Urological symptoms of acute appendicitis in childhood and early adolescence

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Abstract. We present 15 cases of acute appendicitis in ten boys and five girls (age 3–15 years) with cardinal symptomatology coming from the urogenital tract, who were treated in our departments. All the patients presented with right renal colic, dysuria, frequency and urinary retention. The symptoms were attributed to an ongoing appendix inflammatory process in close proximity to the right distal ureter and urinary bladder. All the patients were successfully operated, and postoperative courses were uneventful. As the present patient group is the largest reported to date, a classification of the pathophysiology in relation to the clinical presentation is proposed.

Key words: Acute appendicitis, Dysuria, Renal colic, Urinary retention, Urological symptoms

Introduction

The appendix is a 2 to 20 cm long part of the large bowel, arising from the cecum 1.7–2.5 cm distal to the ileocecal valve. The most common anatomical position of the appendix is retrocecal (60–65%); followed by pelvic (30%) when the tip lies in the lesser pelvis cavity; sunccecal (0.5%); and ileocecal (1.5%). In 5% of cases the appendix is partially or totally located in the retroperitoneal space. The appendix is most commonly located in the right iliac fossa, but in rare cases involving bowel malrotation it can be found near the hepatic or splenic flexure, the midline or the periumbilical region [1, 6].

Acute appendicitis is a common condition (occurring at least once during the lifetime of 7–10% of people in Western countries), affecting all age groups but being more prevalent in childhood and early adolescence (5–14 years of age). The etiology, pathophysiology, pathological classification, clinical manifestations, natural history, and complications of this condition are well understood, because its prevalence means that it forms part of every-day pediatric surgery practice [1, 10].

Since the appendix is in close anatomical proximity to the urogenital tract, parts of it and especially the right distal ureter and the bladder are frequently affected by the inflammatory reaction of acute appendicitis. This gives rise to various urogenital manifestations that can sometimes become the dominant symptomatology of appendicitis and its complications.

The aim of the present study was to define the extent of urogenital involvement in cases of acute appendicitis, by performing a retrospective analysis of 2540 cases covering an 8-year period. From this, a classification of urogenital involvement is attempted, based on the symptomatology and the findings of surgical treatment.

Patients and methods

Fifteen patients were included in the study comprising ten males, and five females (age 3–15 years) who were treated for acute appendicitis in our Departments during 1994–2001. In all these patients the most prominent symptoms arose from the urogenital tract.
The patients were divided into three groups according to the anatomic location of the appendix (Figure 1): (i) Group A comprised nine patients (six boys 4–12 years old, three girls 3–15 years old) with ascending retrocecal appendices that were in contact with the right ureter, the local inflammation was acute to gangrenous; (ii) Group B comprised four patients (two boys 4 and 6 years old, two girls 7 and 13 years old) the appendices were suncecal and had formed a plastron which infiltrated the dome of the urinary bladder; and (iii) Group C comprised two boys (3 and 5 years old) with a pelvic appendix that had formed local abscess.

Results

The patients of Group A presented with the following symptoms: colicoid pain of the right abdomen radiating to the ipsilateral flank (sign Giordano positive), fever (37.5–38.5°C), nausea, and vomiting. The white blood cell (WBCs) and granulocytes counts were raised, and microhematuria (> 100 phpf) was detected by urine microscopy. After a period of close observation and repeat clinical assessment, acute appendicitis was suspected and the patients were operated on. During surgery the appendix was found in a retrocecal ascending position, attached to the right ureter with loose adhesions. A normal appendectomy was performed and the early postoperative course was uneventful.

The patients of Group B presented with lower abdominal (hypogastric) pain, fever (38.0–38.5°C), frequency and urgency of urination. The WBC and granulocytes counts were also raised, and microhematuria and pyuria were observed. The initial diagnosis in all patients was urinary tract infection, but upon repeat clinical evaluation the patients exhibited lower abdominal resistance. Abdominal ultrasound investigation revealed a mass involving the dome of the urinary bladder. Surgical exploration revealed the formation of an inflammatory plastron around the appendix, which had infiltrated the posterior and superior bladder walls. An appendicectomy was performed, and the patients were discharged in good health after 6 or 7 days.

The two patients of Group C reported abdominal pain for the previous 3 or 4 days, together with diarrhea, dysuria, and fever (38°C). The 3-year-old boy was found to have retention of the urine, making bladder catheterization necessary. Intense lower abdominal resistance was present upon palpation, especially at the suprapubic area. Raised WBC and granulocytes counts, and microhematuria and pyuria were also found in both patients. An abdominal ultrasonogram had revealed the presence of fluid in the lesser pelvic cavity, in contact to the bladder and mild upper urinary tract dilatation. After intense hydration and administration of broad-spectrum antibiotics, both patients were operated on, which revealed a pelvic abscess due to a ruptured appendix. The abscess was in close contact with the bladder outlet, especially on the right side. The ruptured appendix was removed and peritoneal lavage was performed. A drainage tube was left in the space between the bladder and the caecum and this was removed on the 3rd or 4th postoperative day. Four days after the operation mild hydronephrosis had subsided and the children were discharged on the 8th day in good health.

Discussion

Acute appendicitis remains a diagnostic trap for the surgeon. The presentation is unclear in 20–35% of children, with this number increasing to 45% in adolescent females [5, 9, 12]. The presence of abdominal resistance and the location of tenderness depend on both the anatomical position of the appendix and the involvement of the anatomical structures surrounding the inflammation. Appendicitis is commonly associated with microscopic hematuria or pyuria make it clear that abnormal urinary sediment had little diagnostic or prognostic value in patients with acute appendicitis, although patients with abnormally placed appendix had 2 1/2 times the incidence of abnormal urinalysis [8, 13]. Appendicitis presenting as disorders of urinary tract is a relatively rare phenomenon [8].

The urinary tract symptomatology in the nine patients of Group A was caused by the attachment of the inflamed appendix to the right ureter. The ureter wall edema lead to intermittent upper urinary tract obstruction, which was manifested as renal colic and micro hematuria. In a similar way, the patients of Group B developed an inflammatory mass (a plastron), around the appendix, which partially infiltrated the bladder dome and caused severe lower urinary tract symptoms such as frequency and urgency of urination, accompanied by microhematuria and pyuria. An appendicovesical fistula may result from undiagnosed or untreated appendicitis, and the most common