

Meckel's Diverticulum Mimicking Crohn's Disease in a 34-Year-Old Female: A Diagnostic Challenge

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ABSTRACT

Meckel's diverticulum (MD) is a rare congenital anomaly that may present in adulthood with nonspecific abdominal symptoms, often mimicking inflammatory bowel diseases such as Crohn's disease (CD). Accurate diagnosis remains challenging due to overlapping clinical and radiologic features. A 34-year-old female presented with a six-month history of recurrent right lower quadrant pain. Initial CT was suggestive of "cecal diverticulitis vs Crohn's disease." Investigations were negative for inflammatory markers, fecal calprotectin, and typical CD features on MRI scans. Collectively, these findings ruled out inflammatory bowel disease as the cause of pain. MRI with contrast provided evidence of a blind-ended tubular structure stemming from the distal ileum with mural thickening and mucosal hyperenhancement, all of which were suggestive of MD with possible ectopic gastric mucosa. Ovarian endometria (2.5 cm) and uterine fibroid emerged as incidental findings, while clinical and anatomical correlations helped exclude gynecological reasons as a possible pain causative. Patient underwent diverticulectomy with resection of 15 cm of inflamed colon after the diagnosis of MD. This case study illustrates a comprehensive approach for preoperative diagnosis of MD to avoid unnecessary immunosuppressive therapy. It underscores that gynecological reasons should be explored in patients of reproductive-age when presented with unexplained abdominal pain. Similarly, a high suspicion index must be ensured for adults with right lower quadrant pain in the absence of inflammatory markers or symptoms strongly mimicking Crohn's Disease.

Keywords: *Inflammatory Bowel Diseases, Abdominal Pain, Diverticulitis, Magnetic Resonance Imaging, Incidental Findings, Ileum.*

INTRODUCTION

Meckel's diverticulum (MD) is the most common congenital malformation of the gastrointestinal tract, affecting approximately 2% of the population¹. It results from the incomplete obliteration of the omphalomesenteric duct during the 5th and the 7th week of fetal life, while a true diverticulum is composed of all the layers of the intestinal wall². MD is traditionally described using a "rule of 2's", which means it affects about 2% of the population, where 2% are symptomatic children who are mostly below the age of 2. The impact of MD is twice more prominent in males than females. It is located 2 feet proximal to the ileocecal valve, measuring 2 inches in length and may encompass 2 types of the mucosal lining^{1,3}.

MD is mainly reported to be asymptomatic and found incidentally⁴; however, its related complication may arise throughout life. The clinical manifestation of Meckel's diverticulum varies significantly with age. Most common complications of MD include bleeding, inflammation, obstruction, or mimicry of other gastrointestinal pathologies. In the pediatric population, the most common presentation prevalent in 50% cases of pediatric MD is bleeding⁴, which is associated with ectopic gastric and pancreatic mucosa, causing ulceration of the adjacent ileal mucosa⁵. In contrast, frequently reported complications in the adult population include intestinal obstruction, intussusception, diverticulitis, and perforation⁶. The non-specific nature of these symptoms in the adult population, MD can be particularly difficult to diagnose as its clinical presentation overlaps with other more common

intra-abdominal conditions such as appendicitis, diverticulitis, and Crohn's disease^{1,7,8}.

Clinicians often face a diagnostic dilemma while differentiating MD from inflammatory bowel disease (IBD), since radiological imaging such as computed tomography (CT) usually reveals bowel wall thickening and mesenteric inflammation, which are common for both MD and IBD^{9,10}. Misdiagnosis of MD exhibits adverse clinical implications, including unnecessary immunosuppressive therapies for mimicking conditions like IBD or Crohn's disease, delaying the possible surgical correction required, since MD is a surgically correctable condition¹¹.

We present a case of a 34-year-old female with chronic right lower quadrant pain, initially suspected to have Crohn's disease based on CT imaging, but ultimately diagnosed with symptomatic Meckel's diverticulum following MRI and surgical intervention. This case aims to highlight MD as a critical diagnostic pitfall in adults and to demonstrate the utility of MRI in resolving diagnostic uncertainty.

