Appendicitis Mimicking Mesenteric Adenitis in Children: A Diagnostic Challenge

E.Y. Mushosho, P. Sibanda, & B. Chinene
School of Allied Health Sciences, Harare Institute of Technology

Abstract

Acute appendicitis (AA) remains a diagnostic challenge in children, often mimicking mesenteric adenitis (MA), leading to high misdiagnosis rates (28–57%) in ages 2–12. This case report underscores the diagnostic complexities through an 11-year-old boy with recurrent right lower quadrant (RLQ) pain, initially managed as MA based on ultrasound findings of enlarged lymph nodes and a non-dilated (3 mm), non-compressible appendix. Despite antibiotic therapy, symptoms persisted, prompting a follow-up ultrasound four weeks later, which revealed a dilated (8.3mm), micro-perforated appendix with minimal pericolic fluid and hyper-vascularity. This was confirmed by computerised tomography (CT) as chronic appendicitis with micro perforations. An emergency appendectomy confirmed the diagnosis. The case report highlights critical diagnostic pitfalls: (1) Non-compressibility of the appendix, even without dilation, may indicate early pathology; (2) Antibiotic use may mask AA progression; and (3) MA and AA share overlapping sonographic features, necessitating serial imaging. Discordance with established criteria (e.g., Pokhrel's findings for AA/MA. and reliance on imaging without laboratory support further complicated the initial assessment. This report advocates for heightened clinical suspicion, standardised imaging protocols, and multidisciplinary evaluation to reduce diagnostic delays, particularly in paediatric cases where perforation risks are high. This case reinforces the need for dynamic reassessment in equivocal presentations to prevent adverse outcomes.

Keywords: acute appendicitis, mesenteric adenitis, paediatric diagnosis, ultrasound, perforation, chronic appendicitis.

Introduction

Differentiating AA from MA remains a significant diagnostic challenge in paediatric populations despite advancements in resolution of imaging modalities (Al Ghadeer et al., 2025). As the most common cause of emergency abdominal surgery in children and adolescents (Almaramhy, 2017), AA requires prompt and accurate diagnosis to prevent complications such as perforation and peritonitis. However, its clinical presentation often overlaps with mesenteric adenitis (MA), a benign inflammatory condition of the mesenteric lymph nodes (Shahba,

2024). Both conditions commonly manifest with right lower quadrant (RLQ) pain, fever, and gastrointestinal symptoms (including nausea, vomiting, etc), yet their management differs drastically: AA necessitates surgical intervention, whereas MA is typically self-limiting (Aygün, 2011).

This diagnostic overlap contributes to high misdiagnosis rates, ranging from 28% to 57% in children aged 2–12 years and approaching almost 100% in those under 2 years (Hameed, 2017; Gross et.al., 2017; Sanchez et. Al., 2016). Notably, MA is frequently identified in cases of negative appendectomies, underscoring the difficulty in distinguishing between the two conditions preoperatively (Almaramhy, 2017; Al Ghadeer et al., 2025). Misdiagnosis delays critical treatment, increasing the risk of perforation, particularly in younger children with thinner appendiceal walls and underdeveloped omenta (Hameed, 2017).

This case report emphasises the importance of systematic clinical evaluation, judicious imaging, and awareness of atypical presentations to reduce diagnostic errors. Through a paediatric case with confounding features, we highlight key discriminative findings on ultrasound and computed tomography (CT), advocate for standardised diagnostic protocols, and underscore the role of serial assessments in equivocal cases. By integrating clinical suspicion with imaging expertise, clinicians can improve diagnostic accuracy and mitigate the risks associated with delayed AA management.

Case presentation

An 11-year-old boy presented with a 3-week history of recurrent dull abdominal pain in the right lower quadrant (RLQ). A history of mild fever and loose stools was reported, but no blood test results. Initial management included a 7-day course of antibiotics (metronidazole), which temporarily alleviated his symptoms; however, pain recurred two weeks after the completion of treatment. The intermittent discomfort primarily occurred during physical activity (e.g., soccer), but did not restrict the child's mobility or daily activities. This prompted the request for an ultrasound scan of the abdomen 2 weeks after finishing the 7-day course of antibiotics.

Patient [reparation and equipment used

The patient starved for at least 6 hours but was drinking water. A DC6 Mindray machine was used.

Technique

A general abdominal survey was performed, and then a focused assessment of the right iliac region was performed to assess the appendix.

Initial ultrasound findings

An abdominal ultrasound revealed:

i) Enlarged mesenteric lymph nodes, which appeared reactive, with the most prominent lymph node measuring 6 mm in anteroposterior (AP) diameter.

ii) A non-compressible appendix (3 mm in diameter; below the diagnostic threshold of 6 mm for AA) (Images not available), and moderate vascularity.

iii) No rebound tenderness

Given these findings, mesenteric adenitis was the primary suspicion, though subclinical appendicitis could not be entirely excluded.

