Case Report

Laparoscopic appendectomy with Meckel's diverticulectomy – Case report with review of literature

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ABSTRACT

Acute appendicitis (AA), although a common surgical emergency, has many clinical mimics. One such condition is Meckel's diverticulitis. It is an age-old conventional surgical teaching that during every appendectomy, a systematic small bowel "walk" should be conducted to specifically check for this condition. If incidentally found, there are specific, defined criteria that help the surgical team decide whether it should be removed or not. Herein, we present the case of a 29-year-old female patient who was preoperatively diagnosed with AA but was intraoperatively found to have Meckel's diverticulitis. Concurrent laparoscopic Meckel's diverticulectomy was performed through the same three trocars, and the patient had an uneventful post-operative recovery.

Key words: Acute, Appendicitis, Appendectomy, Diverticulitis, Diverticulectomy, Laparoscopic, Meckel's, Mimickers

Acute abdominal pain is a primary driver of emergency care, representing 7–10% of all emergency department visits. As the world's most prevalent abdominal surgical emergency, acute appendicitis (AA) carries a lifetime risk of 6.7% for females, rising to 8.6% among the male population [1,2]. Typically presenting as right iliac fossa pain accompanied by fever and vomiting, appendicitis frequently mimics a wide range of medical and surgical conditions. These differentials range from gastrointestinal issues such as Meckel's diverticulitis, perforated peptic ulcer, mesenteric lymphadenitis, intussusception, gastroenteritis, and terminal ileitis to gynecological emergencies such as ruptured ectopic pregnancy and ruptured ovarian cyst, acute cholecystitis, and ureteric colic. Although Fabricius Hildanus initially documented the existence of Meckel's diverticulum (MD) in 1598, it is named after Johann Friedrich Meckel. It was Meckel who, in 1809, successfully characterized the condition's embryological foundations. MD is a congenital anomaly affecting 2% of the population, and is characterized as a true diverticulum located on the antimesenteric border of the ileum, typically 30–90 cm proximal to the ileocecal valve [3,4]. MD is estimated to affect up to 3% of the population [5]. Most individuals remain asymptomatic; consequently, these cases are frequently identified by chance when a patient undergoes surgery for a different condition. In contrast, the pediatric demographic, particularly those in their first decade of life, exhibits a much higher incidence of symptomatic cases.

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CASE REPORT

A 29-year-old female patient presented to the surgical outpatient department with acute non-radiating pain in the right lower abdomen for 1 day. The patient also experienced nausea and fever. There were no aggravating or alleviating factors.

Her pulse was 92 beats/min, blood pressure was 120/80 mmHg, and respiratory rate was 12 breaths/min. A per-abdominal examination revealed rebound tenderness at McBurney point.

Ultrasonography (USG) of the abdomen and pelvis revealed AA in the form of a non-compressible 1.1 cm diameter tubular structure in the right iliac fossa with no appendicolith and no peri-appendicular fat stranding. There was no mention of MD. Laboratory investigations showed leukocytosis of 14,000 with 85% neutrophilia. Thus, a diagnosis of AA was made, and the patient was counseled for an emergency laparoscopic appendectomy.

After a basic investigational workup, ensuring fitness for anesthesia and valid consent, the patient underwent surgery. At laparoscopy, she was found to have mild catarrhal serosal inflammation in the distal half of the appendix. She was also found to have an inflamed MD with a narrow base. An intraoperative decision was made

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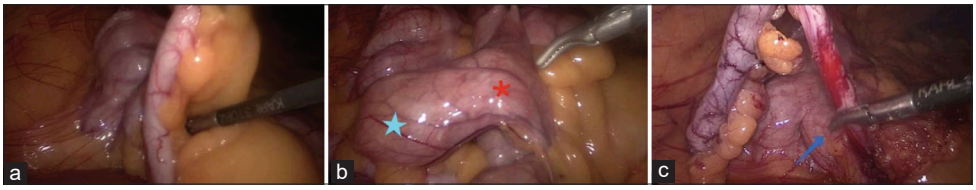

Figure 1: Operative pics. (a) Catarrhal inflammation of appendix; (b) Small bowel (blue asterisk) with Meckel's diverticulum (red asterisk); (c) appendix being devascularised (blue arrow)

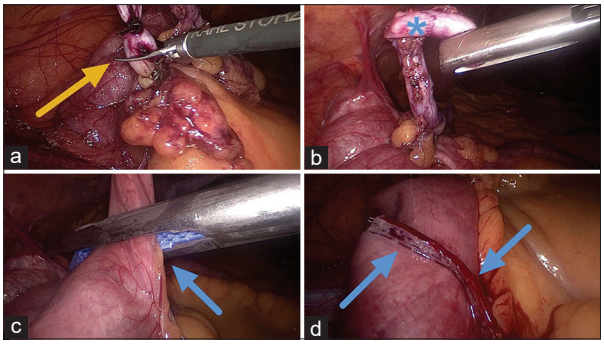

Figure 2: (a) Base of appendix being divided (yellow arrow); (b) appendix being retrieved (blue asterisks); (c) Base of Meckel's diverticulum being stapled (blue arrow); (d) End result- staple line (blue arrow)

