



Case report

Spontaneously perforated Meckel's diverticulum due to diverticulitis with histopathological finding of gastric mucosa in an adult female - A case report

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ABSTRACT

Introduction and importance: Meckel's Diverticulum (MD) is the most occurring congenital anomaly of the gastrointestinal tract. It characterizes a patent remnant of the omphalomesenteric duct. Despite remaining asymptomatic most of the time, the rarity of its occurrence is reflected by the scarcity of data involving it in the literature. Gastrointestinal bleeding, bowel obstruction, and inflammation are the most prevalent complications of MD. Perforation of MD is very rare.

Case presentation: We present the case of a previously healthy 32-year-old female, who presented to the emergency department with a 2-day-history of generalized abdominal pain. Radiological analysis suggested a perforated viscus and an inflamed Appendix.

Clinical discussion: Our patient was diagnosed preoperatively with perforated hollow viscus and an exploratory laparotomy was indicated. Intraoperatively, a perforated MD was found and treated by surgical excision of the affected loop of bowel with end-to-end anastomosis and the specimens were sent for histopathological analysis. Histopathology revealed a perforated MD containing gastric mucosa. The patient had successful recovery.

Conclusion: Early recognition with swift surgical intervention must take place to provide therapeutic outcome for patients and to limit the resulting morbidity. This case highlights the necessity of considering MD as core differential diagnosis in patients with acute abdomen. Due to the scarcity of data on perforated MDs in adult females, it's worthy of studying to highlight its incidence. Due to the rarity of a perforated MD in an adult female, it's worthy to consider such cases to explore preoperative assessment techniques, surgical interventions options, and postoperative complications.

1. Introduction

MD is the most prevalent congenital abnormality of the gastrointestinal (GI) tract, with an incidence rate of 2% of individuals [1–3]. It is a true diverticulum, involving all layers of the bowel wall, and it arises from the antimesenteric border of the bowel. About 2% of cases are symptomatic and the incidence rate is twice as common in males as in females [4]. Most cases of MD are tough to diagnose and are found incidentally intraoperatively. The lifetime complication rate is almost 4%. The most prevalent symptoms are bleeding, followed by intestinal

obstruction, diverticulitis, intussusception, neoplasm, and perforation [5]. Perforation is seldom seen, and it was described in a review as the causative complication in 0.5% of symptomatic Meckel's Diverticulum [6]. MD perforation is considered a consequence of acute inflammation of MD [7]. This case is rare because it documents the rarest complication of Meckel's Diverticulum -Perforation- in an adult female which is unique because the male to female ration of this complication is almost 2:1.

The work has been reported in line with the SCARE criteria [8] and the revised 2020 SCARE guidelines [9].

Abbreviations: MD, Meckel's Diverticulum; CT, Computed Tomography; ED, Emergency Department; IBS, Irritable Bowel Syndrome; GI, Gastrointestinal.

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2. Presentation of case

2.1. Patient information

A previously healthy 32-year-old Middle Eastern female patient, with a medical history of Anemia and IBS, surgical history of two C-Sections. She has negative drug and allergic histories. The patient is not alcoholic and doesn't smoke. Last menstruation was 5 days prior to admission. The patient presented to the emergency department (ED) via ambulance with a 2-day history of generalized abdominal pain that became intense over the last 4 h pre-admission. The pain was colicky in nature and periumbilical in location, then became generalized and continuous over the entire abdomen, it was mildly relieved by over-the-counter analgesics and was aggravated by ambulation. It was associated with nausea and vomiting. There was no history of bleeding per rectum, changes in bowel habits, or genitourinary symptoms.

2.2. Clinical findings

Examination revealed tachypnea and tachycardia, but otherwise within normal. Upon inspection, the abdomen was symmetric and mildly distended.

On palpation, there was generalized guarding and tenderness. No masses were felt. Bowel sounds were faint. Laboratory investigations revealed anemia (Hemoglobin: 10.7 g/dl) and leuko-cytosis (WBC: 10.69 thousand per μ l and Granulocytes comprising 91.9%), otherwise within normal ranges.

2.3. Diagnostic assessment

Abdominal Ultrasound revealed a moderate quantity of free turbid fluid in the abdomen and pelvis. Furthermore, it isolated an inflamed Appendix.

Abdominal X-ray suggested air under diaphragm. However, this was a challenge because the image was technically inconclusive, and as a result, an abdominal CT scan was performed. CT scan of the abdomen and pelvis of the patient detected several sections containing intraperitoneal air. It was predominantly positioned in the center and anterior sides of the abdomen. Additionally, abnormal thickening of ileal loops was noted (Fig. 1 A and B) Another challenge was the unavailability of a laparoscopic device in the surgical Emergency Department at that time and as a result, an exploratory laparotomy was performed. The initial management included intravenous fluid resuscitation, analgesics, and prophylactic antibiotics.

