

Appendicitis Following Blunt Abdominal Trauma: An Illustrative Case

SAMUEL GOLDMAN, MD, MPH; NEAL CANASTRA, BA; ALICIA GENISCA, MD

ABSTRACT

Acute appendicitis is the most common abdominal surgical emergency, with an average of 7–9% of individuals developing the condition within their lifetime.¹ While cases of acute traumatic appendicitis are rare, medical literature supports their plausibility with the most famous case stretching back to the controversial 1926 death of stunt performer, Harry Houdini. Several mechanisms have been proposed by which blunt abdominal trauma results in acute appendicitis. In this review, we describe a young, otherwise healthy male, who developed epigastric abdominal pain after being struck in the abdomen while wrestling with his cousin of similar age. The patient was found to have peri-appendiceal inflammatory change, appendiceal mural thickening and edema consistent with acute uncomplicated appendicitis.

KEYWORDS: acute appendicitis, traumatic, appendiceal obstruction, pediatric

CASE PRESENTATION

An 11-year-old previously healthy male presented to the emergency department with several hours of epigastric abdominal pain. The patient had been in his usual state of health until earlier that day when he was wrestling with a cousin of similar age and was punched in the abdomen. He had no vomiting, nausea, fevers, headache, back pain, dysuria, hematuria, or testicular pain. He had a normal bowel movement after the incident. He maintained adequate intake throughout the day. The pain progressively worsened, prompting a visit to the emergency department.

On examination, the patient had no overt signs of trauma. He was uncomfortable appearing and vital signs were notable for tachycardia. The abdomen was non-distended and bowel sounds were present. There was tenderness maximally over the epigastrium without rebound, guarding, or hepatosplenomegaly. Genitourinary examination was unremarkable.

After the initial evaluation, the patient had an episode of non-bilious, non-bloody emesis and repeat vital signs revealed fever to 102F. Given the evolution of symptoms within the emergency department, as well as persistence of pain despite oral analgesia, an IV fluid bolus was given and labs were obtained.

Figure 1. Axial MRI

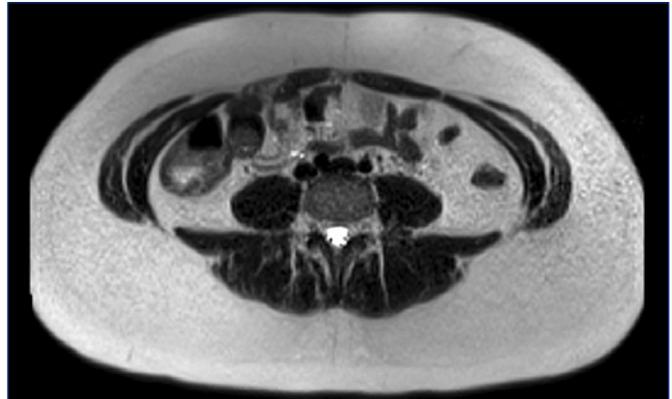
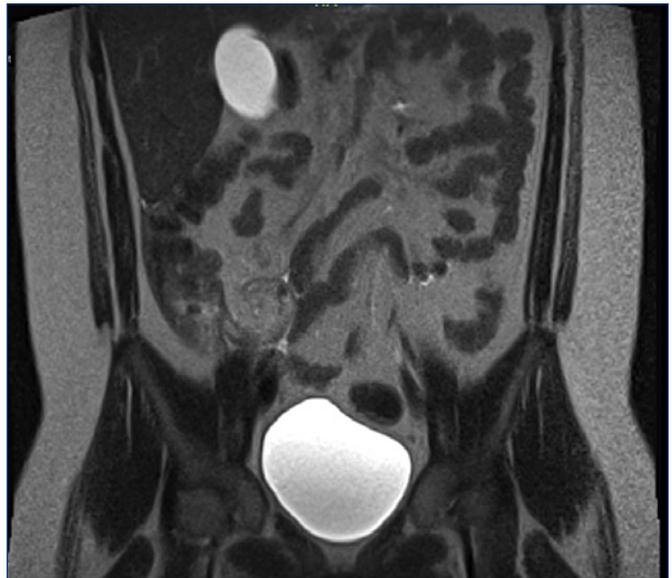


Figure 2. MRI Coronal



Laboratory workup was significant for leukocytosis of 22,000 without shift. Basic metabolic panel, hepatic panel, lipase, ESR and CRP were all within normal limits.

An MRI of the abdomen and pelvis was obtained (Figures 1,2) which demonstrated a diffusely dilated appendix measuring up to 10mm in maximal diameter with periappendiceal inflammatory change and appendiceal mural thickening and edema consistent with acute uncomplicated appendicitis.

The patient was treated with parenteral antibiotics before undergoing laparoscopic appendectomy. Operatively, the

patient's appendix was noted to be acutely inflamed. The postoperative course was uncomplicated, and the patient was discharged home the day after admission.

