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Case Report

ACUTE APPENDICITIS IN A 3-MONTHS-OLD INFANT: A CASE REPORT

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ABSTRACT

Acute infantile appendicitis is an extremely rare condition, with high morbidity and mortality rates. Its clinical presentation is non-specific, therefore clinical diagnosis is often difficult and may be misunderstood by other medical conditions. Ultrasonography plays a fundamental role in diagnosis of infantile appendicitis. In this case report we present a case of a 3-months-old male infant taken to the Emergency Department by his parents due to repeated attacks of vomiting and inconsolable crying. Our case was diagnosed as acute infantile appendicitis for which urgent surgery approach was necessary. The purpose of our case report is to serve as a reminder to always consider acute appendicitis as a cause of infantile acute abdomen, after having excluded all the most common causes reported previously.

1. Introduction

Appendicitis is one of the most frequent causes of acute abdomen and the most common abdominal surgical emergency in the pediatric population. In contrast, acute infantile (from birth to 1 year of age) appendicitis is an extremely rare condition associated with high morbidity and mortality. The acute infantile appendicitis clinical presentation is non-specific and atypical, therefore clinical diagnosis is often difficult and may be misunderstood by other medical conditions. Ultrasonography (US) plays a crucial role in the diagnosis of infantile appendicitis; notably, early diagnosis reduces the risk of complications, such as perforation and abscesses. In this case report we present a case of acute infantile appendicitis diagnosed with ultrasonography for which urgent abdominal surgery was necessary.

2. Case presentation

We report a case of a full-term 3-month-old male infant taken to the Emergency Department by his parents due to repeated attacks of vomiting and inconsolable crying starting the day before.

At the physical examination, his body temperature was 38.3° C, the abdomen was treatable, not painful and tender to palpation and with no evidence of abdominal masses. The liver and spleen were not palpable and the auscultation exam was negative.

Laboratory blood tests and urine analysis were performed and, while results were pending, the infant underwent an abdominal X-ray that revealed bowel loops distension with fecal impaction in rectal ampulla without air-fluid levels (Figure 1). Stool analysis was not performed due to the temporary constipation of the infant.

The patient was also subjected to abdominal US, that excluded the main causes of acute abdomen, such as bowel obstruction, malrotation, midgut volvulus, intussusception and non-accidental trauma.

The infant was subjected to a rectal enema, but after 7 hours his clinical condition had worsened. Laboratory blood tests showed leukocytosis ($16{,}53 \times 10^9$/L) and increased inflammatory markers (C-reactive protein (CRP): 3,61 mg/dl), so another abdominal X-ray and US were performed.

The second abdominal X-ray revealed a bowel loops distension with evidence of small air-fluid levels (Figure 2). In addition, abdominal US showed in right iliac fossa increased caliber (9 mm) and luminal distension of cecal appendix, associated with hyperemic and thickened walls, two appendicoliths and peri-appendiceal adipose tissue inflammation (Figure 3).

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Based on these findings, acute infantile appendicitis was diagnosed and the infant underwent urgent trans-umbilical laparo-assisted appendectomy. The post-operative course was normal and without complications. The post-operative histopathology confirmed an appendicular phlegmon with perforation and peritonitis.

Figure 1. Abdominal X-ray showing bowel loops distension with fecal impaction in rectal place without pathological air-fluid levels.

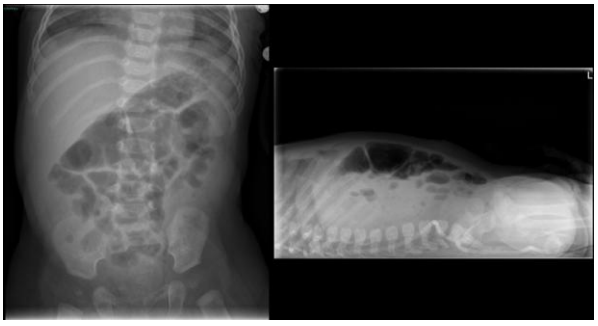

Figure 2. Abdominal X-ray showing bowel loops distension with evidence of some small air-fluid levels.

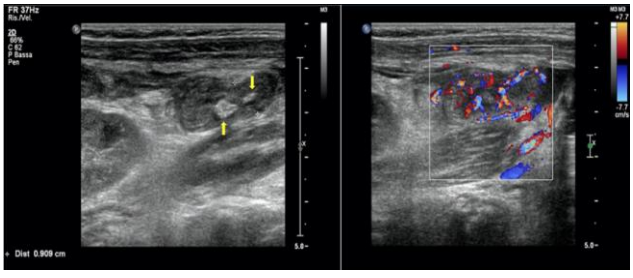

Figure 3. Abdominal US showing: 1) increased appendix caliber of about 9 mm (figure on the left), 2) thickened walls, hyperemic to the echo color Doppler (figure on the right), 3) two appendicoliths indicated by the yellow arrow and 4) peri-appendiceal adipose tissue inflammation.