2.4. Therapeutic intervention

Surgery was done at our university hospital by two General Surgery seniors with 5 years of experience and under the direct supervision of a General Surgery consultant with 10 years of experience. The patient underwent general anesthesia, and an exploratory laparotomy revealed a moderate amount of free turbid fluid and a pedunculated MD with a large base, inflamed and perforated in its body, situated on the anti-mesenteric border at 40 cm proximal to the ileocecal valve (Fig. 2). Appendix was inflamed. The loop containing MD was completely resected and an end-to-end anastomosis was done. Furthermore, an appendectomy was performed. Operative time was approximately 2 h. Histopathology showed heterotopic gastric tissue with inflammation. However, there was no evidence of malignancy (Fig. 3). Furthermore, early stage of acute inflammation of the Appendix with predominance of neutrophils consisting with acute suppurative Appendicitis, no evidence of malignancy, was described by histopathology of the excised Appendix. She was given prophylactic antibiotics, analgesics, and was given instructions that aid in fast wound recovery such as a balanced diet, regular wound dressings, physical rehabilitation, and avoidance of heavy objects lifting. The patient was followed-up in the outpatient

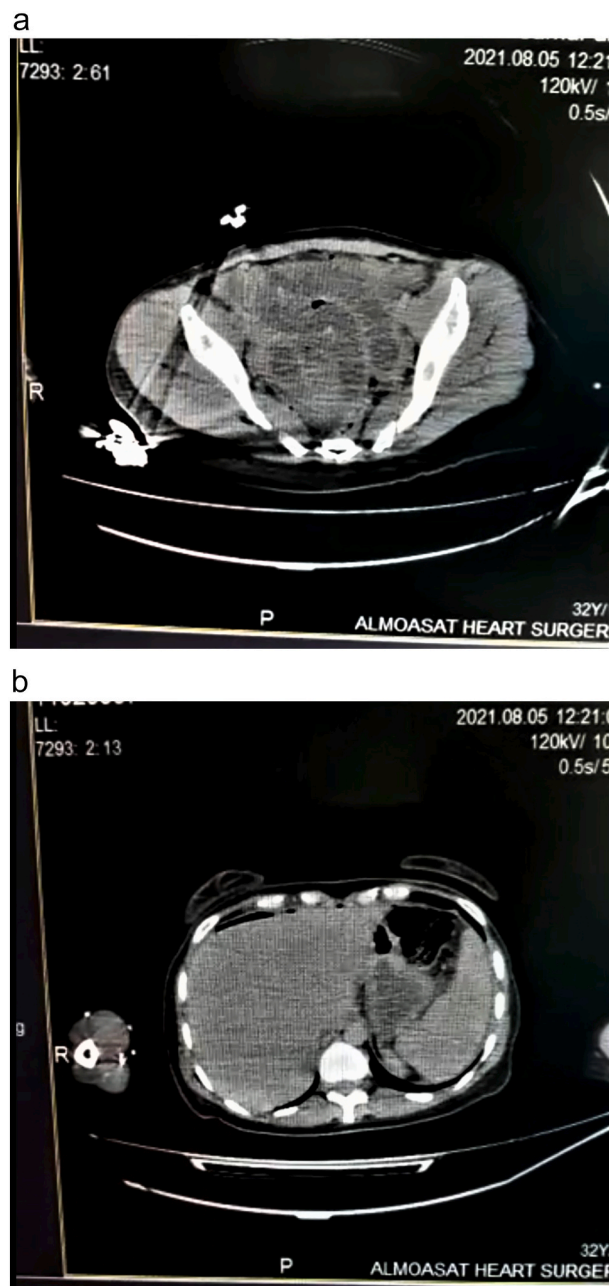


Fig. 1. A and B CT scan of the abdomen and pelvis, showing an abnormal thickening of ileal loops with possible presence of a perforated MD. Several air pockets suggesting a perforated hollow viscus.

settings for 2 months following her operation. Repetitive physical examination at the General Surgery clinic in our hospital in addition to serial abdominal ultrasounds were performed and were normal. The patient had successful recovery with no complications nor adverse events took place. No wound complications were present. She has recovered and has no current symptoms.

