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Delayed Diagnosis of Acute Appendicitis Leading to Generalized Peritonitis and Postoperative Acute Kidney Injury: a case report

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Case Report

Keywords: Appendicitis, Peritonitis, Acute kidney injury, Furosemide challenge, Delayed diagnosis

Posted Date: April 3rd, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9270209/v1

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Additional Declarations: No competing interests reported.

Abstract

Background

Delayed diagnosis of acute appendicitis can lead to severe complications, including peritonitis and organ dysfunction.

Case Presentation

We report a 17-year-old male initially misdiagnosed with Acute gastritis who presented two weeks later with generalized peritonitis due to perforated appendicitis. Following emergency laparotomy and appendectomy, he developed postoperative acute kidney injury. A furosemide challenge test demonstrated preserved renal function, allowing successful conservative management. The patient showed progressive clinical improvement with recovery of renal function and was discharged in stable condition.

Conclusion

This case highlights the consequences of delayed diagnosis and suggests a potential role for the furosemide challenge test in guiding management of postoperative acute kidney injury.

Introduction

Acute appendicitis remains one of the most frequently encountered surgical emergencies, with a lifetime risk estimated at around 7–8% [1]. In most cases, early diagnosis followed by timely surgical intervention leads to good outcomes. However, delays in presentation or diagnosis can result in disease progression, increasing the risk of complications such as perforation, appendiceal phlegmon or abscess, and generalized peritonitis[2]. These complications are associated with significantly higher morbidity and a more complicated clinical course. Generalized peritonitis due to perforated appendicitis represents a severe form of intra-abdominal sepsis and is often accompanied by hemodynamic instability and systemic inflammatory response[3]. In this setting, patients are at increased risk of developing postoperative complications, including acute kidney injury (AKI). The development of AKI is usually multifactorial, commonly related to a combination of hypovolemia, sepsis-induced renal hypoperfusion, and inflammatory injury to the renal tubules[4].

Early identification of AKI in the postoperative period can be challenging, as traditional markers such as serum creatinine may not rise until significant renal impairment has already occurred.[5]. In recent years, the furosemide stress test has been proposed as a useful bedside tool to assess renal tubular function and help predict the progression of AKI, allowing for earlier risk stratification and management decisions.[6].

We report the case of a 17-year-old male patient with delayed diagnosis of acute appendicitis complicated by generalized peritonitis and subsequent postoperative AKI. This case highlights the

clinical impact of delayed presentation and underscores the importance of early functional assessment of renal injury in guiding management.

Case Presentation

A 17-year-old male patient with no contributive past medical history consulted at our health facility with a two-week history of worsening abdominal pain. The pain initially started in the epigastric and periumbilical regions but later became generalized, accompanied by fever, vomiting, and reduced oral intake.

He had previously consulted in another health facility, with similar symptoms, and was diagnosed with acute gastritis. An abdominal ultrasound showed a mildly gassy abdomen; otherwise, it was normal. He was prescribed medications and sent home. However, the symptoms did not improve and gradually worsened, prompting the patient to seek another consultation in our health facility.

On admission, the patient appeared ill, with fever (38.5 degrees Celsius), tachycardia (100 beats per minute), and blood pressure was 100/55 mmHg, with mild signs of dehydration. An abdominal examination revealed generalized tenderness on palpation, more localized at the right iliac fossa, guarding, and rebound tenderness. Based on the clinical findings, a presumptive diagnosis of generalized peritonitis secondary to appendicular abscess was made, with a differential diagnosis of perforated peptic ulcer.

Laboratory investigations were performed, and a full blood count showed leukocytosis with neutrophilia; CRP was markedly elevated (180mg/l). Urinalysis and Hemoglobin level were normal. Baseline renal function was not assessed preoperatively. Abdominal ultrasound demonstrated free intraperitoneal fluid, inflamed bowel loops, and a heterogeneous mass in the right iliac fossa. In the context of the clinical findings, a working diagnosis of complicated appendicitis with appendicular abscess and generalized peritonitis was made.

The patient was resuscitated with intravenous fluids, nil per os, and commenced on broad-spectrum antibiotics. After approximately 24 hours of initial stabilization, he was counseled for surgery and underwent pre-anesthetic evaluation. Emergency exploratory laparotomy was performed. Intraoperative findings showed diffuse purulent contamination of the peritoneal cavity. The appendix was gangrenous and perforated, with areas of necrosis and disruption of the appendiceal wall **(Figure 1).**

Surrounding fibrinous exudate and inflammatory changes were also observed, as shown in **Figure 2.**

An appendectomy was performed, followed by thorough peritoneal lavage with warm normal saline. After lavage, the bowel loops appeared significantly inflamed and edematous, with diffuse serosal congestion, indicating generalized peritonitis **(Figure 3).**

The abdominal wall was then closed in layers.

