CASE REPORT

Beyond Acute Appendicitis: A Rare Case of Preoperative Diagnosis of Appendiceal Intussusception on Ultrasound Imaging

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ABSTRACT

Appendiceal intussusception is an uncommon and often misdiagnosed condition due to its nonspecific clinical presentation. We document the case of a 40-year-old female presenting with right iliac fossa pain, in whom ultrasonography revealed doughnut sign suggestive of appendiceal intussusception—a rare finding on this imaging modality. This case underscores the significance of considering a broad spectrum of differential diagnosis in abdominal pain and reinforces the diagnostic value of ultrasonography in identifying rare surgical pathologies.

Key Words: *Intussusception, Appendix, Ultrasonography.*

Introduction

Appendiceal intussusception is an exceptionally rare and often overlooked clinical entity, with the earliest documentation dating back to McKidd et. al.,[1] in 1858. Clinically deceptive, it can mimic acute appendicitis, present as a caecal polyp, or remain entirely asymptomatic making diagnosis challenging.[2] The condition results from the appendix telescoping into the caecum, often triggered by underlying anatomical or pathological factors. It occurs more commonly in adults (76%) than children (24%), with a notable female predominance in adult cases (72%). In contrast, male patients constitute a higher proportion (58%) in the paediatric age group.[3] Owing to its infrequency and diverse clinical presentations, it remains a significant diagnostic and therapeutic challenge. We report the case of a female patient who presented with right iliac fossa (RIF) pain, where appendiceal intussusception was diagnosed on ultrasonography, an uncommon diagnostic route for this condition.

Case Report

A previously healthy 40-year-old female arrived at the emergency department complaining of abdominal pain for the last 10 days that had initially started in the epigastric region and subsequently localized to the RIF. It was characterised as dull, continuous, and non-radiating, associated with anorexia, nausea, and vomiting. She also reported intermittent low-grade undocumented fever but denied any history of dysuria, menstrual irregularities, vaginal discharge, or tuberculosis contact.

On initial assessment, the following vitals were recorded: temperature 98.8°F, heart rate 95 bpm, and blood pressure 130/80 mmHg. Abdominal examination demonstrated localised tenderness in the RIF with positive Blumberg's and Dunphy's signs. Systemic examination was unremarkable. Laboratory investigations showed leukocytosis (12,500/mm³) with neutrophilia (74.2%). The detailed laboratory findings are given in the Table I. The patient's Alvarado score was calculated as 9/10, as presented in Table II. However, what followed next was a remarkable and completely unexpected ultrasound finding, transforming this seemingly routine case into a surgical rarity: an adynamic, non-compressible, blind-ending structure in the right iliac fossa, measuring 55 mm in length, 11 mm in width, and 4 mm in wall thickness. A doughnut sign (19 × 17 mm) was visualized at the caecal end, suggestive of acute appendicitis with appendiceal intussusception. (as shown in Figure 1)

Based on the clinical assessment and supporting laboratory and imaging findings, a provisional diagnosis of acute appendicitis with appendiceal intussusception was made. After obtaining informed

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Received: May 04, 2025; Revised: August 21, 2025
Accepted: September 13, 2025

https://doi.org/10.57234/jiimc.september25.2528

consent, an emergency open appendectomy was planned. The patient was prepared for surgery according to hospital protocol. Intraoperatively, findings consistent with the ultrasound report were noted i.e. an acutely inflamed appendix with its base buried into the caecum. (as shown in Figures 2, 3) The appendix was gently released, the intussusception was reduced, and a standard appendectomy was performed. The patient had an uncomplicated postoperative recovery, and she was safely discharged in a stable condition and healthy wound on the third postoperative day. Histopathological analysis of the resected specimen revealed an acutely inflamed appendix, with no evidence of malignancy.

