
Perforated Retrocecal Appendicitis Despite Inconclusive Ultrasonography: The Role Of Integrated Clinical Assessment And Reassessment—A Case Report

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Abstract

Acute appendicitis is a dynamic disease process, and clinical findings may evolve during diagnostic evaluation. Ultrasonography (US) is often used as the initial imaging modality; however, nonvisualization of the appendix is an inconclusive finding and cannot, by itself, exclude appendicitis. Therefore, while awaiting further investigations or when imaging remains nondiagnostic, clinical reassessment is essential for detecting changes in the patient's condition. A 56-year-old woman presented with progressive abdominal pain that began in the epigastrium and subsequently localized to the right lower quadrant, accompanied by nausea and vomiting. On initial evaluation, she was hemodynamically stable but tachycardic, with right lower quadrant tenderness, positive psoas and Rovsing signs, and leukocytosis of $18.84 \times 10^9/L$, without rebound tenderness or abdominal guarding. The patient underwent clinical observation and further investigation. Abdominal ultrasonography performed the following morning demonstrated mild localized ileus in the right abdomen; however, the appendix and ileocecal region could not be visualized. Subsequent reassessment revealed new-onset abdominal distension, tenderness at McBurney's point and in the suprapubic region, rebound tenderness, and lower abdominal guarding. Given the progression of these clinical findings, peritonitis secondary to perforated appendicitis was suspected, and emergency exploratory laparotomy was performed. Intraoperatively, a gangrenous retrocecal appendix was identified, with perforations in the midportion and at the base, accompanied by purulent fluid in the right paracolic gutter and pelvis. Retrograde appendectomy, peritoneal irrigation, and drain placement were performed. Histopathological examination confirmed perforated appendicitis, and the postoperative course was favorable. Nonvisualization of the appendix on ultrasonography does not exclude appendicitis, particularly when clinical findings continue to support the diagnosis. This case highlights the importance of integrating imaging findings with ongoing clinical assessment during the diagnostic evaluation period. Serial reassessment of symptoms and abdominal examination findings is essential for detecting changes in clinical status and determining the need for timely escalation to definitive treatment.

Keywords: Perforated Appendicitis; Retrocecal Appendicitis; Ultrasonography; Nonvisualized Appendix; Reassessment.

INTRODUCTION

Acute appendicitis is one of the most common abdominal surgical emergencies in adults. Its clinical spectrum ranges from uncomplicated inflammation to gangrene, perforation, abscess formation, and secondary peritonitis. Because the pathological process is dynamic, findings on the initial examination may evolve within hours as inflammation progresses to necrosis and perforation. Accordingly, the diagnosis of appendicitis requires integration of the clinical history, physical examination, laboratory findings, imaging results, and serial reassessment in accordance with the patient's clinical course (Moris et al., 2021; Podda et al., 2026; Kumar et al., 2024; Salö et al., 2025).

Ultrasonography (US) is commonly used as the initial imaging modality because it does not involve ionizing radiation, is relatively accessible, and allows direct assessment of the area of maximal tenderness. However, its diagnostic performance is influenced by operator experience, patient habitus, bowel gas, the anatomical position of the appendix, and disease severity. When the appendix cannot be visualized, nonvisualization should be regarded as an indeterminate finding rather than as evidence of a normal appendix. Such findings must be interpreted in conjunction with the pretest clinical probability, laboratory results, secondary ultrasonographic signs, and changes in clinical status, because

nonvisualization alone cannot exclude appendicitis. A retrocecal position, as well as morphological changes associated with gangrene or perforation, may further limit visualization of the appendix (Kumar et al., 2024; Comune et al., 2024; Arruzza et al., 2022; Lock & Necas, 2026; Ulutas et al., 2025; Ramji et al., 2026).

Changes in clinical status during observation are an important component of the evaluation of patients with suspected appendicitis. While awaiting imaging or following an inconclusive imaging result, reassessment allows comparison of current findings with those documented previously. Studies of active observation have shown that patients with an uncertain diagnosis of appendicitis can be reassessed over time, with escalation to intervention if their clinical condition worsens. The development of rebound tenderness, abdominal guarding, or other signs of peritonitis should prompt urgent surgical evaluation to avoid delays in definitive treatment (Podda et al., 2026; Salö et al., 2025; Luksaite-Lukste et al., 2024; Lastunen et al., 2022).

