



## Elusive Appendix: Challenges and Innovations in Locating and Tracing the Appendix during Surgical Interventions

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**Abstract:** The vermiform appendix, a lymphoid tube, resides approximately 2 centimeters below the junction where the small intestine meets the large intestine (ileocecal junction) on the cecum. Variations in the appendix's anatomical location result from distinct growth patterns of the cecum during developmental stages. A 53 year old man presented at Pacific Institute of Medical Sciences emergency department on September 2023. With pain in periumbilical region. Physical examination revealed mild tenderness in right lower abdomen. CBC report was normal but WBC count raised which is 16500/cumm.

**Keywords:** Vermiform, between ileum loop, Appendicitis, Ileocaecal, Difficult, Appendectomy.

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## INTRODUCTION

The vermiform appendix is a tube-shaped lymphoid organ located approximately 2 centimeters beneath the junction where the small intestine (ileum) connects to the large intestine (cecum). The different anatomical position of the appendix is due to differential growth of the cecum at the time of development. These different positions are post-ileal (0.5%), pre-ileal (1%), subcecal (1.5%), paracecal (2%), pelvic (21%), and retrocecal (74%). Appendicitis commonly occurs between ages 5 and 45, typically around the age of 28, with an incidence rate of approximately 233 cases per 100,000 individuals. Its usual presentation involves initial generalized or around the navel abdominal pain, which eventually localizes to the lower right quadrant. Initially, nerve fibers around the T8 through T10 region are stimulated, causing vague centralized pain. However, the pain's location in the abdomen can vary due to abnormal anatomical development, such as midgut malrotation, or specific

situations like pregnancy or prior abdominal surgeries. The appendix forms during the fifth week of embryonic development [1].

Patient often presented to OPD and emergency with disease of acute presentation, usually within 24 hours, but it can also be presented as a more chronic condition. If ultrasonography showed perforation with a contained abscess, the presenting symptoms can be more critical now a days it is accepted that this organ may have an immunoprotective function and acts as a lymphoid organ. Other conducted study showed that the appendix acts as a storage vessel for "good" colonic bacteria [2].

In the world acute appendicitis is most common surgical emergency. Usually, incidence of acute appendicitis, male to female ratio is 8:1<sup>2</sup>. Mostly the patient of acute appendicitis presents with epigastrium or paraumbilical pain which is migrating to the right iliac fossa. And also associated with fever,

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nausea, vomiting. Different age-groups as well as different positions of the appendix are responsible for variable signs and symptoms of appendicitis. The typical features of acute and chronic appendicitis may be absent in the post-ileal appendicitis. The patient may present in OPD with unbearable pain and migration of pain being absent and present it is depend on the situation. Which may cause delay in diagnosis and further complications [3].

We presented a case of appendicitis in between loop of ileum at ileocecal junction which had misleading symptoms and signs which finally underwent successful appendicectomy.

### CASE REPORT

A 53 year old male patient presented with pain abdomen in periumbilical region. There was fever or vomiting. As per available hospital records, the patient previously had similar episodes in last one

year prior to which he had symptoms of pain and fever. He was treated in the line of conservatively because he was not willing for surgery and got relived from pain and fever. After one year he again presented with unbearable pain abdomen in periumbilical region pain with the score of 5 on the visual analogue scale. There was fever, anorexia, tenderness in right lower quadrant. Cope-psoas and cope-obturator tests were negative. Total leucocytic counts were 16500/cumm. Alvarado score was 6. On abdominal ultrasonography shows the presence of complex fluid collections or abscesses adjacent to the appendix. These collections appear as hypoechoic (dark) areas with irregular borders, there was no evidence of lump. However, the impression was that of recurrent appendicular pathology with appendix diameter of 6.1 mm and periappendiceal fluid (Fig 1.1).



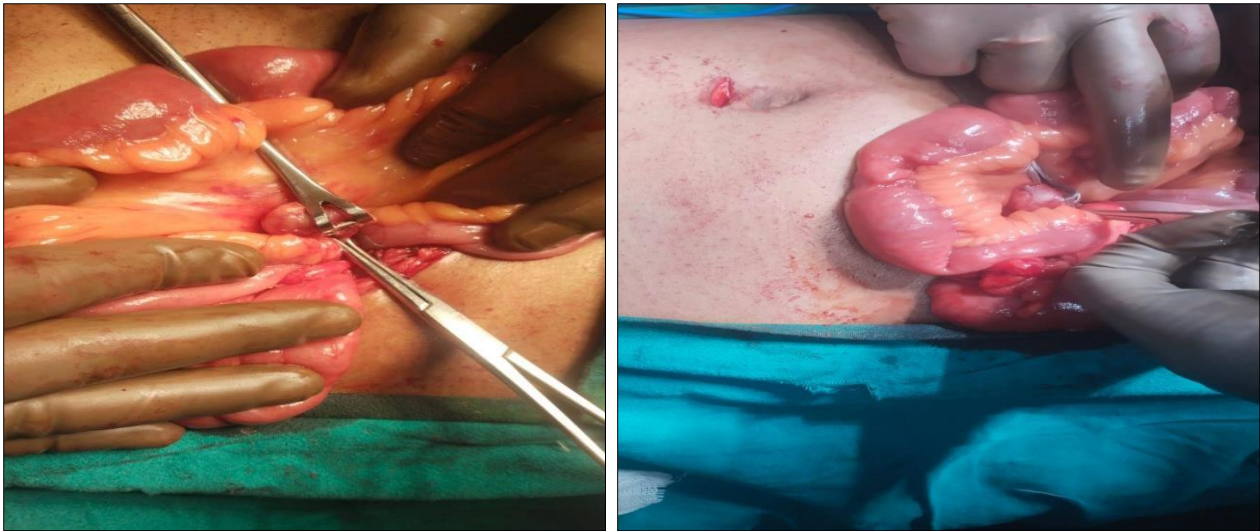
Fig. 1.1: Ultrasonography

Initially, the procedure commenced as a laparoscopic appendectomy with the intention of removing the appendix through minimally invasive means. (Fig 1.2) However, during the course of the laparoscopic procedure, the appendix couldn't be