Table I: Laboratory Findings of the Patient

Parameters	Measured Values	Normal Values
Haematocrit	36.5%	35-49%
Haemoglobin	12.3g/dl	12.0-15.0 g/dl
Platelets	201x10^3/ml	150 – 400 x10^3/ml
TLC	12.5x10^3/ml	4 – 11.0 x10^3/ml
Neutrophils	74.2%	40-70%
CRP	15.6 mg/dl	<0.7 mg/dl

TLC: Total Leucocyte Count CRP: C-Reactive Protein

Table II: Alvarado Score Calculation of the Patient

Symptoms	Score
Migratory RIF Pain	1
Anorexia	1
Nausea	1
Signs	
RIF Tenderness	2
Rebound Tenderness in RIF	1
Elevated Temperature	0
Laboratory Findings	
Leucocytosis	2
Neutrophilia	1
Total	9

Figure 1: Ultrasound Image Demonstrating Appendiceal Intussusception

Figure 2: Intra-operative Image of Acutely Inflammed Appendix with its base buried into caecum

Figure 3: Intra-operative Image Showing Appendiceal Intussusception

Discussion

Appendiceal intussusception is an exceedingly uncommon phenomenon, with an incidence estimated at around 0.01%. [1] It is characterised by invagination of appendix into caecum due to disruption of normal peristalsis caused by anatomical or pathologic factors.[2] Chaar et. al.,[4] analysed the pathological findings of 151 reported cases of appendiceal intussusception and identified association with inflammation (29%), endometriosis (26%), mucocele (18%), adenoma (9%), carcinoid (6%), adenocarcinoma (5%), and other less common conditions (6%). The clinical presentation of appendiceal intussusception can vary significantly, with four distinct types described: the first resembles acute appendicitis, the second features classic intussusception symptoms, including several days of abdominal pain, vomiting, and sometimes diarrhoea or melaena. The third type involves months of recurrent right lower quadrant pain, vomiting, and melaena. The fourth type is asymptomatic and typically diagnosed incidentally.[2]

https://doi.org/10.57234/jiimc.september25.2528

Due to its rarity, appendiceal intussusception presents as a diagnostic challenge to radiologists as well as clinicians. When suspected, ultrasonography and computed tomography (CT) serve as the preferred diagnostic modalities. Ultrasonography may reveal characteristic "target" or "doughnut" signs. On contrast enema studies, though now infrequently used, the absence of contrast filling in the appendix along with the appearance of a coiled spring pattern may suggest intussusception.[5, 6] In addition to imaging, there are documented cases in literature where appendiceal intussusception was identified during colonoscopy. It often presents as a polypoid lesion, which can lead to diagnostic uncertainty. Insufflation during the procedure may cause spontaneous reduction of the intussusception, revealing a halo-like erythematous ring around the appendiceal orifice. However, such findings are not always conclusive, as some cases have been mistakenly interpreted as caecal polyps or even malignancies on endoscopy.[2]

Surgical intervention remains the primary treatment approach for appendiceal intussusception. While appendectomy is the most frequently performed procedure, cases with intraoperative features suggestive of malignancy or lacking a definitive preoperative histological diagnosis may necessitate a right hemicolectomy. Beyond addressing acute conditions like appendicitis or intestinal obstruction, surgeons should remain alert to the possibility of underlying malignancy, it is therefore critical that surgeons conduct a meticulous intraoperative assessment.[1,3]

Conclusion

This report emphasises the indispensable role of imaging in detecting rare variations of common surgical emergencies. The doughnut sign on ultrasonography, a diagnostic gem, proved to be a crucial clue that set this case apart, highlighting the importance of vigilance in abdominal imaging and timely surgical intervention.

Acknowledgement: None

Disclaimer: The authors declare that informed consent was obtained from the patient for publication of her clinical details and images. She understands that her identity would remain confidential, and all measures would be taken to ensure her anonymity.

Conflict of Interest: none

Funding Disclosure: The authors declare that we have not received financial support or grants from funding agencies in public, commercial or not-for-profit sectors.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

Authors have declared no specific grant for this research from any funding agency in public, commercial or nonprofit sector.

DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.