In women presenting with right lower quadrant pain, gastrointestinal, urological, and gynecological differential diagnoses should also be considered. In hemodynamically stable adults, computed tomography (CT) may be appropriate after inconclusive ultrasonography. However, once signs of peritonitis develop, further diagnostic investigations should not delay resuscitation and surgical evaluation (Henrichsen et al., 2021; Dick et al., 2025; Kambadakone et al., 2022; Bonomo et al., 2024). This case report describes a 56-year-old woman with perforated gangrenous retrocecal appendicitis, a nonvisualized appendix on ultrasonography, and newly developed signs of peritoneal irritation on reassessment. The case illustrates how evolving clinical findings during the diagnostic process should be used to revise diagnostic probability and guide timely escalation to surgical management.

Case Presentation

A 56-year-old woman presented to the emergency department at 18:06 Western Indonesia Time (WIB) with abdominal pain that had worsened over the preceding two hours. The pain was initially dull, rated 5/10 on the visual analog scale (VAS), and predominantly located in the upper abdomen; consequently, the patient initially attributed her symptoms to a gastric disorder. She was unable to clearly confirm migration of the pain from the epigastrium to the right lower quadrant. The pain subsequently became sharp and persistent, increasing in intensity to a VAS score of 9/10. She had taken paracetamol without symptomatic improvement. The pain was accompanied by nausea, a single episode of vomiting of yellowish gastric contents containing food remnants without blood, and a subjective mild fever that had not been objectively measured. She denied changes in bowel habits, dysuria, increased urinary frequency, hematuria, or flank pain. Her medical history was negative for hypertension, diabetes mellitus, previous surgery, and drug or food allergies. She reported a history of recurrent epigastric pain and had undergone menopause three years earlier.

On physical examination in the emergency department, the patient was fully conscious, with a Glasgow Coma Scale (GCS) score of 15. Her body weight was 62 kg and her height was 160 cm. Blood pressure was 100/70 mmHg, heart rate 112 beats/min, respiratory rate 22 breaths/min, body temperature 37.7 °C, and peripheral oxygen saturation 99% on room air. Capillary refill time was less than 2 seconds, and no peripheral edema was present. Cardiopulmonary examination revealed a regular heart rhythm without additional heart sounds and bilateral vesicular breath sounds without crackles or wheezing. Abdominal examination showed no distension, palpable mass, or guarding. Tenderness was present in the epigastric region and right lower quadrant, with positive psoas and Rovsing signs. At that time, there was no rebound tenderness or other evidence of peritoneal irritation. The combination of right lower quadrant pain, tachycardia, and positive provocative signs raised suspicion of an intra-abdominal inflammatory process. The differential diagnoses included

acute appendicitis, urinary tract infection, and gynecological pathology. The patient was therefore admitted for clinical observation and further diagnostic evaluation.

Ancillary investigations performed in the emergency department included a complete blood count and urinalysis. The complete blood count revealed leukocytosis of $18.84 \times 10^9/L$, while hemoglobin concentration, hematocrit, platelet count, and random blood glucose were within clinically acceptable ranges. Urinalysis demonstrated pyuria, positive leukocyte esterase, and mild bacteriuria, with negative nitrites and no hematuria (Table 1).

Table 1. Initial Laboratory Findings

Examination	Result	Reference range/interpretation
Hemoglobin	123 g/L	120–160 g/L
White blood cell count	$18.84 \times 10^9/L$	$5.0\text{--}10.0 \times 10^9/L$
Hematocrit	0.37 L/L	0.36–0.46 L/L
Platelet count	$222 \times 10^9/L$	$150\text{--}400 \times 10^9/L$
Random blood glucose	4.8 mmol/L	3.9–11.1 mmol/L
Urine color	Yellow	–
Urine clarity	Turbid	Abnormal
Urine specific gravity	1.021	–
Urine protein	1+	Mild proteinuria
Leukocyte esterase	2+	Positive
Urine leukocytes	17–18/high-power field	Pyuria
Urine bacteria	1+	Mild bacteriuria
Urine nitrite	Negative	–
Urine blood/erythrocytes	Negative	No hematuria

Based on these findings, the patient was admitted and referred for further evaluation by an internist and a surgeon. The internist requested abdominal ultrasonography, which was scheduled for the following morning. Initial management included intravenous Ringer’s lactate at 20 drops/min, ceftriaxone 1 g intravenously every 12 hours, ranitidine 50 mg every 12 hours, and paracetamol 500 mg every 8 hours. Following admission, the antimicrobial regimen was modified to ceftriaxone 2 g intravenously every 24 hours and metronidazole 500 mg intravenously every 8 hours to provide coverage against enteric gram-negative and anaerobic organisms.