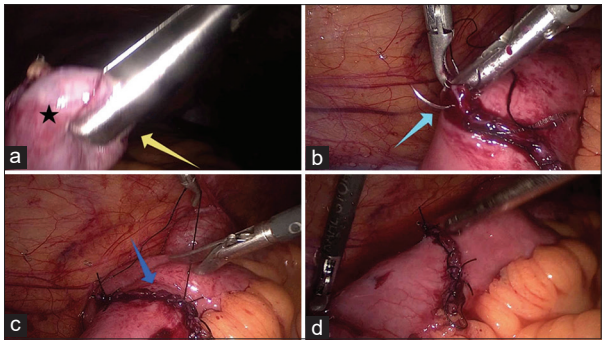

Figure 3: (a) Meckel's diverticulum (black asterisk) being retrievd (yellow arrow); (b) Staple line being buttressed with underrunning sutures (blue arrow); (c) End result (blue arrow); (d) Local peritoneal wash being given

to excise the mass because of inflammation. The same was achieved through the same three trocars inserted for the appendectomy. The subumbilical 10 mm trocar was replaced with a 12 mm trocar to accommodate the surgical stapler. An Endo GIA stapler loaded with a 45 mm blue cartridge was used to excise the MD. The staple line was oversewn using 3-0 Vicryl, with simple interrupted sutures. The appendix was devascularized, the base of the appendix was ligated, and the appendix was removed (Figs. 1-3). The patient had a smooth post-operative recovery. She was kept nil per oral for 3 days due to prolonged ileus, and after passing flatus, she was started on liquids orally on post-operative day (POD) 4 and then on a semisolid diet. She was discharged from the hospital on POD 5.

On her POD 10 post-operative follow-up visit, all her wounds had healed well, and she was asymptomatic. Histopathological examination revealed Meckelian diverticulitis with catarrhal appendicitis. At the time of writing, a telephone interview was conducted with the patient 3 months after her surgery. She continues to be symptom-free.

DISCUSSION

MD (diverticulum ilei) is a small bulge in the small intestine that represents a vestigial remnant of the vitelline duct (also known as the omphalomesenteric duct or yolk stalk). As the most common congenital malformation of the gastrointestinal tract, it results from incomplete obliteration of the proximal omphalomesenteric duct during the 7th week of gestation. Typically situated on the anti-mesenteric border of the ileum, the diverticulum has its own distinct blood supply. Heterotopic mucosa is present in 50–60% of cases, most commonly gastric, followed by pancreatic tissue.

Asymptomatic cases predominate, with most diverticula remaining undetected until they are encountered during surgery for other pathologies. 12.7–53.3% of symptomatic MD cases are misdiagnosed as AA, especially in older patients [6]. Acute abdominal pain and painless hematochezia, often with small intestinal obstruction, were the main clinical characteristics seen in symptomatic cases [7]. A gender distribution analysis revealed a male-to-female ratio of 11:6 [8]. In <4% of patients, symptomatic MD is correctly diagnosed before surgery, despite its clinical relevance [5,9]. MD can lead to complications such as obstruction, intussusception, hemorrhage, diverticulitis, perforation, and malignancy.

Diagnostic modalities for MD include USG, computed tomography (CT), technetium-99m pertechnetate (Meckel's) scan, capsule endoscopy, and barium studies. As the preferred first-line imaging modality for the acute abdomen, ultrasound typically identifies an inflamed MD as a non-compressible, thick-walled tubular structure. The "gut signature" wall and its attachment to a small bowel loop, typically located in the pelvis or right iliac fossa, are important diagnostic characteristics [10]. The key CT features distinguishing Meckel's diverticulitis from AA include its ileal (versus cecal) origin, characteristic mural enhancement, larger size, and unique mesenteric vascularity [11]. MD with a heterotopic gastric mucosa can be easily detected by technetium-99m pertechnetate scintigraphy. Because ectopic gastric tissue is less common in older individuals, sensitivity drops to about 60% in adults while reaching 85–90% in the pediatric population [12,13]. Surgical management of incidental MD typically involves either simple diverticulectomy or formal segmental resection, followed by primary anastomosis. Following simple diverticulectomy for bleeding MD, leftover ectopic tissue requires

segmental excision only in cases of chronic or recurrent bleeding, as the original treatment does not necessarily lessen the risk of post-operative bleeding [14,15]. It is advised to remove asymptomatic Meckel's diverticula when specific risk factors are present, such as being under 50 years old, being male, having a diverticulum length >2 cm, or having abnormal tissue visible under a microscope. Surgical management depends on the diverticulum's proportions: long diverticula (height-to-diameter ratio >2) require diverticulectomy because ectopic tissue is distal, whereas short diverticula (height-to-diameter ratio ≤2) necessitate wedge resection due to widespread tissue distribution at the base [16].

CONCLUSION

As seen in this report, AA, although a common surgical emergency, is mimicked by Meckel's diverticulitis. Although much rarer than appendicitis, it should be considered in patients with right iliac fossa pain. A careful systematic inspection of the terminal ileum should be performed in all cases so as not to miss it, but especially in those patients in whom the appendix cannot fully explain the clinical picture. In addition, as seen here, it is feasible to treat it through the same ports inserted initially for purported AA.

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