**Original Article**

# Non-Operative Management of Acute Uncomplicated Appendicitis in Children

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## Abstract

**Objective:** To compare the efficacy of non-surgical conservative management with surgical management in cases of uncomplicated acute appendicitis in children.

**Study design:** Prospective comparative study.

**Place and duration of study:** Pediatric Surgery Department, Ghulam Muhammad Mahar Medical College Sukkur from February 2020 to May 2021.

**Materials & Methods:** Ninety patients of either gender with an age range from 5-12 years, diagnosed as uncomplicated acute appendicitis, were divided into two groups.

**Results:** In group C, 34 (75.56%) patients were successfully treated with conservative management, whereas in group S, 39 (86.67%) were successfully treated with surgical management. The difference was insignificant with a p-value of 0.114. In group C, 5 (11.11%) patients did not respond to conservative management and they were managed with appendicectomy, and recurrence of symptoms was seen in 6 (13.33%) patients in group C, they were also managed with appendicectomy. In group S, 6 (13.33%) patients suffered post-operative complications. The mean length of stay in the hospital was 4.31±1.20 and 4.09±1.12 days in groups C and S respectively. This difference was statistically insignificant with a p-value of 0.368.

**Conclusion:** It is concluded in our study that uncomplicated acute appendicitis in children can be successfully managed with non-surgical conservative management.

**Keywords:** Acute appendicitis, Appendicectomy, Conservative management, Non-surgical management, Pediatric surgery, Uncomplicated acute appendicitis.

## Introduction

Acute appendicitis is one of the most common surgical emergencies in the pediatric population.[1-2] It accounts for about 1-2% of all pediatric surgical admissions and about 2-8% of children presenting with acute abdominal pain have acute appendicitis.[3] Despite the advancements in diagnostic tools, timely diagnosis and surgery remain a challenge, especially for the patients of rural Sindh that report very late in tertiary care hospitals after the onset of symptoms. Delayed diagnosis and management can result in various complications which include rupture of the appendix, abscess formation, appendicular lump formation, peritonitis, sepsis, and death.[4-5]

The appendicectomy has been considered the gold standard treatment for acute appendicitis. However, conservative management of acute appendicitis in children is gaining popularity. Several researchers have tried the conservative management of acute appendicitis in children with varying degrees of success.[6-8] In conservative management of acute appendicitis, the patient is admitted to hospital, kept nil per oral, intravenous antibiotics and maintenance fluids are started. The patient is closely observed for deterioration and improvement.

In developing countries like Pakistan, medical facilities are scarce especially in rural and far-flung areas of the country. Timely surgical management of patients with acute appendicitis belonging to such areas becomes very difficult as they report very late in hospitals where surgical facilities are available. These patients usually present very late with complications of acute appendicitis which in turn increase the morbidity, mortality, and extended stays in the hospital. Conservative management in such patients could be of great help and can reduce complications, morbidity, and mortality.

We planned to carry out this study in our institute to compare the efficacy of conservative management with surgical management in cases of uncomplicated acute appendicitis in children.

## Materials and Methods

This prospective comparative study was carried out at the Pediatric Surgery Department, Ghulam Muhammad Mahar Medical College Sukkur from February 2020 to May 2021. Prior permission was sought from the Ethical Review Board of the institute before the start of this study. The sample size was calculated with an online sample size calculator available at https://select-statistics.co.uk/calculators/sample-size-calculator-two-proportions/. The sample size was estimated to be 83 patients with a 95% confidence level, and 5% margin of error, with the power of the test 95%, P1, and P2 as 16.1% and 40.54% respectively9. The sample size was rounded off to be 90. Ninety patients of either gender with an age range from 5 to 12 years, who reported in OPD or emergency department and were diagnosed with uncomplicated acute appendicitis, were recruited for this study. Written informed consent from the guardians of the patients was taken before recruiting them for the study. Those failing to give consent were excluded from the study. Patients with a history of any chronic debilitating disease were also excluded from the study. Patients who were lost to follow-up were also excluded from the study. Patients were divided into two equal groups with the draw method.

Group C (Conservative management group) was managed conservatively. These patients were admitted to the High Dependency Unit, kept nil per oral, intravenous antibiotics (ceftriaxone 100 mg/kg/day, amikacin 10 mg/kg/day, and metronidazole 22.5 mg/kg/day) and maintenance fluids were started. Patients were observed for improvement or any signs of deterioration. Those who deteriorated within 24 hours were managed with surgical management immediately. Those who showed improvement with conservative management were given intravenous fluids and antibiotics for three days. Patients were allowed oral feed (liquids, semisolids, and then solids gradually) at the end of the third day and were shifted to oral antibiotics. Follow-up was carried out after seven days, one month, and six months. Patients presenting with recurrence of acute appendicitis were managed with appendicectomy.