CASE PRESENTATION

Initial Symptom Presentation and Patient's Medical History

A 34-year-old female presented to the outpatient clinic with a six-month history of recurrent, intermittent right lower quadrant abdominal pain. The pain was non-radiating and not associated with defecation,

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Table 1. Laboratory Workup and Results

Test	Result	Reference Range
Complete Blood Count (CBC)		
White Blood Cells (WBC)	$6.2 \times 10^9/L$	$4.0\text{--}11.0 \times 10^9/L$
Hemoglobin (Hb)	13.2 g/dL	12–15 g/dL (female)
Platelets (PLT)	$280 \times 10^9/L$	$150\text{--}450 \times 10^9/L$
Neutrophils	$3.8 \times 10^9/L$	$1.7\text{--}7.5 \times 10^9/L$
Lymphocytes	$2.1 \times 10^9/L$	$1.0\text{--}3.2 \times 10^9/L$
C-Reactive Protein (CRP)	2.1 mg/L	< 5 mg/L
Liver Function Tests (LFTs)		
ALT	24 U/L	7–55 U/L
AST	22 U/L	8–48 U/L
Total Bilirubin	0.6 mg/dL	0.2–1.4 mg/dL
Albumin	4.2 g/dL	3.5–5.0 g/dL
Fecal Occult Blood Test (FOBT)	Negative	Negative
Fecal Calprotectin	32 $\mu\text{g/g}$	< 50 $\mu\text{g/g}$ (normal)