Postoperatively, the patient was placed on IV fluids, broad-spectrum antibiotics, Nil per os, and was closely monitored. Day 1 and Day 2 post-surgery were unremarkable.

On postoperative day 3, the patient developed reduced urine output (oliguria) despite adequate IV fluid therapy. Serum creatinine and electrolytes were assessed to evaluate kidney function. Serum creatinine was elevated above the normal range, consistent with acute kidney injury, and serum electrolytes were unremarkable.

A furosemide challenge test was performed with 40 mg of intravenous furosemide to assess renal tubular function, and urine output was monitored over the subsequent hours—the response to the challenge supported continued conservative management with fluid optimization and close monitoring of renal function. Over the following days, the patient showed gradual clinical improvement, with recovery of urine output and stabilization of renal function. Gastrointestinal function also improved, with the return of bowel sounds and passage of flatus. Oral intake was gradually reintroduced, starting with semi-solid feeds, which were well tolerated.

The patient remained hemodynamically stable and was discharged on postoperative day ten in good condition. He was counseled on proper feeding and wound care and advised to avoid strenuous physical activity for at least three months. The patient's clinical course and laboratory trends are summarized in **Table 1**.

Table 1. Laboratory Trends and Clinical Course

Time Point	WBC (×10⁹/L, 4–11)	CRP (mg/L, <5)	Creatinine (mg/dL, 0.6–1.2)	Urine Output (mL/kg/h, >0.5)	Clinical Notes
Admission	17.8	180	Not done	Normal	Generalized peritonitis
Post-op Day 3	14.2	96	2.1	0.3	Acute kidney injury
After Furosemide	—	—	—	1.2	Responsive to diuretic
Discharge	10.0	24	1.1	Normal	Clinically stable, tolerating oral feeds

Values are presented with standard reference ranges in parentheses. WBC: white blood cell count; CRP: C-reactive protein

Discussion

Acute appendicitis is a common surgical emergency, and diagnosing it early helps prevent complications[7]. In our case, the initial diagnosis was acute gastritis, diagnosed in another health

facility, and the ultrasound did not provide clear results. This probably delayed proper treatment, leading to rupture and subsequently generalized peritonitis. Early imaging is not always helpful, especially if bowel gas is present, but if symptoms persist or worsen, the diagnosis should be reassessed. This case highlights the importance of performing thorough clinical examinations rather than relying solely on laboratory findings. Furthermore, upon the patient's arrival at our health facility, additional clinical and laboratory investigations were performed, including a repeat ultrasound, which subsequently confirmed the diagnosis and guided prompt surgical intervention. The delay in the initial diagnosis of acute appendicitis led to the development of appendicular abscess and subsequently generalized peritonitis. Previous studies have shown that delayed presentation is often due to misdiagnosis[8]. Delayed diagnosis of appendicitis (typically hours) significantly increases risks of rupture (perforation), abscess formation, and severe peritonitis. These complications can cause sepsis, extended hospital stays, the need for open surgery rather than laparoscopy, infertility in women, and long-term abdominal adhesions[9].

Several factors explain why this patient developed acute kidney injury (AKI). Generalized peritonitis causes a systemic inflammatory response, often accompanied by hypovolemia and reduced renal blood flow. Sepsis can also directly damage the kidney tubules. Although we did not know the patient’s baseline kidney function, the drop in urine output and rise in creatinine after surgery were consistent with AKI. This is a common problem in emergencies, where the main focus is on stabilizing the patient and managing surgery.

Waiting about 24 hours for resuscitation before surgery in this patient demonstrated a balanced approach. Surgery is urgent in generalized peritonitis, but ensuring the patient's stability first helps reduce risks. In this case, starting with resuscitation and then performing an exploratory laparotomy to control the infection was the right decision and aligns with current guidelines for treating intra-abdominal sepsis. [10].

The use of the furosemide challenge test in this setting provided additional insight into renal function. Although not routinely used in surgical practice, it can be a helpful bedside tool in selected patients with evolving AKI. A good urine output response suggests preserved tubular function and supports conservative management, whereas a poor response may indicate more severe renal injury requiring escalation of care.[11]. In this patient, the observed response to furosemide supported continued fluid optimization and close monitoring, without the need for further intervention.

