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## Case Report

# Acute appendicitis after closed abdominal trauma: A case report<sup>☆,☆☆</sup>

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## ABSTRACT

We present the case of a 14-year-old female patient with no clinical history who was admitted due to an impact on the abdomen and pelvis with a soccer ball during a match and who developed acute post-traumatic appendicitis. Acute appendicitis is one of the most common causes of acute abdomen. The diagnosis is mainly clinical and based on definitive history; however, the images can be decisive for the diagnosis. The etiology of acute appendicitis is well-reported in the literature, with the traumatic mechanism being one of the etiologies described. Acute post-traumatic appendicitis is rare; a timely diagnosis requires a high index of suspicion, a careful history, and a physical examination. Imaging with ultrasound or computed tomography is recommended if there is a discrepancy between the medical history and physical examination.

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## Introduction

Acute appendicitis is one of the most common causes of acute abdomen [1]. The acute abdomen is a life-threatening entity that requires rapid, timely diagnosis and often emergency surgical intervention. The risk of developing acute appendicitis in life is approximately 7% [2,3]. The diagnosis is mainly clinical and based on definitive history; however, the images can be decisive for the diagnosis [1]. The etiology of acute appendici-

tis is well-reported in the literature, with the traumatic mechanism being one of the etiologies described.

Acute post-traumatic appendicitis is rare; a timely diagnosis requires a high index of suspicion, a careful history, and a physical examination. Imaging with ultrasound (US) or computed tomography (CT) is recommended if there is a discrepancy between the medical history and physical examination.

Computed tomography is considered a vital imaging modality since it provides an exact and reproducible diagnosis, improves the diagnostic accuracy of the clinician physi-

