

## PHOTO QUIZ

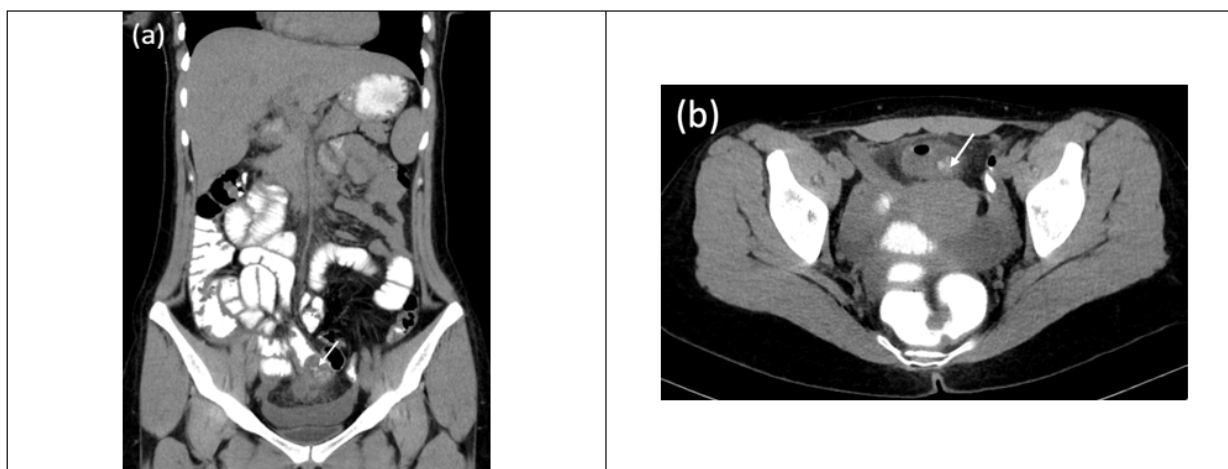
# An Adult Female with Periumbilical Pain and Intractable Vomiting; a Photo quiz

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Received: October 2022; Accepted: December 2022; Published online: 1 January 2023

Cite this article as: Ramawad HA, Toloui A, Viguri A. An Adult Female with Periumbilical Pain and Intractable Vomiting; a Photo quiz. Arch Acad Emerg Med. 2023; 11(1): e7. <https://doi.org/10.22037/aaem.v11i1.1849>.



**Figure 1:** The patient's abdominopelvic computed tomography scan with oral and intravenous contrast.

## Case Presentation

A 25-year-old female with no significant past medical history presented to the emergency room with complaints of worsening, sharp, periumbilical pain for two days, with an intensity of 8 out of 10 based on the visual analogue scale. She complained of fever, nausea, anorexia, and multiple episodes of non-bloody, non-bilious emesis. The patient appeared unwell and diaphoretic. Her vital signs were as follows, blood pressure of 108/66 mmHg, heart rate of 106 beats/minute and body temperature of 39.3°C. Physical examination showed a distended abdomen with localized tenderness and guarding in the periumbilical region.

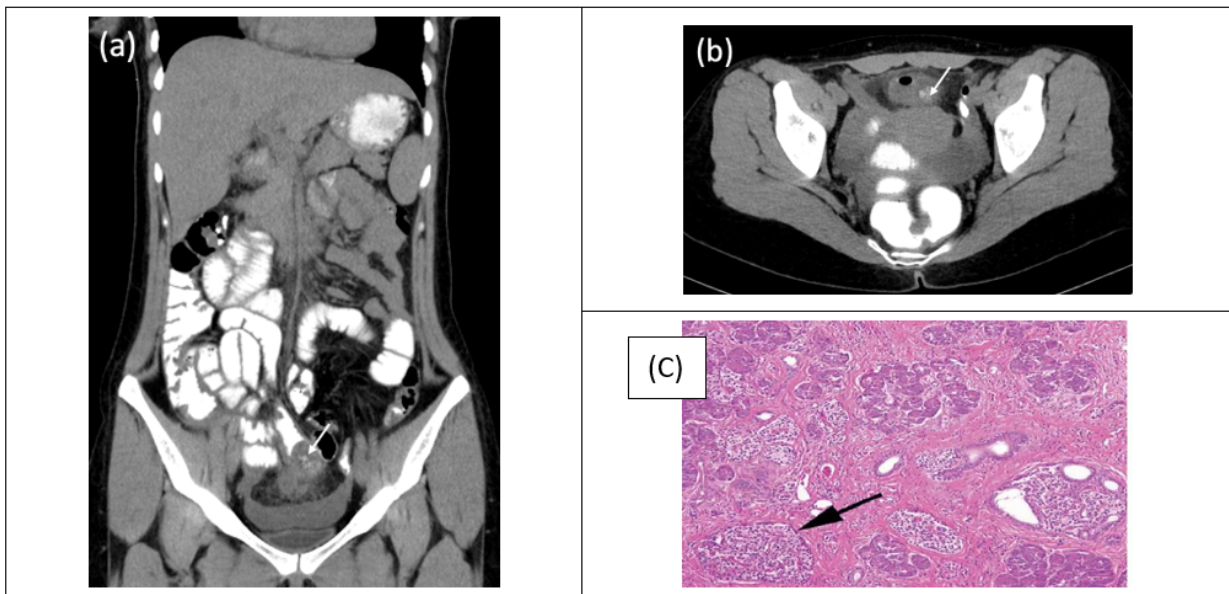
A point-of-care ultrasound (POCUS) of the abdomen did not reveal any free fluid. Laboratory testing, which included electrolytes, complete blood count, and renal and liver function revealed no significant abnormalities. Pregnancy test was negative, and urinalysis was unremarkable. The findings of oral and intravenous contrast-enhanced computed tomography (CT) scan of the abdomen and pelvis are shown in figures 1a and 1b.