3. Discussion

Meckel's Diverticulum is the most frequent congenital anomaly of the gastrointestinal tract [1–3]. The incidence rate ranges between 1% and 2%, with an overall complication risk of 4–6% [5]. MD is a true diverticulum, commonly found on the anti-mesenteric border in the ileum [10]. The majority of MD are silent and are incidentally discovered intraoperatively [11]. Perforation is concluded to be a direct result of



Fig. 2. Intraoperative: Perforated pedunculated MD with large base, located at 40 cm from the ileocecal valve.

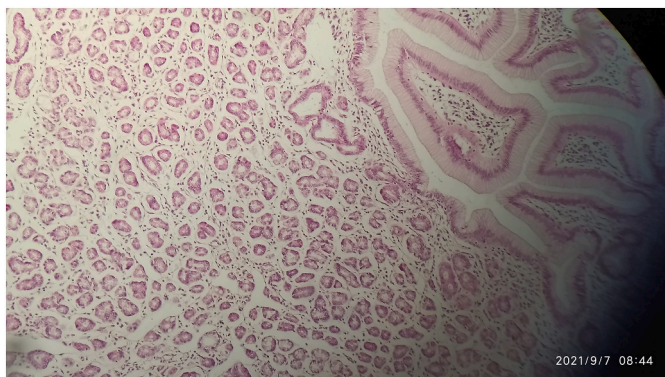


Fig. 3. Histopathology: Heterotopic gastric tissue.

acute inflammation of MD. However, the precise percentage of this pathology has not been reported. Perforation of MD is tremendously rare. Furthermore, diverticulitis causing perforation is rare in adults, specifically in adult females [12–13]. Perforated MD may present as acute abdomen and mimic acute appendicitis [14]. It is either caused by irritation of foreign bodies [15] or following blunt abdominal trauma. Perforation due to inflammation of MD and ulcerating ectopic tissue was explored, described and was evident in our case. Diagnosis of MD is considerably tough, as symptoms and imaging features are non-specific [6,16]. CT scan and Ultrasound are not diagnostic due to their inability to differentiate between a diverticulum and a loop of bowel [17]. Meckel-scan with ^{99m}Tc -pertechnetate may diagnose MD. It can detect the presence ectopic gastric mucosa in cases of complicated MD and can also recognize the site of gastrointestinal bleeding. Its accuracy was reported to be around 90% in pediatric series, and only 46% in the adult group [18].

Preoperatively, under 10% of complicated cases of MD are diagnosed correctly. In our case, perforated MD was diagnosed intraoperatively. Surgical resection remains to be the gold standard for treatment for the symptomatic MD. This can be accomplished by diverticulectomy, segmental bowel resection and anastomosis and wedge resection. This is particularly valid when there is palpable ectopic tissue at the diverticular-intestinal junction, intestinal ischemia or perforation. In our case, the patient had perforation of a pedunculated MD and an

inflamed Appendix. Resection of the involved bowel segment and anastomosis was indicated in addition to an Appendectomy.

4. Conclusion

MD perforation is extremely rare; nevertheless, it should be kept in mind as a core differential diagnosis for patients presenting with acute surgical abdomen. In cases where surgery is indicated, early laparoscopy or open exploration is performed to limit morbidity and mortality associated with the complications. Treatment should be based on the surgeon's judgment, clinical examination, hemodynamic status, and on the unique characteristics of each patient. The scarcity of data on perforated MD in adults, especially adult females and more specifically in our region, warrants further studying, consideration, and assessment to denote the incidence rate of such cases, explore optimal intervention methods, preoperative diagnostic modalities in the setting of an acute surgical abdomen, surgical means and options available, and post-operative evaluation and recovery duration. Lastly, despite the earlier mentioned challenges that we faced in the clinical setting from the lacking-quality of the X-ray device to the unavailability of an emergency-setting laparoscopic device, a swift decision was made after considering the available data to limit the resulting morbidity and to attempt to provide the best available clinical care for patients presenting with similar cases.

Abbreviations

| | |
|-----|--------------------------|
| MD | Meckel's diverticulum |
| CT | Computed Tomography |
| ED | emergency department |
| IBS | irritable bowel syndrome |

Availability of data and materials

The datasets generated during and/or analyzed during the current study are not publicly available because the Data were obtained from the hospital computer-based in-house system. Data are available from the corresponding author upon reasonable request.

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Ethical approval

N/A.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

OA, RA, MA: who wrote, original drafted, edited, visualized, validated, literature reviewed the manuscript.

JS, FA: supervision, project administration, and are the surgeons who performed the operation and reviewed the manuscript.

AM: specialist, General Surgery supervision, who supervised the operation.

OA: conceptualization, resources, and the corresponding author who submitted the paper for publication.

All authors read and approved the final manuscript.

Research registration

N/A.

Guarantor

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Declaration of competing interest

The authors declare that they have no competing interests.

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