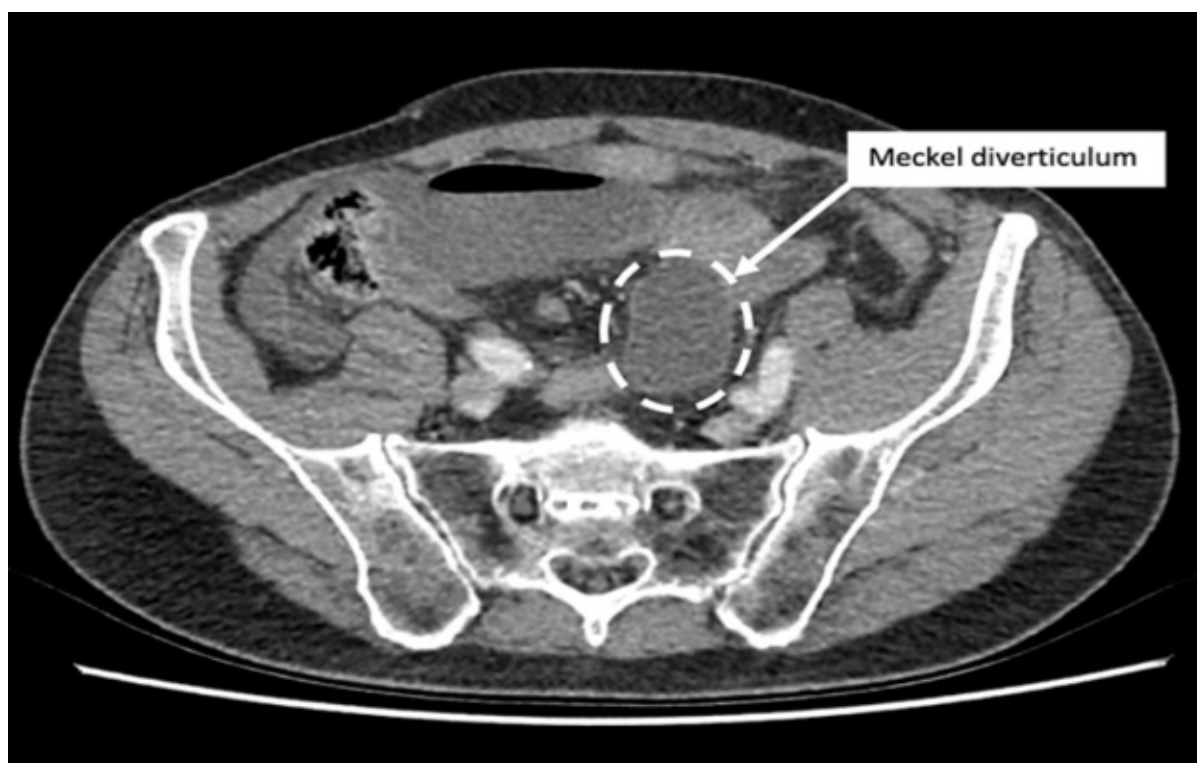


Figure 1. Axial CT scan showing a blind-ending fluid-filled pouch arising from the antimesenteric border of the distal ileum, consistent with Meckel's diverticulum

menstruation, or food intake. She reported no fever, diarrhea, hematochezia, or significant weight loss. There was no past medical history of any abdominal complication or recent surgical procedure. No significant family history related to inflammatory bowel disease or diverticular disease was reported. Patient's gynecological history included regular menstrual cycles, and the non-cyclical pain did not exacerbate upon menstruation.

Physical Examination

Abdominal examination revealed mild tenderness in the right iliac fossa upon palpation, described as mild ache without severe pain, guarding, or rebound tenderness. Otherwise, the abdominal examination was unremarkable: inspection showed no scars or distention; auscultation revealed normal bowel sounds; percussion was normal with no fluid, masses, or organomegaly; Special maneuvers, including Rovsing sign and psoas sign, were negative. The general physical examination was normal.

Laboratory Findings

Initial laboratory workup was within normal limits in relation to the hospital's standard reference ranges (Table 1):

The normal CBC and CRP helped rule out systemic infection or significant inflammatory disease such as active Crohn's disease. Normal LFTs reassured against hepatic causes of abdominal pain. The negative FOBT and low fecal calprotectin strongly reduced the likelihood of active colonic inflammatory disease and gastrointestinal (GI) bleeding.

Imaging Findings

A contrast-enhanced computed tomography (CT) scan of the abdomen and pelvis showed mural thickening in the distal ileum with surrounding mesenteric fat stranding, initially reported as "cecal diverticulitis vs Crohn's disease" (Figure 1).