The following morning, abdominal ultrasonography was performed at 07:40 WIB. The examination demonstrated mild dilatation of bowel loops in the right abdomen, consistent with localized ileus, without evidence of free intra-abdominal fluid. The appendix and ileocecal region could not be visualized. Mild diffuse hepatic steatosis was also noted, while the kidneys, urinary bladder, uterus, and both adnexa showed no clinically significant

abnormalities. The formal ultrasonography report became available at 08:30 WIB and was subsequently communicated to the surgeon.

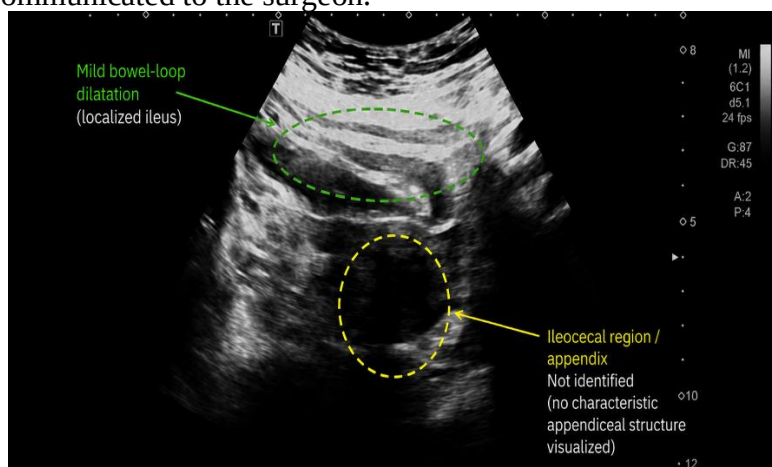


Figure 1. Abdominal Ultrasonography

At approximately 09:00 WIB, shortly after the ultrasonography report became available, the patient was reassessed during the surgeon's morning rounds. The examination revealed clinically significant changes. Tenderness was more pronounced at McBurney's point and in the suprapubic region, with newly developed rebound tenderness. Abdominal guarding was also present in both lower quadrants, and percussion elicited tenderness bilaterally. These findings indicated the development of peritoneal irritation, which had not been present on the initial examination. Given the progression of the physical findings, together with the preceding clinical suspicion of appendicitis and the presence of leukocytosis, the surgeon diagnosed peritonitis secondary to suspected perforated appendicitis and planned an urgent exploratory laparotomy.

Exploration through a midline abdominal incision revealed a minimal amount of seropurulent fluid after the peritoneum was opened. Further exploration identified a retrocecal, gangrenous appendix in its middle portion and at its base. Approximately 50 mL of purulent fluid was present in the right paracolic gutter and pelvic cavity. Because the retrocecal position made conventional mobilization of the appendix difficult, a retrograde appendectomy was performed. Based on these findings, perforated gangrenous retrocecal appendicitis with secondary peritonitis was diagnosed. Histopathological examination confirmed perforated appendicitis.

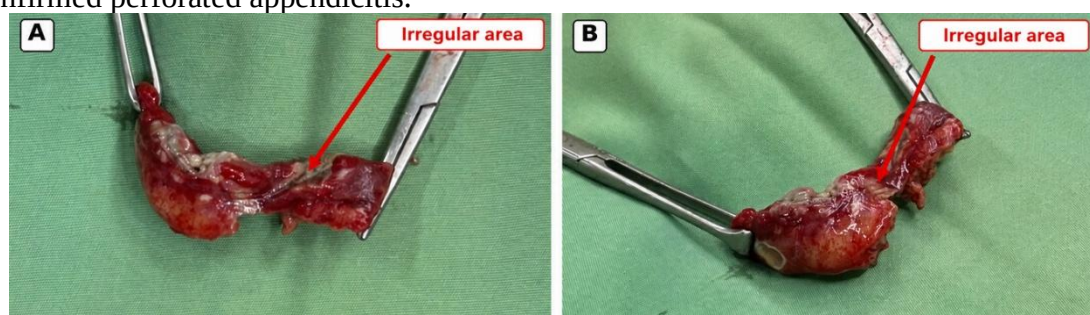


Figure 2. Macroscopic appearance of the resected appendix in two views (A–B). The red arrows indicate macroscopically irregular areas corresponding to the perforation sites described during surgery

