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ORIGINAL ARTICLE

Acute appendicitis following blunt abdominal trauma in children: by chance or a cause?

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KEYWORDS

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Abstract *Background/Introduction:* In rare cases, blunt trauma of the abdomen (BTA) can be a direct cause of appendicitis.

Purpose/Aim: To evaluate whether appendicitis or appendiceal perforation following BTA occurs by chance or cause.

Methods: This retrospective study was performed for the period July 2010–December 2014.

Results: In total, 245 pediatric cases were included. The cause of appendicitis was idiopathic in 190 (77.55%), appendicolith in 30 (12.24%), trivial abdominal trauma in 17 (6.93%), intraoperatively identified hyperplastic lymphoid tissue in six (2.44%), and significant BTA in two (0.81%) children. The symptoms of the two children who developed appendiceal perforation after sustaining BTA began from trauma inception, and BTA was the only apparent etiological factor. The children were a 9-year-old boy who sustained BTA through a bicycle handlebar 4 days previously and an 11-year-old girl who presented at our hospital after falling over a boulder. Both cases were associated with appendicolith, without solid organ injury.

Conclusion: Acute appendicitis or appendiceal perforation following significant BTA is rare. In the two corresponding cases in this study, the etiology may have been dislodgement of the appendicolith at the moment of injury. Moreover, children may erroneously implicate appendicular pain to be trivial trauma sustained during play (6.8% of the current cases). In all children presenting with right lower abdominal pain and vomiting following BTA (although trivial), the possibility of appendiceal pathology should be considered.

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1. Introduction

Blunt trauma of the abdomen (BTA) following road-traffic accidents, bicycle handlebar injury, falls, and assaults rarely causes appendicitis.^{1–5} The incidence of such cases is higher in the pediatric population.^{2–5} Because we encountered two pediatric cases that developed appendiceal perforation after sustaining substantial BTA, we reviewed our previous records and evaluated whether appendicitis or appendiceal perforation following BTA in children occurs by chance or through a causal relationship.

2. Methods

We retrospectively collected the data of all patients admitted to our tertiary care center of pediatric surgery. The records of patients presenting with acute appendicitis or complicated appendicitis over a period of 4.5 years, from July 2010 to December 2014, were reviewed and analyzed. Only patients aged < 17 years were included. Patients for whom appendectomy was performed as an interval appendectomy and as a part of another procedure (e.g., Ladd's procedure) were excluded.

The clinical, laboratory, radiological, and operative records of all included patients were evaluated. The following chart data were reviewed: causative factors, history of preceding illnesses, and BTA intensity (trivial or significant). We evaluated the incidence of appendicolith found intraoperatively, on radiological images, and in pathological sections of the appendix of patients with appendicitis. Furthermore, all possible radiological investigation results, including those of abdominal X-ray, ultrasonography (USG), and computed tomography (CT) scans, were reviewed.

3. Results

We reviewed 245 pediatric cases (197 boys and 48 girls; male:female, 4:1); of these, 86 (35.10%) had acute appendicitis, whereas the remaining 159 (64.89%) had complicated appendicitis (appendiceal perforation and appendicular lump). The causes were idiopathic in 190 (77.55%), appendicolith in 30 (12.24%) cases, trivial abdominal trauma in 17 (6.93%) cases, intraoperatively identified hyperplastic lymphoid tissue in six (2.44%) cases, and significant BTA in two (0.81%) children. Most appendicoliths were single; however, two were detected in three (10%) cases (Figure 1). The appendicoliths were associated with complicated appendicitis in 22 of 30 cases (73.33%; Figure 2).

In the two cases with appendiceal perforation following BTA, symptoms began from the inception of trauma, with BTA as the only apparent etiological factor. In both cases, no evidence of solid organ injury was noted, but these cases were associated with appendicolith. Their appendicoliths were present outside the perforated appendix and in the lump (Figure 3). The following are the detailed clinical and operative records of the two cases.

3.1. Case 1

A 9-year-old boy was referred to us for BTA caused by a bicycle handlebar injury sustained 4 days previously. The child had severe abdominal pain (more severe in the right lower quadrant of the abdomen), nausea, vomiting, anorexia, and obstipation. The child was conservatively managed for BTA at a private clinic for the initial 3 days. He reported that the pain had started after the bicycle handlebar injury. Although the pain was bearable initially, its severity increased gradually. He did not report any recent abdominal uneasiness. On examination, he was hemodynamically stable. Abdominal examination revealed considerable tenderness in the lower quadrant of the abdomen, along with rebound tenderness and muscle guarding. Blood examination revealed 10.5 g/dL hemoglobin and 17,200 white blood cells/mm³ with polymorpholeukocytosis (78%). Renal and liver function tests and chest radiography revealed normal findings. Abdominopelvic USG scans demonstrated an appendicular lump with free fluid in the pelvis, without solid organ injury. A gridiron incision revealed the appendicular lump with omentum wrapping the inflamed appendix. The appendix was perforated and fecalith (appendicolith) was protruding from its lumen (Figures 3A and 3B). Next, appendectomy was performed, and no evident solid organ injury was detected. Further pathological examination demonstrated appendicitis with appendicolith. The boy had an uneventful postoperative recovery.

3.2. Case 2

An 11-year-old girl was referred to our emergency department; she complained of abdominal pain and experienced vomiting episodes after falling while playing in the backyard 3 days previously. The girl reported that she fell over a boulder while playing with her friend and sustained injury in the upper abdomen (epigastrium and right hypochondrium). The symptoms began from trauma inception, and although the pain was moderate initially, its severity increased after a few hours. She was hospitalized in a nearby hospital and then referred to our institute. She did not mention any recent abdominal discomfort before the trauma. She was afebrile, with a pulse rate of 122/min and blood pressure of 98/60 mm Hg. The abdomen had no external injury marks; however, tenderness was noted on the right costal margin. Abdominal palpation revealed moderate tenderness in the right lower quadrant of the abdomen. Bowel sounds were inaudible. Blood examination revealed 11.8 g/dL hemoglobin, 13,200 white blood cells/mm³ with polymorpholeukocytosis (85%), 13-mm erythrocyte sedimentation rate at the end of the first hour, 1.58 mg% (direct: 0.7 mg%) serum bilirubin, 440 IU alkaline phosphatase, and C-reactive protein positivity. Renal function tests, urinalysis, and chest radiography demonstrated normal findings. Abdominopelvic USG and CT scans were inconclusive, except for mild-to-moderate free fluid in the pelvis. No signs of pneumoperitoneum or solid organ injury were noted.

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