Nonoperative management of acute appendicitis in children

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Aim
The aim of this study was to evaluate the feasibility of conservative treatment of noncomplicated acute appendicitis in children in our institute.
Patients and methods
This prospective study was conducted on children with noncomplicated acute appendicitis diagnosed by means of clinical, laboratory, and radiological investigations admitted for conservative treatment and checked in a regular manner to detect and manage complications. The study was conducted during the period between March 2015 and February 2016.
Results
Thirty-nine patients with noncomplicated acute appendicitis, with a mean age of 7.8 years, were admitted for conservative management. Twenty-five (64%) patients improved on medical treatment and were discharged home within 2–3 days and 14 (36%) patients required surgical intervention.
Conclusion
Most of the children who were managed with antibiotics for noncomplicated acute appendicitis improved and the risks of appendectomy were avoided. Therefore, we should not embark on appendectomy in children with noncomplicated appendicitis and imply the possibility of medical treatment.

Keywords:
acute appendicitis in children, acute appendicitis, nonoperative management

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Introduction

Acute appendicitis is a common disease in children and an appendectomy is the most common emergency operation performed in this population [1].

Acute appendicitis occurs in children at any age, but it is more common in children of school age [2].

Despite the great advancement in imaging modalities, careful history taking and physical examination confirm the diagnosis in most cases [3].

Acute appendicitis occuring in children younger than 3 years is difficult to diagnose because of two reasons. First, the clinical signs of appendicitis in this age group differs from those in older children due to changes in thier immunological reactivity. Second, the clinical picture is similar to other acute diseases occuring in that age group. Therefore, children in this age group present with complicated appendicitis [2].

The rate of appendectomy for noninflamed appendix was documented above 6%, whereas the rate of perforations was above 35% despite using computed tomography as a first diagnostic tool in many centers [4].

In another study, the rate of negative appendectomy was 16.5% and the rate of perforations was 23.7% [5].

To diagnose acute appendicitis in children, a number of clinical scoring systems have been developed, the two most commonly used scores in children are the Alvarado score and Samuel's Pediatric Appendicitis Score [6].

Pelvi-abdominal ultrasonography has a sensitivity of 83.3%, a specificity of 97.4%, and a positive predictive value of 92.1% and a negative predictive value of 94% [5].

Postappendectomy complications may occur in up to 17% of cases in some studies; these complications include prolonged paralytic ileus, intraabdominal abscess, wound infection, adhesive intestinal obstruction, and prolonged duration of hospital stay (mean 7.9 days) [2].

When antibiotics are administered to patients with acute appendicitis, appendectomy is no longer considered an emergency and can be performed as an elective operation [7].

Patients and methods

This prospective observational study was conducted on children older than 3 years with acute noncomplicated appendicitis who were admitted in the emergency unit between March 2015 and February 2016. They were managed conservatively until either the condition improved and the patient was discharged home or the condition complicated or did not improve and surgical intervention was decided.

Clinical diagnosis of acute appendicitis was made using Alvarado scoring system items: migratory right iliac fossa pain, nausea, vomiting, anorexia, tenderness in the right iliac fossa, rebound tenderness, elevated temperature above 37.3°C, leukocytosis, and shift of neutrophils to the left greater than 75% [8].

Pelvi-abdominal ultrasonography was performed for all cases before admission to aid in the diagnosis of acute appendicitis and to exclude complicated appendicitis. It was repeated 12 hourly until the patient was discharged or operated.

Limitation

Computed tomography scanning was not routinely used in diagnosis due to its relatively high costs in the study locality.

Inclusion criteria

(1) Children older than 3 years.
(2) Early acute appendicitis, the start of symptoms within 2 days.

Exclusion criteria

(1) Delayed presentation to hospital, the start of symptoms before 2 days.
(2) Complicated cases either detected clinically or using ultrasonography.
(3) Children younger than 3 years.

Conservative treatment

(1) Nothing by mouth.
(2) Intravenous fluids.
(3) Triple antibiotic intravenous injection: cefotaxime sodium (50 mg/kg/24 h), ampicillin (50 mg/kg/24 h), and metronidazole (7.5 mg/kg/12 h).
(4) Regular checkup for temperature (4 hourly), severity of pain (4 hourly), tenderness (4 hourly), abdominal ultrasonographic findings (12 hourly), and total and differential leukocytic count (24 hourly).

Criteria of improvement

(1) Disappearance of pain.
(2) Temperature going down to normal range.
(3) No tenderness or rebound tenderness.
(4) Tolerated oral fluids.
(5) No increase in leukocytosis and shift of neutrophils to the left on follow-up laboratory investigations.
(6) Free follow-up ultrasonography.

Conservative treatment was continued if the regular follow-up parameters improved and the patient was discharged on oral ampicillin (50 mg/kg/24 h) and metronidazole (50 mg/kg/24 h). Parents were advised to bring their children for follow-up to the outpatient clinic for 1 week and were informed to come back to the emergency unit if recurrence of symptoms occurred.

Results

Thirty-nine patients with noncomplicated acute appendicitis, with a mean age of 7.8 years, were admitted for conservative management [24 male (61.5%) and 15 female (38.5%)].

Twenty-five patients (64%) improved on medical treatment and were discharged home within 2–3 days. The two-tailed *P* value was less than 0.0001. This difference is considered to be highly statistically significant. Fourteen patients (36%) required surgical intervention.

Causes of surgical intervention

(1) Continued symptoms for 2 days.
(2) Appearance of reaction fluid around the appendix in follow-up ultrasonography in five patients (13%).

Discussion

The first prospective randomized study on medical treatment of acute appendicitis in adults was conducted by Eriksson and Granstrom.

In 1995, 20 patients with acute appendicitis were treated medically, of whom 19 improved and were discharged within 2 days and only one of them required appendectomy after 12 h [9].

In this study, 64% of children with acute noncomplicated appendicitis showed improvement on antibiotic therapy and were discharged home, and none of them returned after discharge for recurrent symptoms.

In a prospective study by Steiner and colleagues on 45 children with early acute appendicitis, between 4 and 15 years of age, 42 children showed improvement with antibiotics and were discharged within 3–5 days. The study by Steiner *et al.*[10] supports conservative treatment of early acute appendicitis without increased risk for morbidity in failed cases.

In another prospective study by Ramon and colleagues on 44 children between 7 and 17 years of age subjected to antibiotic therapy, 25 children improved, delayed appendectomy was performed in two, and the other 23 were without symptoms at 8 weeks of follow-up. None of the patients suffered from an adverse event or a recurrent appendicitis [11].

Conclusion

In this study, 25 (64%) patients improved on medical treatment. These results imply a possibility for children with acute noncomplicated appendicitis for medical treatment and not embarking on appendectomy once diagnosed.

Conflicts of interest

There are no conflicts of interest.

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