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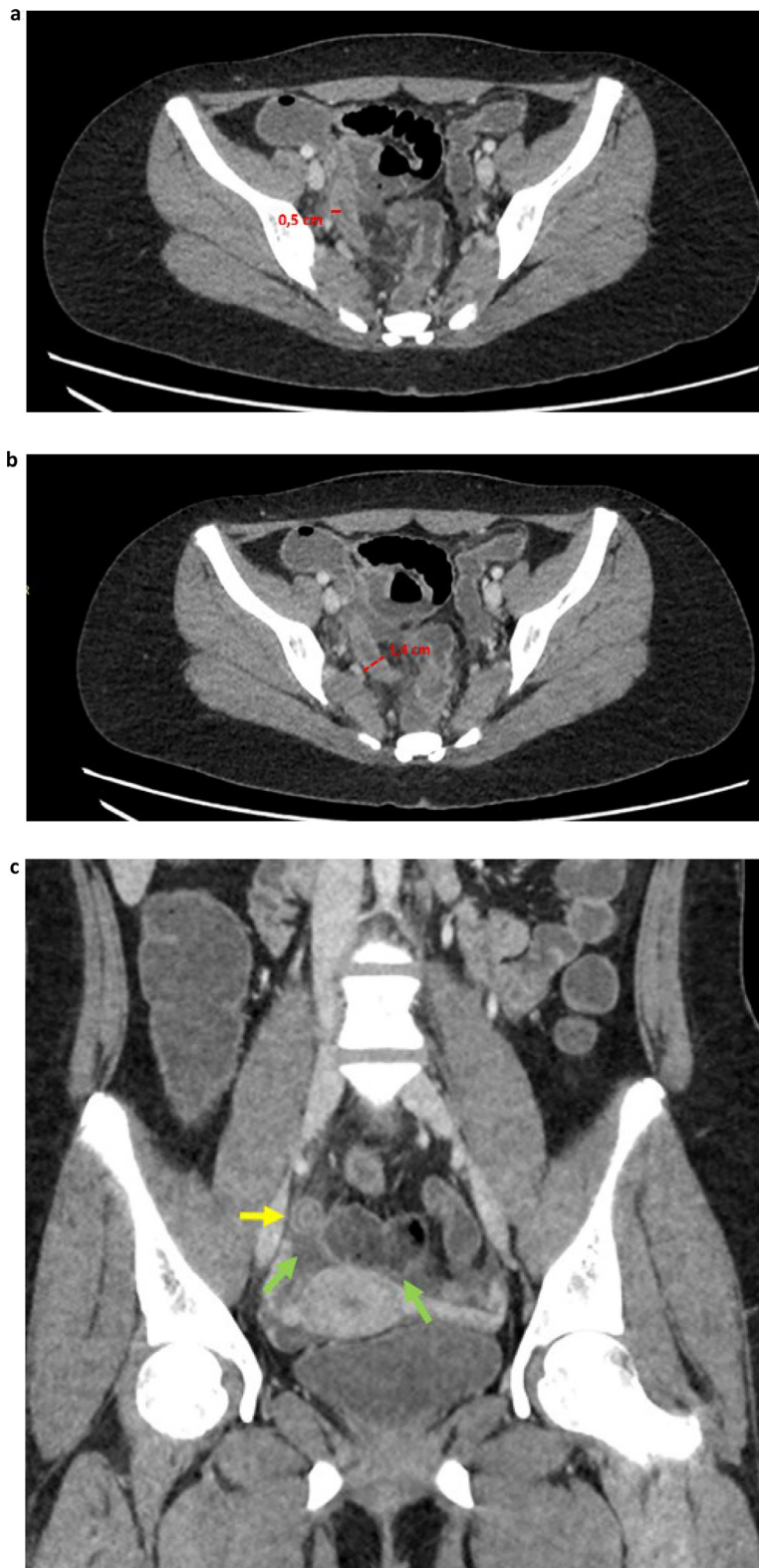
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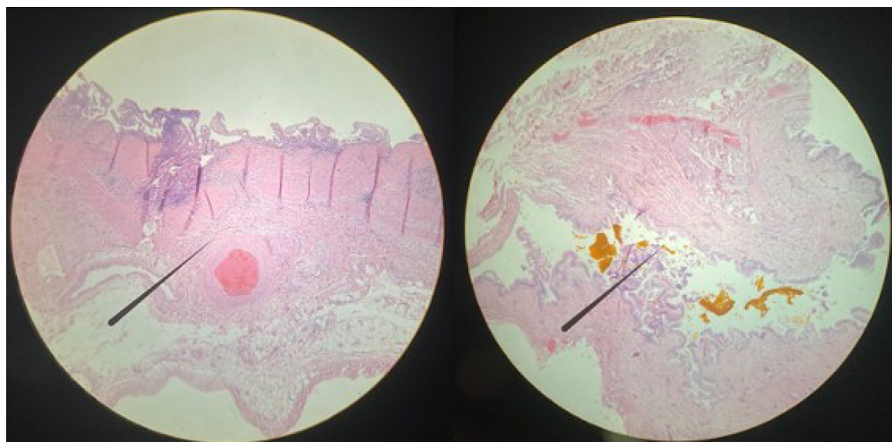
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**Fig. 1 – (a)** CT of the abdomen and pelvis with intravenous contrast in axial shows thickened cecal appendix located in the pelvis, with thickening of its walls of up to 0.5 cm (red line), **(b)** CT of the abdomen and pelvis with intravenous contrast in axial acquisition shows a cecal appendix located in the pelvis with a transverse diameter of 1.4 cm (red discontinuous line). **(c)** CT of the abdomen and pelvis with intravenous contrast in coronal reconstruction shows thickened cecal appendix located in the pelvis, with thickening of its walls (yellow arrow) and free fluid in the pelvis (green arrow). No signs of perforation.



**Fig. 2 – Macroscopic description shows a brown and congested surface of the appendix, with sparsely attached mesoappendix, fibrinopurulent membranes, and necrotic-looking mucosa.**

cian, defines who benefits from surgical management, and reduces mortality from underlying complications.