Follow-up ultrasound (4 weeks later)

Due to persistent mild pain, a repeat ultrasound was performed. The patient was asymptomatic at rest, but reported discomfort post-exertion (especially after school sports). The ultrasound scan was performed using a DC3 Mindray machine. Both the patient preparation and technique were the same as for the first scan.

Imaging findings included:

1) Normal liver, kidneys, pancreas, and spleen.

2) Progressive lymphadenopathy: An increased number and size of mesenteric lymph nodes, with the most prominent lymph node measuring 8.1mm in anterior-posterior diameter (Figure 1), best visualised with a 5 MHz linear probe.

3) RLQ Abnormalities:

   a) A dilated, blind-ended tubular structure (5.9mm to 8.3 mm diameter) with adjacent normal peristalsis Figure 2, 3, 4.
   b) Non-compressibility, focal wall perforations, and minimal pericolic free fluid.
   c) Severe rebound tenderness on palpation.
   d) Hypervascularity surrounding the structure.

These findings raised concern for chronic appendicitis with early perforation, prompting urgent CT confirmation.

CT & surgical outcome

CT corroborated chronic appendicitis with micro perforations (images not available). The patient underwent emergency appendectomy with a successful postoperative recovery.

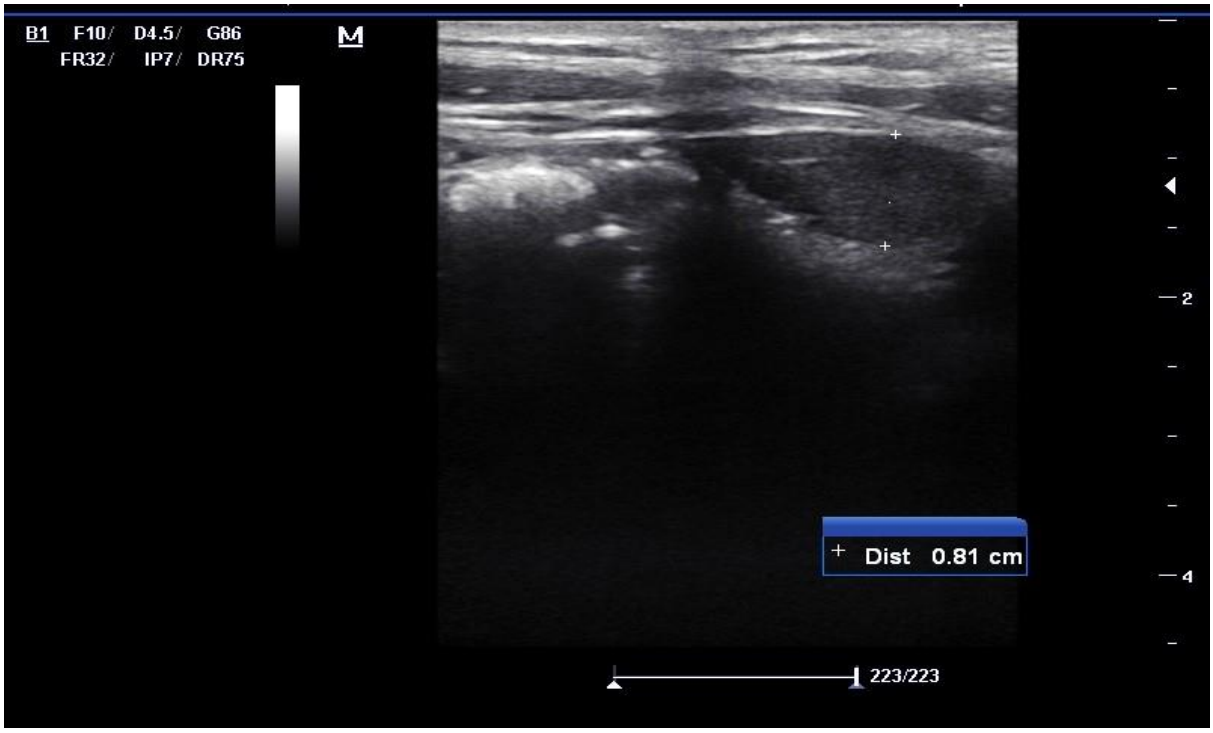

Figure 1: Enlarged mesenteric lymph nodes

Figure 2: Blind ended dilated non-compressible bowel

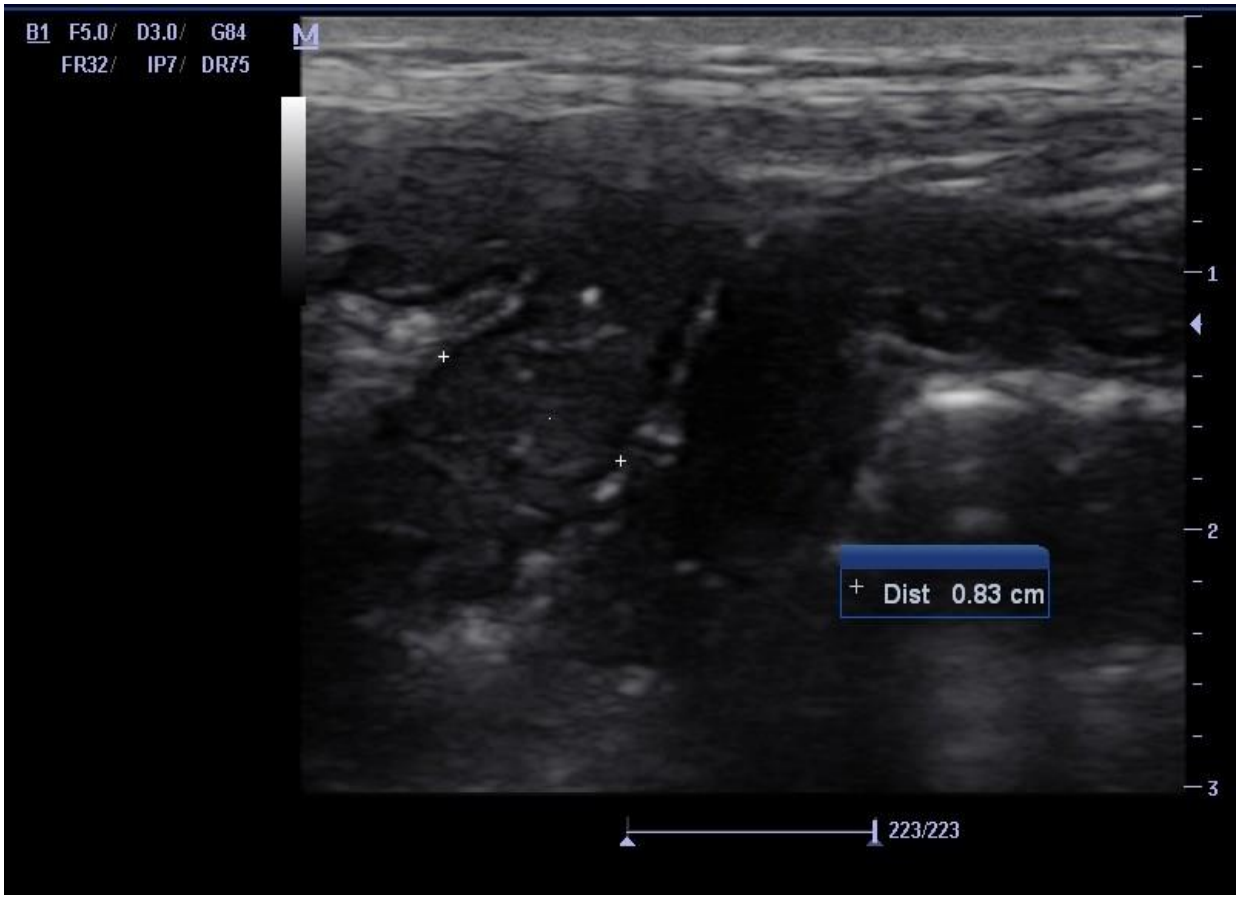

Figure 3: Longitudinal section of dilated bowel with perforations

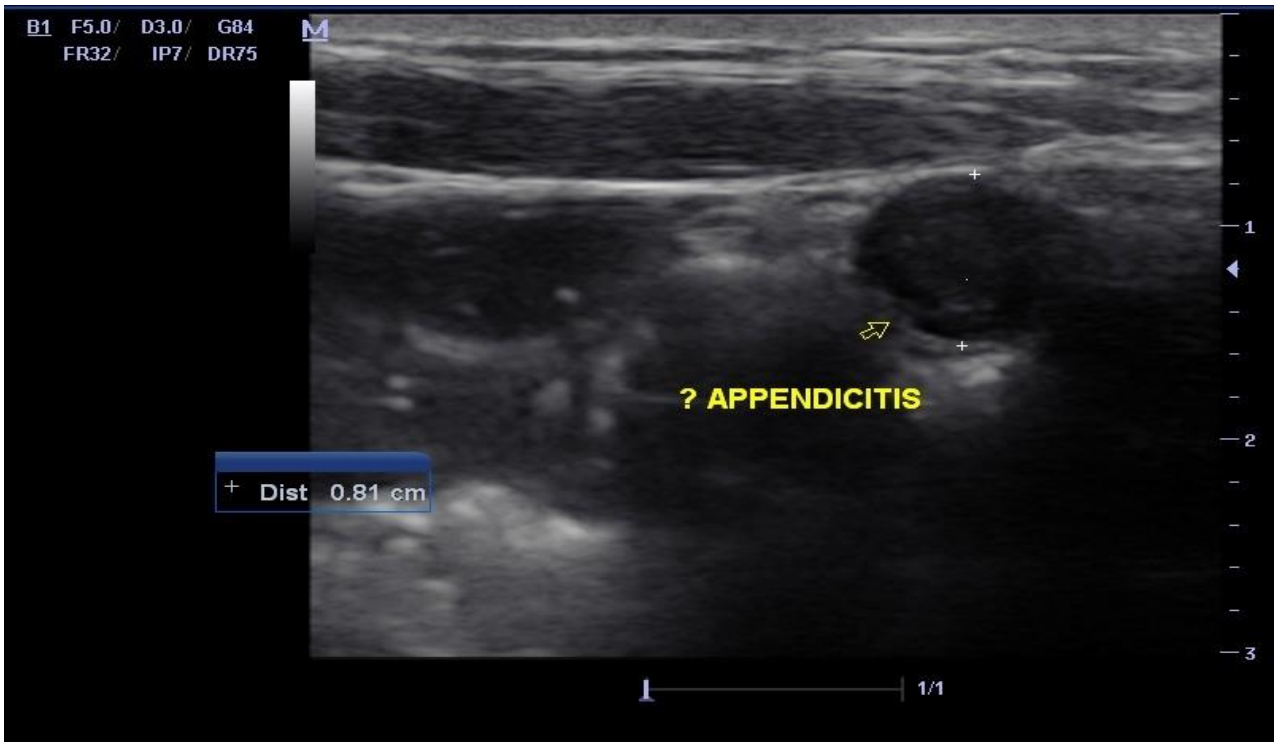