3. Discussion

Acute appendicitis is a common diagnosis and the most common condition requiring emergent abdominal surgery in the pediatric population.

In contrast, the diagnosis of infantile appendicitis is very difficult considering the atypical and non-specific presentation and tends to be delayed, with appendix perforation found at laparotomy [1-4].

The incidence of appendicitis in the pediatric population is different according to age group: in a study over a 12-year period, 17% of patients were under 5 years of age, 5% were under 3 years of age and 0.38% were younger than 1 year [5-6].

The low incidence of acute appendicitis in infant population may be attributed to the funnel shaped appendix with a wide opening into the cecum [5; 7-10], liquid diet, and the relative low presence of lymphatic hyperplasia in the peri-appendiceal region [11].

Differential diagnoses of infantile acute abdominal pain are: gastroenteritis, bowel obstruction, necrotizing enterocolitis, mesenteric adenitis, malrotation of midgut, volvulus, Meckel diverticulum, Hirschsprung disease, incarcerated hernias and non-accidental trauma [12-13].

The clinical presentation of acute appendicitis in infantile population is atypical and non-specific and the mean time interval between the onset of symptoms and final diagnosis is usually 72 to 96 hours [10].

The majority of infants with acute appendicitis show vomiting (85% to 90%), pain (35 to 81%), fever (40–60%), diarrhea (18 to 46%) and irritability (35% to 40%), while on physical examination most of them show a temperature higher than 37°C with diffuse abdominal tenderness (55% to 92%), right lower quadrant tenderness (50% above), lethargy (40%), abdominal distension (30–52%), rigidity (23%) and abdominal or rectal mass (30%) [10; 14-15].

Results of laboratory tests have less value for diagnosis in the infantile period than for older patients: white blood cell (WBC) count presents both low sensitivity and specificity, while CRP is more specific than WBC count but the sensitivity is lower [5]. In the infantile population high mortality and morbidity is associated with complications related to acute appendicitis. The main complication consists in appendiceal perforation, more frequent in young children (86% in children less than 1 year of age, 74% between 1 and 1.9 years, 60% between 2 and 2.9 years, 64% between 3 and 3.9 years, and 49% between 4 and 4.9 years) and less in older patients (only 5%) [5-6] and these rates increase with delayed diagnostic (> 24 h) [5]. The delay in diagnosis often results in appendiceal perforation (82–92%) and bowel obstruction 82% [10; 14-15].

This high rate of appendiceal perforation is attributed to: the thin appendiceal wall; high mobility and low fixability of the appendix with the cecum (that is non-extendable), ascending colon and the posterior abdominal wall; undeveloped omentum and small size of the peritoneal cavity, which are all factors contributing to diffuse purulent material effusion from a perforation allowing a more rapid and diffuse contamination in such patients, compared to a localized abscess in older children [5, 10]. US is very useful and safe for the diagnosis of infantile appendicitis, with a sensibility range of 86 to 98% and a sensitivity range of 80-92% [16-19], because it is operator dependent.

The ultrasound findings suggestive of acute appendicitis are: increased appendiceal caliber (diameter > 6 mm), thickened and hyperemic walls, distension and obstruction of the appendiceal lumen, appendicoliths, target sign with concentric layers, inflammation of the peri-appendiceal adipose tissue that appears hyperechoic, peri-cecal and peri-vesical free fluid and thickened bowel loops with deceased peristalsis [20].

US is more effective than abdominal radiography that only shows indirect and non-specific signs, such as abnormal gas pattern, free peritoneal fluid and air and thickened abdominal wall [5; 21-22].

It is very important to combine ultrasound findings with clinical manifestation: in our case the little patient had a suggestive clinic manifestation for his age with indirect signs in the abdominal radiography and ultrasound findings suggestive of acute appendicitis.

4. Conclusion

Acute infantile appendicitis is an extremely rare condition with low incidence but is marked by rapid disease progression and high rates of complications, including perforation and abscess.

In this context, ultrasound is a valid diagnostic option for its safety and rapid execution and it is recommended to confirm indication for emergent abdominal surgical treatment.

In conclusion, the purpose of our case report is to serve as a reminder to always consider acute appendicitis as a cause of infantile acute abdomen, after having excluded all the most common causes reported previously.

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