The patient received postoperative care for four days. On postoperative day 1, she remained hemodynamically stable but had not yet passed flatus. Urine output through the urinary catheter was adequate, and the intraperitoneal drain produced no output. Ceftriaxone and metronidazole were continued, along with analgesics, intravenous fluids, and supportive care. Oral intake was gradually reintroduced after the return of bowel sounds.

On postoperative day 2, the patient was able to mobilize with assistance and tolerated a soft diet. The intraperitoneal drain remained nonproductive. On postoperative day 3, both the intraperitoneal drain and urinary catheter were removed, and the patient was able to ambulate independently. She remained afebrile throughout the postoperative period and showed no evidence of clinical deterioration. On postoperative day 4, the patient was asymptomatic, hemodynamically stable, and considered fit for discharge. She was discharged with oral antibiotics, analgesics, and supportive medications.

At the outpatient follow-up visit, the patient was fully conscious and afebrile. Her blood pressure was 110/80 mmHg, pulse rate 78 beats/min, respiratory rate 18 breaths/min, and temperature 36.1 °C. Local examination showed that the surgical wound was dry, without pus or hyperemia, and there were no signs of surgical-site infection. The abdominal wall sutures were subsequently removed.

Discussion

Acute appendicitis is not diagnosed on the basis of a single examination but rather through integration of the clinical history, physical examination, laboratory findings, and imaging results (Moris et al., 2021; Podda et al., 2026; Kumar et al., 2024; Salö et al., 2025). In this patient, appendicitis was suspected during the initial emergency department evaluation because of right lower quadrant pain, tachycardia, leukocytosis of $18.84 \times 10^9/L$, and positive psoas and Rovsing signs, despite the absence of peritoneal signs. Appendectomy was not performed at that stage because the diagnosis remained uncertain, the patient was hemodynamically stable, and there were no signs of peritonitis or other indications for immediate surgical intervention. Clinical reassessment was therefore appropriate to identify either improvement or progression of the disease (Podda et al., 2026; Luksaite-Lukste et al., 2024; Lastunen et al., 2022).

In this patient, ultrasonography was performed to address the limitations of the initial clinical assessment and to evaluate alternative causes of right lower quadrant abdominal pain. Although the patient was postmenopausal, gynecological differential diagnoses still warranted consideration, particularly adnexal torsion, complications of ovarian cysts, pelvic inflammatory disease, and ovarian neoplasms (Henrichsen et al., 2021; Dick et al., 2025). Other differential diagnoses included ureteral calculi and urinary tract infection of urological origin, as well as right-sided colonic diverticulitis, ileitis, and colitis of gastrointestinal origin. Abdominal and pelvic ultrasonography can assist in evaluating the uterus, adnexa, urinary tract, free intraperitoneal fluid, and selected bowel abnormalities; therefore, its role extends beyond the detection of appendicitis (Moris et al., 2021; Kumar et al., 2024; Henrichsen et al., 2021; Dick et al., 2025; Kambadakone et al., 2022). However, the limited diagnostic accuracy of ultrasonography and nonvisualization of the appendix do not exclude appendicitis. Imaging findings must therefore be interpreted in conjunction with the clinical history, physical examination, laboratory results, and the patient's evolving clinical course (Comune et al., 2024; Ulutas et al., 2025; Ramji et al., 2026).

In clinical practice, diagnostic evaluation may be influenced by the availability and timing of ancillary investigations. In this case, progression of the disease during the interval between the initial emergency department assessment and reassessment the following morning underscores the importance of structured clinical reassessment. Findings from the initial examination provide a baseline for comparison, including changes in the character and severity of pain, vital signs, abdominal distension, the distribution and intensity of tenderness, and the development of rebound tenderness, abdominal guarding, or other signs of peritoneal irritation. In patients with suspected appendicitis in whom the diagnosis remains uncertain, abdominal examination and inflammatory markers may be repeated within 4–8 hours, or earlier if clinical deterioration occurs (Salö et al., 2025; Luksaite-Lukste et al., 2024; Lastunen et al., 2022). If signs of peritoneal irritation or clinical deterioration

develop, urgent surgical evaluation should be undertaken without waiting for scheduled imaging (Podda et al., 2026; Salö et al., 2025; Kambadakone et al., 2022; Bonomo et al., 2024). Thus, reassessment functions as an important safety measure while diagnostic uncertainty persists.