successfully located or visualized. Consequently, the laparoscopic appendectomy had to be converted into an open appendectomy, transitioning from the minimally invasive approach to a more traditional surgical method to remove the appendix.



Fig. 1.2: laparoscopic appendectomy



**Fig. 1.3: perforated appendix present in between loop of ileum at ileum cecum junction adhesion to mesenteric**



**Fig. 1.4: perforated appendix**



**Fig. 1.5: drain placed**

On exploration by Mcburney's grid-iron incision, the only the base of the appendix was found with difficulty by tracing the taenia coli as the entire

appendix was buried in between loops of ileum. Initially edematous, thickened inflamed perforated appendix present in between loop of ileum at ileum

cecum junction adhesion to mesenteric (fig 1.3). Appendix is blunt at base of lumen with localized collection of pus and adhesion of omentum. Surrounding bowel is edematous. Following this, the mesoappendix and appendix was separated together from the small loops of bowel by gentle dissections. Ligation of Mesoappendix and appendix is separated. Finally, when the tip and majority of the body of the appendix were separated from the mesoappendix, the final attachment between perforated appendix and mesoappendix was separated and the perforated appendix was taken out (fig 1.4) and drain is placed (fig 1.5). Specimen was sent for biopsy which gave the impression of acute perforated appendicitis with periappendicitis. Post-operative recovery was uneventful.

## DISCUSSION

Perforated appendicitis within the loop of the ileum represents a specific scenario where the appendix, upon perforation, releases its contents into the looped portion of the small intestine (ileum). This condition presents unique challenges and considerations compared to a typical perforated appendicitis.

When the appendix perforates within the loop of the ileum, it can lead to distinct clinical manifestations and diagnostic difficulties. Symptoms may be less pronounced or may mimic other gastrointestinal conditions, potentially delaying the diagnosis. Patients might present with less severe abdominal pain initially, which can be misleading or attributed to other abdominal issues. As a result, diagnosing perforated appendicitis within the loop of the ileum can be particularly challenging due to atypical symptomatology.

Imaging techniques such as CT scans or ultrasound play a crucial role in identifying the site of perforation and confirming the diagnosis. However, the specific location of the perforation within the loop of the ileum might make it more difficult to visualize and diagnose accurately through imaging alone.

Surgical management is often the primary approach for treating perforated appendicitis within the loop of the ileum. The surgical procedure aims to remove the damaged appendix, address the perforation, and manage any complications that may have arisen, such as localized infections or abscesses.

Postoperative care for this specific condition may involve vigilant monitoring for potential complications due to the proximity of the perforation to the small intestine. Complications like intra-abdominal abscess formation or contamination of the

peritoneal cavity are possible and require prompt attention.

The prognosis for perforated appendicitis within the loop of the ileum largely depends on the timeliness of diagnosis, surgical intervention, and the presence of associated complications. Early recognition, prompt surgical intervention, and meticulous postoperative care are critical in improving outcomes and minimizing potential adverse effects.

Given the unique challenges in diagnosing and managing perforated appendicitis within the loop of the ileum, discussions among healthcare professionals often revolve around the importance of maintaining a high index of suspicion, leveraging imaging tools effectively, and adopting a multidisciplinary approach for timely intervention and optimal patient care

The study findings indicated that complications associated with appendicitis, such as gangrene, perforations, abscess formation, the development of a mass, or widespread peritonitis, were more frequently observed in patients with retro-caecal appendicitis compared to those with pelvic or post-ileal appendicitis. The position of the appendix appears to correlate with the likelihood of experiencing these severe complications. Additionally, the anatomical location of the appendix seems to significantly impact the clinical presentation of appendicitis, potentially influencing the severity and specific manifestations of the condition in affected individuals [4].

In a different study, the distribution of appendix positions was reported as follows: retrocecal (43.5 percent), sub-caecal (24.4 percent), post-ileal (14.3 percent), pelvic (9.3 percent), paracecal (5.8 percent), pre-ileal (2.4 percent), and other positions (0.27 percent). The observed lengths of the appendix ranged from 1.0 to 20 cm, with an average length documented at 11.4 cm [5].

In a separate study focused on the pediatric population, it was found that post-ileal appendicitis exhibited the highest incidence of surgical site infections at 42.3 percent, followed closely by retrocaecal appendix cases which showed a rate of 36.7 percent for such infections [6].

The diagnosis relied on patient history, clinical examinations, and laboratory tests. Approximately 30-45 percent of patients exhibited atypical signs and symptoms during initial presentation. In cases where the diagnosis remained uncertain, ultrasonography and CT scans emerged as

the predominant imaging modalities used to provide further clarity [7].

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