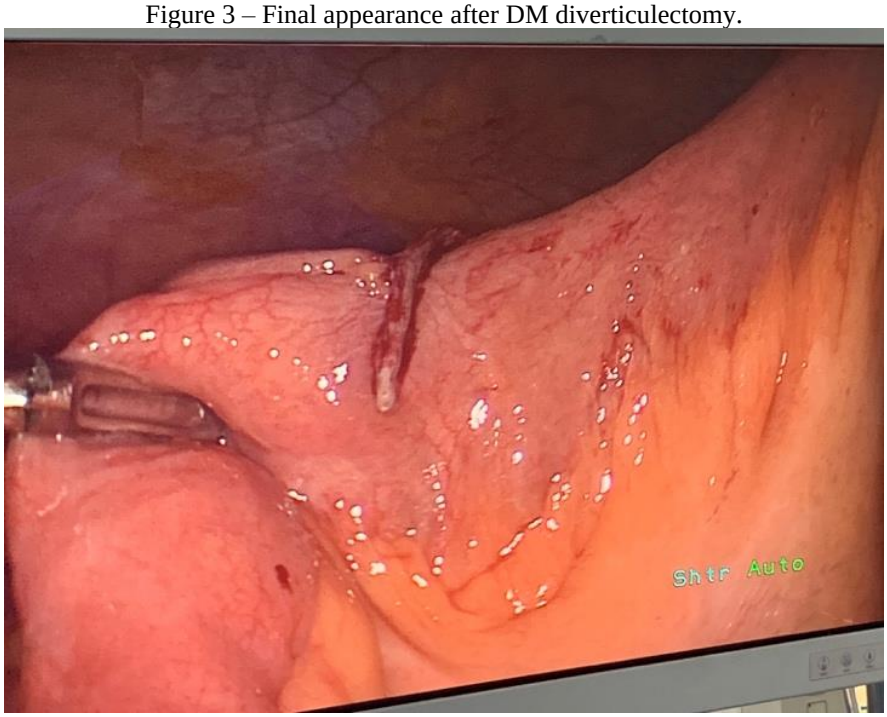
Laparoscopic stapling of the DM was performed using two 45-mm white loads, without the need for enteroanastomosis (Figure 3). The cavity was washed with saline, hemostasis was reviewed, and the surgical portals were synthesized. Surgical time was estimated at 45 minutes, with the submission of a surgical specimen for histopathological study. (Figure 4)

Figure 2 - Meckel's diverticulum perforated by a foreign body.



Source: personal archive.

Figure 3 – Final appearance after DM diverticulectomy.



Source: personal archive.

Figure 4 – Foreign body and DM

Source: personal archive.

The patient received pasty liquid food 8 hours after the surgical procedure, with good acceptance, with no episodes of vomiting or intercurrences in the postoperative period. On physical examination, the patient presented with a slightly distended abdomen, no abdominal pain on palpation, peristalsis present, clean surgical wound, and no other abnormalities

The patient was discharged 24 hours after surgery, with no pain complaints, accepting the diet well, walking and eliminating flatus. An oral antibiotic was prescribed for another 7 days and outpatient follow-up. Biopsy of the surgical specimen compatible with diverticulum without atypia, with acute serositis.

DISCUSSION

The diagnosis of complicated DM presents a number of challenges due to its wide range of presentations. Diverticulitis and foreign body perforation of DM have very similar symptoms, and it is difficult to differentiate these etiologies through physical examination alone. An acute abdomen with potential surgical indication is usually found.

Several factors predispose to the ingestion of a foreign body, intentionally or accidentally. Of all the predisposing factors, the use of dental prostheses is considered the most frequently associated with the ingestion of foreign bodies, and the bones of birds and fish are commonly the most implicated in intestinal perforation6. Perforation caused by a fishbone is an extremely rare situation.

In complications related to perforations, resection of the intestinal segment with primary anastomosis or diverticulectomy are the most indicated procedures.

Foreign body perforation is a rather uncommon occurrence. In the literature, according to some reviews, the incidence varies from 2 to 8% of all cases16, because most foreign bodies are able to follow the intestinal transit without complications. In this context, herringbone perforation in a DM is a differential diagnosis of acute perforative abdomen that is little discussed and, if not recognized early, can lead to fatal consequences17.

DM is twice as common in men as in women and is usually located 60 cm from the ileocecal valve, as described by the authors Silva et al. These data corroborate the finding of diverticulum in a male patient, despite the fact that it presented a greater distance from the ileocecal valve in the case described7.

Among the most frequent complications, there are some variations in age group. In children, it usually presents as digestive bleeding. In adults, the main complication is diverticular obstruction, followed by inflammation (diverticulitis), with perforation being a rarer cause of complication8. Foreign body perforation is a fairly rare event. In the literature

DM is internally lined by ileal mucosa and may contain heterotopic tissue in 30 to 40% of cases. Among the types of heterotopic tissue, gastric tissues, pancreatic tissues, or both stand out. Perforation, on the other hand, is more related to DM with gastric mucosa, where ulceration may coexist9. In the present study, the biopsy did not show heterotopic tissue, and the perforation was performed by a foreign body, leading to acute serositis.

Charles Mayo showed the diagnostic difficulty of MD in one sentence "Meckel's diverticulum is often suspected, usually sought, but rarely found". Because it is a rare entity, imaging tests are usually used for diagnosis, as in the case described, computed tomography of the total abdomen, which is more commonly used in the presence of an inflammatory or obstructive process, since in perforative cases it increases the difficulty of differentiating the location between the intestinal loop or the DM itself10,11.