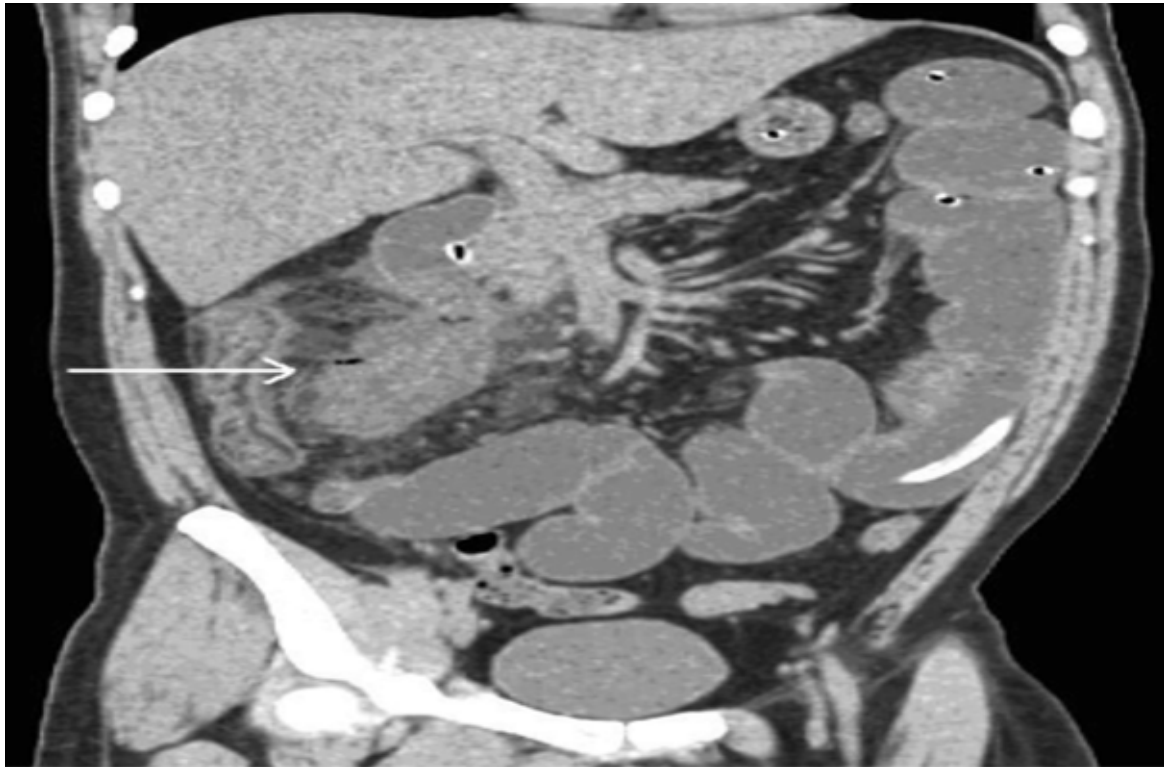


Figure 2. Coronal T2-weighted MRI enterography image showing a tubular structure extending from the ileum with wall thickening

This diagnostic uncertainty and negative inflammatory markers prompted the conduct of an MRI (magnetic resonance imaging) of the abdomen and pelvis with IV gadolinium. MRI revealed a blind-ended tubular structure arising from the antimesenteric border of the distal ileum, with focal mural thickening and mucosal hyperenhancement, suggestive of Meckel's diverticulum with possible ectopic gastric mucosa (Figure 2). No strictures, ulcers, fistulae or active IBD evidence were seen.

Incidental Findings and Exclusion of Gynecological Causes

MRI also identified a 2.5 cm right ovarian endometrium and a small fundal uterine fibroid, both without surrounding fat stranding, torsion, or hemorrhage. The possibility of gynecological causes of chronic right lower quadrant pain was ruled out based on clinical correlation (no association between the non-cyclical pain and menstruation), laboratory findings (normal inflammatory markers), and imaging characteristics (localization of fat stranding and enhancement were adjacent to the Meckel's diverticulum and not close to the ovaries or uterus). Anatomically, pain localized to the right lower quadrant corresponded anatomically to the distal ileum and cecal region (site of Meckel's diverticulum), whereas the ovarian and uterine lesions were in slightly different anatomical locations and not cause secondary inflammatory changes.

Diagnosis and Management

Based on the clinical, laboratory, and imaging findings, a diagnosis of symptomatic Meckel's diverticulum was made. The patient was referred for surgical evaluation.

Surgical Outcome and Follow-Up

On May 12, 2025, the patient underwent diagnostic laparoscopy, which confirmed the presence of a Meckel's diverticulum arising from the distal ileum. A diverticulectomy was performed with resection of 15

cm of the inflamed colon. The postoperative recovery was uneventful, and the patient remained symptom-free at follow-up.

DISCUSSION

Meckel's diverticulum (MD) results from the failure of the vitelline duct to involute completely during embryogenesis, forming a true diverticulum that contains all layers of the intestinal wall. Given its rarity (2% of the population) and occurrence as a common congenital GIT malformation, it remains asymptomatic in the majority of cases¹². In case of complications, presentations vary across age groups: children often experience painless rectal bleeding due to ectopic gastric mucosa¹³, while adults more frequently present with obstruction, inflammation, or nonspecific abdominal pain^{14,15}.