This case illustrates the progression of delayed appendicitis to severe systemic complications, including postoperative acute kidney injury, and highlights the practical use of the furosemide challenge test in guiding renal management in a surgical setting, an approach that remains underreported in the literature.

Conclusion

Delayed diagnosis of acute appendicitis can result in significant complications, including appendicular abscess, generalized peritonitis, and postoperative acute kidney injury. This case highlights the

importance of maintaining a high index of suspicion in patients with persistent abdominal symptoms, even when initial investigations are inconclusive. Early resuscitation followed by timely surgical intervention remains essential in the management of complicated intra-abdominal sepsis. In addition, the furosemide challenge test may serve as a simple and practical bedside tool for assessing renal function and guiding conservative management in patients with acute kidney injury.

Abbreviations

AKI
Acute Kidney Injury

Declarations

Consent to Participate: Written informed consent was obtained from the patient's parent/legal guardian for participation in this case report. Consent for Publication: Written informed consent was obtained from the patient's parent/legal guardian for the publication of this case report and any accompanying images. All reasonable efforts have been made to protect the patient's identity.

Author Contributions: CA managed the patient and wrote the first draft of the manuscript; KFBI and AGM critically reviewed and revised the manuscript. All authors read and approved the final manuscript.

Ethical Approval Statement: This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the Solidarity Clinic Local Research Committee. Written informed consent was obtained from the patient.

Consent to Participate: Written informed consent was obtained from the patient's parent/legal guardian for participation in this case report.

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Availability of data and materials: Data sharing does not apply to this article, as no datasets were generated or analyzed during the current study.

Competing interests: All authors declare no conflict of interest.

Funding Source: This research did not receive any specific grant from funding agencies in the public, commercial, or non-profit sectors.

Acknowledgments: We sincerely acknowledge the operating theatre team and the entire staff of Solidarity Clinic Buea, Cameroon, for their prompt intervention and contributions to the management of this patient.

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Figures

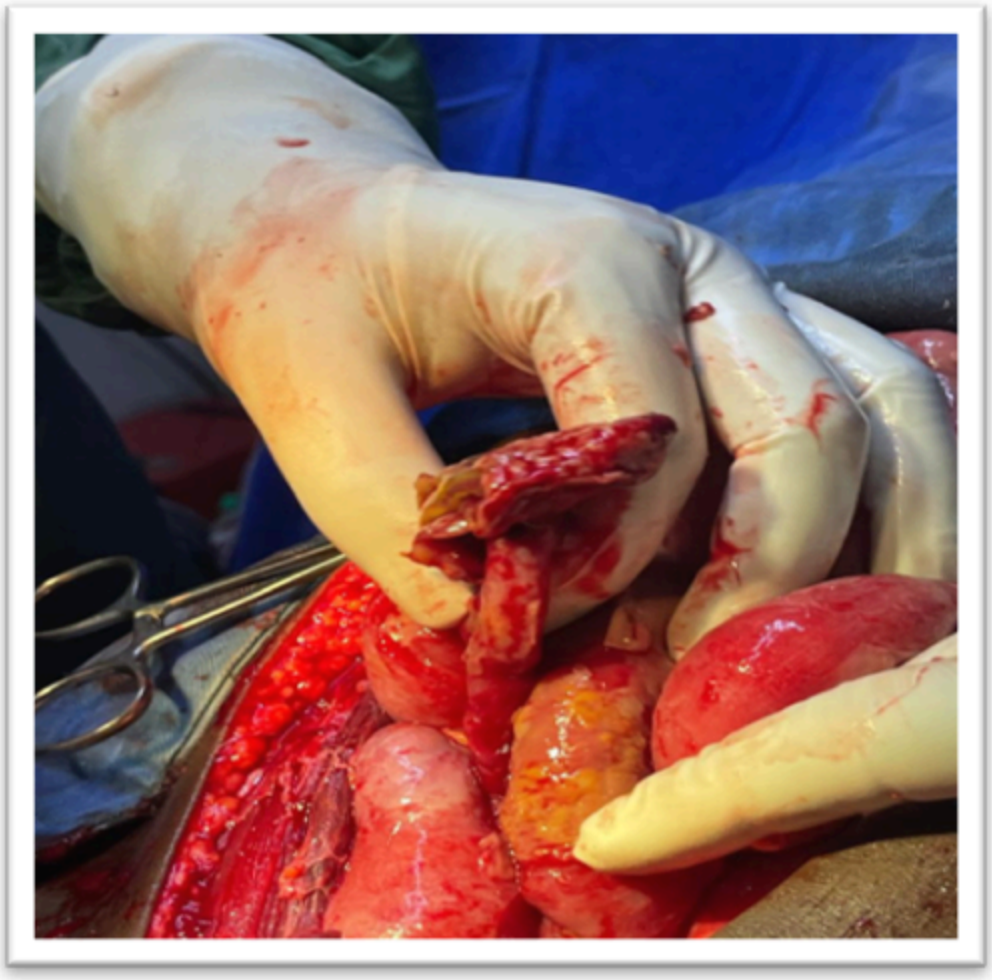


Figure 1

Intraoperative image demonstrating a gangrenous and perforated appendix with areas of necrosis and disruption of the appendiceal wall, consistent with advanced appendicitis.