This report, similar to what was described by Goulart et al., where the DM was perforated by a toothpick, demonstrates that the perforation of DM by a herringbone is a rare complication and a very uncommon cause of acute abdomen12. As reported by Merayo-Álvarez et al, where the perforated diverticulum was approached conventionally with the use of stapling, prolonging the hospital stay for 6 days13.

The definitive treatment of DM is surgical, and access is either laparoscopy or laparotomy with satisfactory results14. Laparoscopy, on the other hand, shows some advantages in the sense of less pain in the postoperative period, a lower complication rate with surgical site infection, and earlier hospital discharge15. In the present study, in view of the advantages of the laparoscopic

approach, we opted for laparoscopic diverticulectomy to resolve the acute perforative abdomen, since the perforation was more distal in relation to the base of the diverticulum.

CONCLUSION

Since its description in 1809, the most common congenital malformation of the gastrointestinal tract has persisted as a diagnostic challenge. Its variable clinical presentation is usually associated with its complications, being confused with other diseases. Intestinal perforation by a foreign body is rare, even more so in DM. Surgical treatment remains the first line of definitive treatment in symptomatic patients. In asymptomatic patients, it should be individualized to determine whether the benefits outweigh the risks of the procedure and its complications.

REFERENCES

1. Araújo, L. M., Araújo, F. M., Alves, A. C. S., Monteiro, A. C. F., Paula, B. C. de, Xavier, D. S. S., Alves, É. V. S., & Sezko, I. A. (2014). Meckel's diverticulum: a literature review. Revista Médica de Minas Gerais, 24(1). https://doi.org/10.5935/2238-3182.20140022

2. Massoni Neto LM, Hinkel BB, Doi A, Alcântara PSM. (2007). Obstrução intestinal devido a enterolitos em divertículo de Meckel: relato de caso. Rev Med (São Paulo), 3, 155-162.

3. Uppal K, Tubbs S, Matusz P, Shaffer K, Loukas M. (2011). Meckel's diverticulum: a review. Clin Anat, 24, 416-422.

4. Rocha, K. N. S., Fagundes, L. R. F., Figueiredo, R. de P., Dogakiuti, J. P. de A., Souza, S. F. de, Lana, A. L. B., Alves, L. de B. G., Alvarenga, G. C. de S., & Silva, A. C. C. (2022). Atualizações sobre o tratamento cirúrgico do divertículo de Meckel / Updates on surgical treatment of Meckel's diverticulum. Brazilian Journal of Health Review, 5(2), 6621–6641. https://doi.org/10.34119/bjhrv5n2-232

5. Arnold JF, Pellicane JV. (1997). Meckel's diverticulum: a ten-year experience. Am Surg, 63, 354-355.

6. Greenspan L, Abramovitch A, Tomarken J, Cohen Z. (1983). Perforation of a Meckel's diverticulum by a foreign body. Can J Surg, 26(2), 184-185.

7. Silva PDV, Sá VHLC, Gerardini Filho VA. (2006). Divertículo de Meckel. Arq Med ABC, 31(1), 53-56.

8. Groebli Y, Bertin D, Morel P. (2001). Meckel's diverticulum in adults: retrospective analysis of 119 cases and historical review. Eur J Surg, 167, 518-524.

9. Matsagas MI, Fatouros M, Koulouras B, Giannoukas AD. (1995). Incidence, complications, and management of Meckel's diverticulum. Arch Surg, 130, 143-146.

10. Levy AD, Hobbs CM. (2004). Meckel Diverticulum: Radiologic features with pathologic correlation. RadioGraphics, 24, 565-587.

11. Hochhegger B, Haygert CJP. (2007). Papel da tomografia computadorizada no diagnóstico da diverticulite de Meckel: relato de caso e revisão de literatura. Rev Imagem, 29, 71-74.

12. GOULART, A. et al. (2011). Divertículo de Meckel perfurado por palito: Relato de caso clínico. Revista Portuguesa de Cirurgia, (17), 41-44.

13. Merayo-Álvarez M, Fernández-Martínez D, Gonzales-Stuva J, Sanz-Álvarez L, Álvarez-Pérez JA. (2019). Perforación de divertículo de Meckel por cuerpo extraño. Revista de Gastroenterología de México, 84, 112-114.

14. Martins MVDC, Duarte JGC, Martins HS. (2004). Tratamento videolaparoscópico da hemorragia digestiva por divertículo de Meckel. Rev Bras Videocirurgia, 1, 28-30.

15. Ding Y, Zhou Y, Ji Z, et al. (2012). Laparoscopic management of perforated Meckel´s diverticulum in adults. Int J Med Sci, 9, 243-247.

16. Shahid, F., Abdalla, S. O., Elbakary, T., Elfaki, A., & Ali, S. M. (2020). Fish Bone Causing Perforation of the Intestine and Meckel's Diverticulum. Case Reports in Surgery, 2020, 1–6. doi:10.1155/2020/8887603.

17. Cavalcante JSVN, Menezes FH, Castro IF, Ferreira JNM, Conrado RP, Assunção RCG, de Souza PFA, Goes ACA de M, Costa MLV. (2023). Perfuração de divertículo de Meckel por corpo estranho como diagnóstico diferencial de abdome agudo perfurativo: relato de caso. Braz. J. Hea. Rev., 6(5), 23291-23298. Retrieved from https://ojs.brazilianjournals.com.br/ojs/index.php/BJHR/article/view/63535.