This case presents a diagnostic dilemma where MD manifested in an adult female with chronic right lower quadrant pain, based on the initial screening, was thought to be Crohn's disease. Since the patient was a female in her 30's, differential diagnosis was critical, spanning across gastrointestinal, gynecological, and urological etiologies. These broader categories include conditions like appendicitis, Crohn's disease, cecal diverticulitis, irritable bowel syndrome, and gynecological challenges such as endometriosis, ovarian cysts, or pelvic inflammatory disease.

Initial CT findings of mural thickening and mesenteric fat stranding in the distal ileum were highly suggestive of Crohn's disease, which typically involves the terminal ileum. Normal lab findings (CBC, CRP) and no fever pointed towards the absence of systemic inflammatory markers, which otherwise exhibit an acute-phase response¹⁶. Fecal calprotectin is a highly reliable marker for intestinal inflammation, making Crohn's disease unlikely. The negative predictive value of fecal calprotectin is widely cited in literature for excluding inflammatory bowel disease¹⁷. Moreover, the possibility of Crohn's disease was further reduced as no typical features of the disease, such as strictures, fistulae, or skip lesions on transmural involvement, were observed on the MRI scans.

This case highlights the critical role of MRI with IV gadolinium in differentiating MD from IBD. MRI offers superior soft tissue characterization and is particularly valuable in evaluating subtle features of bowel wall enhancement, perienteric fat, and complications such as abscesses or fistulae. The identification of a blind-ended ileal structure with mural thickening and enhancement, in the absence of typical Crohn's findings, strongly favored Meckel's diverticulum. The enhancement patterns also suggested the presence of ectopic gastric mucosa, which is present in the majority of symptomatic cases and often increases complications, including bleeding and perforation^{18,19}.

The presence of a right ovarian endometrioma (2.5 cm) and a uterine fibroid were incidental but served as reminders of the importance of considering gynecologic causes in reproductive-age women with abdominal pain. This possibility was ruled out based on the clinical presentation (non-cyclical pain not associated with menstruation or related complications), imaging, and anatomical findings were clear of any indications of inflammation around the ovaries or uterus, or pain localization, but were significant for MD in the distal ileum, with precise localization of pain in the said region. This comprehensive assessment enabled the team to effectively rule out any underlying gynecological reasons and attribute the symptoms to MD.

An important diagnostic challenge in identifying MD is that its symptoms are similar to those of CD, which delays diagnosis in adults²⁰. While it occurs rarely, these cases are widely reported in the literature. Cleveland et al. reported that a patient was started on corticosteroid therapy for presumed CD before diverticulectomy revealed MD to be the true etiology²¹. Similarly, Sidhu et al. described CT findings to be consistent with CD in a case, but a normal colonoscopy followed by MRI revealed an inflamed MD²². Kassim et al. also reported suspicion of symptom mimicry, leading to adalimumab therapy for suspected CD while the inflammatory markers were normal, later revealed to be a strictured MD via laparotomy¹⁰. Moreover, Wong et al. presented a case of perforated MD and fistulae in a patient, which are features of advanced CD²³. In line with these findings, our patient's initial symptoms and imaging findings were also suggestive of CD. However, instead of being dependent on laparoscopy for definitive confirmation as reported in previous cases, this case study reports a comprehensive approach that employs MRI with contrast, supported by normal fecal calprotectin and inflammatory markers which is not only helpful in streamlining preoperative diagnosis but also reduces the need for unnecessary immunosuppressive therapy. Maintaining a high index of suspicion for MD is essential in patients with atypical features or inconclusive investigations²⁴.

CONCLUSION

This case highlights Meckel's diverticulum as a potential diagnostic pitfall in adult patients presenting with chronic abdominal pain and imaging findings suggestive of Crohn's disease. A careful correlation of clinical, laboratory, and advanced imaging data is essential to avoid misdiagnosis. Meckel's diverticulum should remain a consideration in the differential diagnosis, particularly in the presence of atypical IBD features, inconsistent laboratory markers, and when MRI reveals a blind-ended structure with mural enhancement. Surgical resection with histopathological confirmation remains the gold standard for definitive diagnosis and treatment.

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Potential Conflicts of Interest: None

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