This case report aims to review a pediatric patient who developed acute post-traumatic appendicitis after blunt trauma to the abdomen sustained during a football match.

## Case report

We present the case of a 14-year-old female patient with no clinical history who was admitted to our institution due to an impact on the abdomen and pelvis with a soccer ball during a match. The patient presents a subsequent clinical history of 6 hours of diffuse abdominal pain and multiple emetic episodes with progression to oral intolerance. On physical examination, she presented abdominal pain on palpation of the hypogastrium and right iliac fossa, with no signs of peritoneal irritation. Paraclinical shows leukocytosis and neutrophilia.

The diagnostic method of choice as the first approach was an abdominal ultrasound, which did not show significant findings. Given the persistence of abdominal pain, a contrast-enhanced CT scan of the abdomen is performed, resulting in acute appendicitis without signs of perforation (Figs. 1a-c).

The patient was taken for laparoscopic appendectomy with non-perforated appendicitis as a finding. The specimen was sent for a histopathological study confirming acute suppurative and necrotizing appendicitis (Fig. 2).

The patient presented adequate post-surgical evolution according to outpatient control by treating specialty.

## Discussion

Acute post-traumatic appendicitis is a rare entity with great diagnostic difficulty, given the lack of familiarity of health personnel with the pathology and the extensive differential diagnosis of abdominal pain after closed abdominal trauma. Although acute post-traumatic appendicitis occurs in 5%-15% of patients with abdominal trauma and multiple mechanisms

have been reported, including seat belt injuries, falls, assault, and blunt trauma sustained during a motor vehicle collision, the exact incidence of the damage is unknown [4–6]. In our case, no report was found in the literature on post-traumatic appendicitis after blunt trauma to the abdomen sustained during a football match.

There are multiple mechanisms attributed to the pathological process of the development of acute post-traumatic appendicitis, mainly the increase in intra-abdominal pressure that leads to an increase in pressure within the appendix, generating appendiceal edema, inflammation, or hyperplasia of the intrinsic lymphoid tissues, which results in obstruction of the appendicular lumen [7,8].

Another mechanism is attributed to the combination of appendiceal fecalith and cecal trauma, where a blow to the cecum increases luminal pressure leading to mucosal lacerations invading the submucosal layer of bacteria generating complete obstruction, decreased circulation, perforation, and gangrene [7,8].

Finally, it is established that the stretching of the appendicular orifice is the cause of appendicitis since the cecum is the widest part of the colon. Therefore, it is more susceptible to distension with increased intracolonic pressure, developing obstructive appendicitis [9].

The presentation of appendicitis secondary to trauma is generally similar to non-traumatic appendicitis.

The diagnostic criteria for traumatic appendicitis are [10,11]:

- Previously asymptomatic patient.
- Direct or indirect trauma to the abdominal wall.
- The onset of symptoms is between 6 and 48 hours after the trauma.
- Persistent/progressive symptoms with surgical confirmation of appendicitis.

When evaluating CT images, the radiologist should pay attention to the following signs of appendicitis [10–12]:

1. Enlarged appendix diameter of more than 6 mm.
2. An appendicular wall is more than 2 mm thick, with ring-shaped thickening.

3. The striation of the adjacent mesenteric fat.
4. Calcified appendicolith.
5. Thickening of the walls of the cecum.
6. Signs of complications include perforation of the appendix due to the presence of extraluminal gas and the formation of a periappendiceal abscess.

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## Conclusion

In conclusion, acute post-traumatic appendicitis is a rare entity with great diagnostic difficulty. It should be considered in patients with acute abdominal pain after blunt abdominal trauma. It is essential to remember the diagnostic criteria for traumatic appendicitis and the imaging findings that must be deemed to have an adequate diagnostic approach.

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## Patient consent

The reported case was reviewed and approved, and individual patient consent was obtained following institutional guidelines. Following our institutional policies, all protected health information was removed.

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## Data sharing statement

The relevant anonymized patient-level data are available via request from the authors.

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