Ultrasonography performed the following morning demonstrated mild localized ileus in the right abdomen; however, the appendix and ileocecal region could not be visualized. Nonvisualization of the appendix on ultrasonography should not be interpreted as evidence of a normal appendix; rather, it represents an indeterminate finding that can neither confirm nor exclude appendicitis. A meta-analysis reported a sensitivity of approximately 82.1% for ultrasonography in the diagnosis of appendicitis. Another study found that approximately 8.5% of adults with a nonvisualized appendix on ultrasonography were subsequently confirmed to have appendicitis on pathological examination. The negative predictive value of indeterminate ultrasonography is generally reported to be 80–90% and is higher when the clinical probability of appendicitis is low and no secondary ultrasonographic signs of inflammation are present. This differs from the present case, in which the initial clinical findings and inflammatory features supported the possibility of appendicitis, while localized ileus on ultrasonography represented an additional secondary finding. The retrocecal position of the appendix, together with morphological changes associated with gangrene and perforation identified intraoperatively, may also have contributed to the difficulty in visualization. However, because computed tomography (CT) was not performed before surgery, the relative contribution of these factors to the failed ultrasonographic visualization cannot be determined with certainty (Comune et al., 2024; Arruzza et al., 2022; Lock & Necas, 2026; Ulutas et al., 2025; Ramji et al., 2026).

Changes in the physical examination findings the following morning illustrate why diagnostic probability must be continually reassessed (Moris et al., 2021; Podda et al., 2026; Kumar et al., 2024; Salö et al., 2025). During the initial emergency department evaluation, the abdomen was not distended, and neither rebound tenderness nor abdominal guarding was present. In contrast, during surgical reassessment at approximately 09:00 the following morning, the abdomen was more distended, with marked tenderness at McBurney's point and in the suprapubic region, newly developed rebound tenderness, guarding of both lower quadrants, and pain elicited by percussion. Although this reassessment occurred after the ultrasonography results became available, its diagnostic significance lay in the change from the initial examination. The emergence of peritoneal signs increased suspicion of complicated appendicitis and prompted escalation to exploratory laparotomy. In hemodynamically stable adults, computed tomography (CT) may be considered when ultrasonography is inconclusive; however, once signs of peritonitis develop, further diagnostic investigations should not delay surgical evaluation and definitive treatment (Kambadakone et al., 2022; Bonomo et al., 2024). The intraoperative findings of a gangrenous retrocecal appendix with perforations in the midportion and at the base, together with approximately 50 mL of purulent fluid in the right paracolic gutter and pelvis, were consistent with the clinical progression observed during reassessment.

This case illustrates the importance of monitoring changes in clinical status in two situations: while imaging is still pending and after imaging has been performed but remains inconclusive. Both circumstances require continued clinical reassessment. Imaging remains an important component of the diagnostic evaluation of appendicitis; however, its findings must be interpreted in conjunction with the clinical examination and the patient's evolving condition (Moris et al., 2021; Podda et al., 2026; Kumar et al., 2024; Salö et al., 2025; Comune et al., 2024; Ramji et al., 2026). Clinical reassessment serves as an important safety measure for detecting disease progression both while imaging is pending and when imaging findings are nondiagnostic. The key lesson from this case is that reassessment should

continue throughout the diagnostic process, particularly when imaging is delayed or inconclusive (Podda et al., 2026; Salö et al., 2025; Luksaite-Lukste et al., 2024; Lastunen et al., 2022).

CONCLUSION

This case illustrates that acute appendicitis is a dynamic disease process that may progress during diagnostic evaluation. Nonvisualization of the appendix on ultrasonography does not exclude appendicitis, particularly when clinical suspicion remains high. Clinical reassessment is therefore essential both while imaging is pending and when imaging findings are inconclusive, allowing early recognition of deterioration and timely escalation to definitive treatment.

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