



# Acute Perforated Appendicitis Due to *Shigella flexneri*; A Rare Case Report

Sanaz Soleimani<sup>1</sup>, Ramin Zare-Mahmoudabadi <sup>2</sup>, Maryam Vafapour <sup>3,\*</sup>, Majid Karoubi <sup>4</sup>, Fatemeh Safari<sup>3</sup>

<sup>1</sup> Student Research Committee, Faculty of Medicine, Iran University of Medical Sciences, Tehran, Iran

<sup>2</sup> Pediatric Intensive Care Unit, Clinical Research Development Center, Firoozabadi Hospital, Iran University of Medical Sciences, Tehran, Iran

<sup>3</sup> Clinical Research Development Center, Firoozabadi Hospital, Iran University of Medical Sciences, Tehran, Iran

<sup>4</sup> Neonatal Intensive Care Unit, Clinical Research Development Center, Firoozabadi Hospital, Iran University of Medical Sciences, Tehran, Iran

\*Corresponding Author: Clinical Research Development Center, Firoozabadi Hospital, Iran University of Medical Sciences, Tehran, Iran. Email: vafapourm@gmail.com

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## Abstract

**Introduction:** This case report presents a rare manifestation of *Shigella* infection: Acute perforated appendicitis. It emphasizes the importance of differential diagnosis in patients presenting with diarrhea, especially when symptoms overlap with surgical emergencies like appendicitis.

**Case Presentation:** Our case involved a 10-year-old girl who was referred to our hospital with complaints of abdominal pain and non-bloody watery diarrhea. Clinical examinations confirmed acute appendicitis, and an appendectomy was performed. A few days post-surgery, the patient developed dysentery. Stool culture identified *Shigella flexneri*, and the patient was treated with Piperacillin/tazobactam and ciprofloxacin based on the antibiogram and consultation with the infectious disease team. The patient responded well to treatment and was discharged in good general condition after completing the full course of therapy.

**Conclusions:** Although shigellosis is a common gastrointestinal infection, it is rarely linked to appendicitis. This case highlights the need for thorough evaluation in patients with diarrhea, as infectious conditions like shigellosis can mimic or coexist with acute appendicitis, leading to potential diagnostic and management challenges.

**Keywords:** Shigellosis, Appendicitis, Dysentery, Gastroenteritis

## 1. Introduction

Shigellosis is a self-limiting gastrointestinal bacterial infection caused by *Shigella* that typically occurs in developing countries and among children (1). *Shigella* species proliferate in the intestines, causing inflammation and are expelled with loose stools (2). Compared to other bacteria, *Shigella* is particularly contagious; only 10 to 100 bacteria are needed to cause disease in an individual (3). The geographical distribution of the four species of *Shigella* – *Shigella dysenteriae*, *Shigella flexneri*, *Shigella boydii*, and *Shigella sonnei* – varies, as do the diseases they cause (4). A common method of transmission is ingesting food or water contaminated with *Shigella*, and another is through person-to-person contact (5). In children, shigellosis can lead to serious complications such as

severe dehydration, convulsions, and hemolytic-uremic syndrome if not treated promptly (6).

Diagnosing shigellosis can be challenging because its symptoms are similar to those of other infectious gastrointestinal disorders, including appendicitis (7). Such issues can cause diagnostic errors or delays in treatment, leading to unnecessary surgical procedures or other consequences if shigellosis is not managed or treated effectively (8). The treatment for shigellosis primarily includes supportive care by administering fluids and restoring electrolyte balance. In some cases, antibiotic treatment may be indicated, especially in severe cases or in patients at greater risk of complications (9). However, over the past several years, treatment strategies for shigellosis have been challenged by certain strains of the bacterium becoming resistant to well-established antibiotics (10).

This report presents a case of a ten-year-old girl who suffered from diarrhea, vomiting, and abdominal pain and was initially diagnosed with acute appendicitis, which subsequently turned out to be shigellosis.

## 2. Case Presentation

A 10-year-old girl was admitted to the emergency room with complaints of nausea, vomiting, and persistent periumbilical abdominal pain for 2 - 3 days, accompanied by fever. She experienced vomiting approximately 4 - 5 times a day. The patient's medical, family, and drug histories were considered non-contributory.

Upon examination, the patient was fully conscious, lying in bed, and able to answer questions appropriately. She appeared ill but not toxic. Abdominal examination revealed tenderness and rebound tenderness in the right lower quadrant (RLQ). Other physical examinations were normal.

Initial laboratory investigations showed a white blood cell (WBC) count of 9800/ $\mu$ L with 69.4% neutrophils. The hemoglobin level was 13.9 g/dL, and the platelet count was 340,000/ $\mu$ L. A stool examination showed a smear of 4 - 6 WBCs and 2 - 3 red cells per high power field with weak positive occult blood. The C-reactive protein (CRP) level was elevated at 79.3 mg/L, and the erythrocyte sedimentation rate (ESR) was 26 mm/hr. Blood urea nitrogen (BUN) was 6 mg/dL, and creatinine was 0.5 mg/dL. Serum electrolytes showed sodium at 133 mEq/L, potassium at 4.4 mEq/L, calcium at 9.8 mg/dL, and magnesium at 2.4 mg/dL.