Figure 2

Intraoperative image depicting a gangrenous appendix with necrotic areas and surrounding fibrinous exudate, indicative of advanced inflammatory changes.

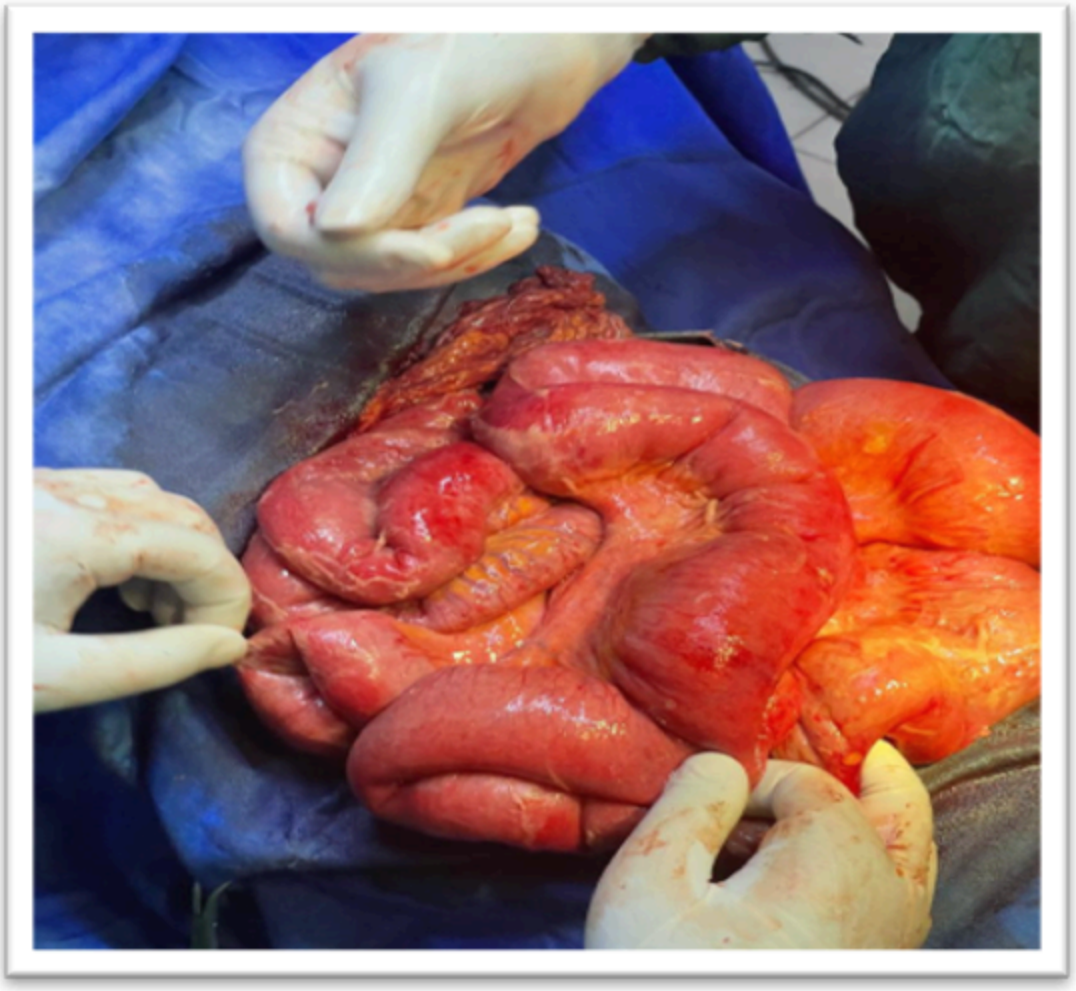


Figure 3

Intraoperative image following peritoneal lavage with warm normal saline, demonstrating markedly inflamed and edematous bowel loops with diffuse serosal congestion, consistent with generalized peritonitis.