Group S (surgical management group) patients were prepared for surgery and were operated on with an open technique. Intravenous antibiotics (ceftriaxone 100 mg/kg/day, amikacin 10 mg/kg/day and metronidazole 22.5 mg/kg/day) were started and continued till second post-op day.

Data were analyzed with Statistical Package for Social Sciences program (IBM-SPSS version 24). Mean and standard deviation was presented for quantitative variables like age and duration of hospital stay. Frequency and percentage of qualitative variables like gender, treatment efficacy, complications, and recurrence were computed. Treatment efficacy was

defined as complete resolution of symptoms, no post-operative complications, and no recurrence within six months of discharge.

## Results

The age range of the patients selected for this study was from 5 to 12 years. The overall mean and standard deviation of the age of the patients was 9.26±2.09 years. In group C mean and standard deviation of the age was 8.93±2.41 years while in group S it was 9.58±1.67 years. The age difference between both groups was insignificant with a p-value of 0.144. Out of 90 patients selected for this study, 58 (64.44%) were male and 32 (35.56%) were female with male to female ratio of 1.81:1. In group C, out of 45, 27 (60%) patients were male and 18 (40%) patients were female; while in group S 31 (68.89%) patients were male and 14 (31.11%) patients were female. The difference in gender in both groups was not significant with a p-value of 0.378. There was no statistically significant difference in treatment efficacy of both groups. In group C, 5 (11.11%) patients did not respond to conservative management and they were managed with appendicectomy, and recurrence of symptoms was seen in 6 (13.33%) patients in group C, they were also managed with appendicectomy. In group S, 6 (13.33%) patients suffered post-operative complications. Details of treatment efficacy, post-operative complications, and hospital stay are shown in Tables 1, 2, and 3 respectively.

**Table 1: Treatment Efficacy in Both Groups**

| *Group* | *Efficacy* | | *P-value* |
|---|---|---|---|
| | Yes | No | |
| | n (%) | n (%) | |
| Group C | 34 (75.56%) | 11 (24.44%) | |
| Group S | 39 (86.67%) | 6 (13.33%) | 0.114 |

**Table 2: Post-operative Complications**

| *Complication* | *Number of Patients n (%)* |
|---|---|
| Surgical Site infection | 4 (8.88%) |
| Respiratory infection | 2 (4.44%) |
| Fecal Fistula | 0 (0%) |
| Post-operative adhesions | 0 (0%) |
| Death | 0 (0%) |

**Table 3: Hospital Stay**

| *Group* | *Hospital Stay in Days (Mean±SD)* | *P-value* |
|---|---|---|
| Group C | 4.31±1.20 | 0.368 |
| Group S | 4.09±1.12 | |

## Discussion

Acute appendicitis and its complications pose a significant amount of workload on the healthcare system all over the world. Incidence of acute appendicitis in the pediatric population varies from seven to eight percent.[10] Males tend to have a higher lifetime risk of developing acute appendicitis than females (8.6% versus 6.7%).[11] Prompt diagnosis and early surgery have remained the mainstay of management for quite some time now. However many researchers have tried the non-surgical conservative management of uncomplicated acute appendicitis with promising results.[12,13]

In our study, we observed that there was no statistical difference in the efficacy of treatment between the conservative and surgically managed groups. Thirty-four (75.56%) patients were successfully managed with conservative management in our study. In a study conducted by Steiner Z et al, 42 (89.36%) out of 47 patients were successfully treated with conservative management.[14] Similar results were seen in another study.[15,16] In a local study conducted by Safirullah et al conducted at Hayatabad Medical Complex and Lady Reading Hospital, Peshawar, concluded that appendicular mass can be successfully managed with conservative management.[17]

In our study, the recurrence of acute appendicitis was seen in 6 (13.33%) patients. In a study conducted by Paudel G, recurrence was seen in 7 (7.3%) out of 95 patients.[18]

Limitation: The limitation of this study was the follow-up was done for only six months, as carrying follow-up was extremely difficult as the majority of patients reporting in our institute come from far-flung areas of rural Sindh.

Recommendation: It is recommended that similar studies should be carried out with at least one-year follow-up to find out the incidence of recurrence after conservative management.

## Conclusion

It is concluded in our study that uncomplicated acute appendicitis can be successfully managed with non-surgical conservative management.

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