An abdominal ultrasound showed a visible end loop of the appendix. The diameter of the loop was within normal limits (5 mm) but was non-compressible. Increased echogenicity with minimal peritoneal fluids was seen in the RLQ interloop spaces, highly suggestive of appendicitis. The attending physicians ordered a surgical consult, and the patient underwent an appendectomy, where perforated appendicitis was encountered.

Two days post-surgery, the patient began passing bloody, watery stool containing bright red blood. A repeat ultrasound was performed, confirming previous findings but showing normal results. Due to incompatible diagnostic signs, a pediatric consultation was requested, and the patient was transferred to the pediatric service.

Subsequent blood work showed a WBC count of 16,110/ $\mu$ L with 70.1% segmented neutrophils, hemoglobin levels of 12.2 g/dL, and a platelet count of 537,000/ $\mu$ L. Stool analysis revealed 12-14 WBCs, 2 - 3 red blood cells

per high-power field, and 1+ occult blood in a fecal sample. The CRP level significantly rose to 198 mg/L, and the ESR level remained at 26 mm/h. BUN was 5 mg/dL, creatinine was 0.6 mg/dL, and serum electrolytes indicated 135 mEq/L of sodium and 3.4 mEq/L of potassium.

A pediatric infectious disease consultation was requested, and the patient's antibiotic regimen was modified: Ciprofloxacin was discontinued, metronidazole was continued, and cefepime and amikacin were initiated. A stool culture was ordered, which returned positive for *Shigella* resistant to amikacin, ampicillin, ceftriaxone, ceftazidime, cotrimoxazole, gentamycin, piperacillin, tetracycline, cefixime, and cefepime. Another infectious disease consultation was requested, and the antibiotic was switched to tazocin (piperacillin/tazobactam) and ciprofloxacin. Metronidazole, amikacin, and cefepime were withdrawn. The symptoms subsided, and the patient was discharged on day 10 of hospitalization.

In this case, the patient was admitted due to nausea, vomiting, and diarrhea, which later progressed into dysentery and gastroenteric bleeding. An abdominal ultrasound was performed, confirming a diagnosis of acute appendicitis complicated by effusion. *Shigella* spp. were isolated in stool cultures. During treatment, the patient received antibiotics and was actively hydrated. Clinical signs eventually improved, and both diarrhea and bleeding ceased. The patient was discharged from the hospital and returned to her normal life after ten days of hospitalization, with complete relief of all symptoms. Follow-up visits did not reveal any signs of illness, and the patient recovered perfectly.

## 3. Discussion

Acute abdominal pain or any gastrointestinal symptoms can be quite challenging to diagnose in the pediatric population, as demonstrated in this case report. Additionally, the case highlights the potential for clinical presentations in pediatric gastrointestinal disorders to overlap, necessitating a broad range of differential diagnoses. This was evident in the case of shigellosis, where appendicitis was initially diagnosed (1).

Acute appendicitis is a frequent surgical emergency in children, with an estimated occurrence of 1 - 2 incidences per 1,000 children per year (12). A typical case presentation includes periumbilical pain that eventually moves to the RLQ, accompanied by fever, nausea, and vomiting (13). However, these manifestations may be vague, especially in young children, leading to potential misdiagnosis (1).

On the other hand, *Shigella* infection is generally associated with diarrhea and fever, often accompanied by abdominal pain. Dysentery, characterized by watery stool with red blood cells, occurs in approximately 30% of cases. In this patient, the initial absence of bloody diarrhea, combined with RLQ tenderness and rebound tenderness, led to the working diagnosis of appendicitis. The literature has documented that shigellosis can present in a manner easily confused with appendicitis (14).

The diagnostic accuracy of appendicitis by ultrasound is about 88% sensitive and 94% specific. In this instance, ultrasound was performed due to clinical suspicion of appendicitis, resulting in surgical management. This reveals the limitations of imaging studies and the necessity of considering clinical contexts in their interpretations. The development of bloody diarrhea postoperatively in this patient was a significant event. This symptom was not typical for post-appendectomy surgical complications, prompting further investigations that eventually led to the diagnosis of shigellosis. This underscores the need for constant clinical evaluation and readiness to change the diagnosis as the clinical picture evolves.

The antibiotic management in this case is also noteworthy. The initial use of ciprofloxacin was rational, as it should be active against gram-negative bacteria, but it is not advisable as the first-line drug for young children. The subsequent change to cefepime and amikacin after an infectious disease consultation represents the standard of care for complicated intra-abdominal infections in children. This case further supports the role of stool culture in evaluating a child with persistent diarrhea, especially if it is bloody. Stool cultures are positive in 30 - 50% of children with shigellosis and remain the gold standard for diagnosis.

This case emphasizes that the causes of abdominal pain in children are vast, and infections causing diarrhea can present as an acute abdomen.

### 3.1. Conclusions

This case highlights the necessity of conducting a detailed assessment with relevant imaging, laboratory testing, and microbial examination. Additionally, it underscores the importance of teamwork in managing challenging cases in pediatrics.

### 3.2. Limitations

This case report presents a single instance of a very rare condition and should not be considered a basis for general conclusions.

## Footnotes

**Authors' Contribution:** Study concept and design: M. V. and S. S.; Analysis and interpretation of data: M. V., R. Z. M., and S. S.; Drafting of the manuscript: M. V., S. S., M. K., and F. S.; Critical revision of the manuscript for important intellectual content: M. V.

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