**What is your diagnosis?**

## Diagnosis

Oral and intravenous contrast-enhanced computed tomography (CT) scan of the abdomen and pelvis showed an enterolith within a tubular blind ending structure off the distal ileum with adjacent fat stranding (Figures 2a and 2b). A diagnosis of Meckel's diverticulitis was made. Meckel's diverticulum is a rare congenital malformation of the gastrointestinal tract, which is difficult to diagnose in adults. This anomaly

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**Figure 2:** Preoperative computed tomography (CT) images. Coronal (a) and transverse (b) CT images with oral and intravenous contrast showed an enterolith (white arrow) in a tubular blind ending structure with the distal ileus with adjacent fat stranding. Histopathology image of ectopic pancreatic cells and islets (black arrow) in Meckel's diverticulum (C).

generally remains silent and asymptomatic; however, potential complications include perforation, hemorrhage, and bowel obstruction. Most cases are incidentally discovered during radiographic imaging or during surgery performed for other reasons. This case presents the preoperative diagnosis of Meckel's diverticulum in an adult female who presented with symptoms of peritonitis.

### Case Course

The patient was admitted for surgical management with intraoperative findings of a normal appendix and a perforated Meckel's diverticulum. The intestinal segment containing the diverticulum was resected with the creation of an end-to-end anastomosis. The patient had a stable post-operative course on systemic antibiotics (cefazolin and metronidazole) without any complications and was discharged within a week. Histopathology (Figure 2c) later revealed a Meckel's diverticulum with suppurative diverticulitis containing ectopic pancreatic mucosa (1).

### Discussion

Meckel's diverticulum (MD) is the most prevalent congenital malformation of the gastrointestinal tract, occurring in approximately 2% of the general population. It results from incomplete obliteration of the vitelline duct during the 7th or 8th weeks of gestation, leading to the formation of true diverticula (i.e., all layers of the gastrointestinal tract) in the small intestines (2). The diagnosis is usually made in

childhood and has a 4% to 6% lifetime risk of developing complications with a male to female ratio of 3:1 (3). Due to its rarity in adults and vast differential, preoperative diagnosis of MD is uncommon.

Although Meckel's diverticulum generally remains silent, life-threatening complications such as gastrointestinal hemorrhaging, intussusception, bowel obstruction and formation of neoplasm or enterolith may arise (2). The risk of developing complications decreases with age and the incidence rate of developing a complication due to MD is estimated to be less than 4% in the adult population, making it a very rare diagnosis (3). The rates of diverticulitis and perforation in patients with complicated MD are approximately 12.7% and 7.3%, respectively according to the largest study done on MD (4). These complications may present with nonspecific symptoms that mimic common intrabdominal pathologies like appendicitis or diverticulitis, making the diagnosis challenging in the adult population. Heterotopic tissue is found in about 50% of all MD cases, with gastric mucosa being the predominant type with a corresponding incidence of 60% to 85%. The presence of pancreatic mucosa is found in about 5% of all MD cases. Reports have also cited other tissues such as hepatic and endometrial, but these are quite rare and are not reported in complications (5). In this case, the MD presented as peritonitis secondary to perforation and contained pancreatic tissue with enteroliths, making it an atypical presentation for an adult.

When a patient with MD presents to the emergency department, the symptoms are usually non-specific. Patients often

present with abdominal tenderness, distension, and sometimes peritonitis. To overcome some of these difficulties, a CT scan with oral and intravenous contrast is recommended (6). When encountering a blind ending structure in the right lower quadrant apart from a normal appearing appendix, MD should be considered as a differential diagnosis.

The mortality of symptomatic MD is approximately 6% and higher in elderly patients with comorbidities (7). Patients with symptomatic MD should be evaluated by a surgical team, especially if there is peritonitis, small bowel obstruction, or diverticulitis. Treatment of symptomatic MD is definitive diverticulectomy or bowel resection with anastomosis (2). This case emphasizes the importance of keeping MD in the differential diagnosis, as making the diagnosis preoperatively allowed us to avoid complications of delayed surgical intervention.

## Conclusion

Although most patients with Meckel's diverticulum remain asymptomatic, the diagnosis should be considered in patients with acute abdominal pain without other explanation. Perforated MD often presents with an acute abdomen and its preoperative diagnosis is difficult. To overcome some of these challenges, a CT scan with oral and intravenous contrast is recommended. Treatment of symptomatic MD is definitive surgery.

## Declarations

### Acknowledgments

Special thanks to Mahmoud Yousefifard, Ph.D from (Iran University of Medical Science, Department of Physiology) and Jordan Jeong, D.O (Coney Island Hospital, Department of Emergency Medicine) for their comments and feedback on the draft of this paper.

### Ethical Approval

This case report received ethical approval from the New York City Health and Hospitals Academic Committee at Coney Island Hospital (Confirmation Code: CIH-22-16). We conducted this study in accordance with the Helsinki Declaration as revised in 2013. Verbal and written consent for publi-

cation was obtained from the patient.

### Sources of funding

This work did not receive funding.

### Conflict of interests

All authors have declared that they have no conflict of interests.

### Authors' contribution

Study design: All authors

Data gathering: All authors

Data analysis: N/A

Interpreting the findings: All authors

Manuscript writing: All authors

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