Figure 4: Transverse section of dilated appendix

Discussion

This case illustrates the diagnostic challenges in differentiating AA from MA in paediatric patients. In this case, the initial ultrasound findings: a non-compressible but normo-calibre appendix (3 mm) and enlarged lymph nodes suggested MA, aligning partially with Pokhrel's (2020) criteria for MA (≥3 lymph nodes, short axis >5 mm). However, the non-compressibility of the appendix, though below the 6 mm diagnostic threshold for AA (Park et al., 2011), raised concern for early pathology. As highlighted by surgical consultation, a non-compressible appendix, even without dilation, may indicate fibrosis and loss of elasticity, predisposing to rupture (Quigley & Stafrace 2013). This underscores the limitation of relying solely on diameter-based criteria and emphasises the need for dynamic sonographic assessment (e.g., compressibility, vascularity).

The initial antibiotic therapy may have masked appendiceal dilation, delaying a definitive diagnosis during the first ultrasound scanning procedure (Yadao, Lamture & Huse 2022). Follow-up imaging revealed progression to a dilated (8.3mm), perforated appendix with pericolic fluid, meeting Pokhrel's (2020) criteria for acute appendicitis (blind-ended tube >7 mm, target sign, pericolic fluid). The concurrent lymphadenopathy further complicated the situation, as MA and appendicitis often coexist, while simultaneously increasing the suspicion of appendicitis (Shahba, 2024). Notably, perforation rates in paediatric appendicitis range from 9% to 76%, with higher risks in younger children due to delayed presentation and thinner appendiceal walls (Withers, 2019).

Chronic appendicitis, as seen here, presents additional diagnostic challenges due to nonspecific symptoms and variable imaging findings (Brodzisz et al., 2022). While imaging is crucial, overreliance on it without complementary laboratory tests (e.g., CRP, WBC) may delay diagnosis (Saeedi & Langarizadeh, 2016). In this instance, the patient did not provide any laboratory tests to the ultrasound scan department. This case emphasises the importance of serial evaluations and multimodal assessment in equivocal presentations.

Conclusion

This report underscores the diagnostic pitfalls in paediatric AA, particularly when overlapping with MA and when initial imaging is inconclusive. Key lessons include: 1. Non-compressibility of the appendix is an early sign of appendiceal pathology, even without dilation. 2. The need for serial imaging in persistent symptoms, as findings may evolve. 3. The value of standardised protocols integrating clinical, laboratory, and sonographic criteria to reduce misdiagnosis.

Vigilance and a low threshold for re-evaluation are critical to prevent perforation and optimise outcomes in paediatric abdominal emergencies.

Clinicians should also utilise the Appendicitis Score and/or Alvarado Score, which are established clinical assessments. Since such assessments are not conducted in the ultrasound department, they were not included in the case report.

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