DISCUSSION

Acute appendicitis is the most common abdominal surgical emergency. Roughly 7–9% of individuals in Western countries will develop the condition during their lifetime.¹ Appendicitis is most common in the pediatric population, with peak incidence between 11 and 12 years of age.² Appendicitis is thought most commonly to develop as a result of appendiceal obstruction.³ Obstruction can be caused by a number of conditions including fecalith, mass, lymphatic tissue, foreign body, or intestinal parasites. Obstruction of the appendiceal orifice increases luminal pressure resulting in mucosal edema, inflammation, and impaired venous and lymphatic drainage and ultimately, tissue ischemia. Ischemic appendiceal tissue may then necrose, leading to bacterial translocation and suppurative infection.⁴

While the development of appendicitis following blunt abdominal trauma is rare, it has been reported in medical literature as a plausible mechanism dating back to the turn of the 20th century.^{5,6} Of historical interest, stunt performer, Harry Houdini, likely died of peritonitis as a result of a ruptured appendix after inviting a college student to punch him in the abdomen as part of an on-stage performance. Debate, however, persists regarding whether trauma is causative or coincidental in the development of acute appendicitis.^{7,8} Several mechanisms have been proposed by which blunt abdominal trauma results in acute appendicitis. The first mechanism involves an indirect process in which a traumatic force causes a transient increase in intra-abdominal pressure which translates directly to increased intra-appendiceal pressure. Trauma may alternatively cause muscular irritation leading indirectly to adhesions or altered anatomic positioning of the appendix resulting in subsequent mucosal edema. Additionally, indirect abdominal trauma may result in visceral edema, limiting intra-abdominal space and therefore increasing intra-abdominal pressure. An alternative mechanism suggests a direct process in which focal trauma results in local edema, inflammation or lymphatic hyperplasia leading to appendiceal luminal obstruction. The presence of an appendiceal fecalith may contribute to increased luminal pressures after either direct or indirect trauma.⁹ Case reports suggest that high energy trauma, particularly in the pediatric population, are at risk for developing delayed appendicitis.¹⁰ In particular, it has been suggested that pediatric trauma patients requiring massive resuscitation are at risk for developing post-traumatic appendicitis possibly as a result of visceral edema.¹¹

CONCLUSION

Blunt abdominal trauma is a rare, though plausible and well documented cause of acute appendicitis. It is important to consider the diagnosis of appendicitis in the workup of patients with abdominal pain following trauma. While the diagnosis of acute appendicitis following trauma may be coincidental, it is more likely attributable to the traumatic event if the presentation is temporally related to the trauma and the patient lacked antecedent symptoms. The diagnosis and management of acute appendicitis is similar regardless of relation to trauma.

References

1. Toumi et al. Systematic review of blunt abdominal trauma as a cause of acute appendicitis. *Ann R Coll Surg Engl.* 2010 Sep;92(6):477-482.
2. Addiss DG, et al. The epidemiology of appendicitis and appendectomy in the United States. *Am J Epidemiol.* 1990;132:910-925.
3. Wangenstein OH, Bowers WF. Significance of the obstructive factor in the genesis of acute appendicitis. *Archives of Surgery.* 1937;34(3):496–526.
4. Schwartz's principles of surgery (9th ed.). New York: McGraw-Hill, Medical Pub. Division. 2010;Chapter 30.
5. Fowler R. The rare incidence of acute appendicitis resulting from external trauma. *Ann Surg.* 1938 Apr;107(4):529-39.
6. Behan RJ. Traumatic Appendicitis. *Ann Surg.* 1927;85:263-268.
7. Ciftci AO, et al. Appendicitis after blunt abdominal trauma: cause or coincidence? *Eur J Pediatr Surg.* 1996;6:350–3.
8. Hennington MH, et al. Acute appendicitis following blunt abdominal trauma. *Ann Surg.* 1991; 214:61–3.
9. Sharma AK, Vig S, Neades GT. Seat-belt compression appendicitis. *Br J Surg.* 1995;82:999
10. Etensel B, et al. The effect of blunt abdominal trauma on appendix vermiformis. *Emerg Med Journ.* 2005;22:874-877.
11. Ramsook C. Traumatic appendicitis: Fact or fiction? *Pediatr Emerg Care.* 2001;17:264–6.

Authors

Samuel Goldman, MD, MPH, Warren Alpert Medical School of Brown University, Providence, RI.

Neal Canastra, BA, Wheaton College, Norton, MA.

Alicia Genisca, MD, Assistant Professor of Pediatrics, Assistant Professor of Emergency Medicine, Warren Alpert Medical School of Brown University, Providence, RI.

Correspondence

Samuel Goldman, MD, MPH
segoldma@gmail.com