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## A study on treatment option for appendicitis- conservative vs surgical methods and its outcomes with Alvarado score of five

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### Abstract

**Background:** Acute appendicitis is one of the commonest causes of acute abdomen. There is a wide discussion and controversy on the surgical and nonsurgical treatment of acute uncomplicated appendicitis.

**Aim and objective:** The aim of this study was to evaluate the efficacy and outcomes of the conservative management Vs Surgical management of selected cases of acute appendicitis with Alvarado score of five.

**Patients and methods:** This was a prospective study done at NIZAMS Institute of Medical sciences, Panjagutta and Bibinagar with duration of 24 months. Patients with clinical and radiological features of acute appendicitis presenting within 72 h of the beginning of abdominal pain with Alvarado score 5 were included. The follow-up period was 6 months. They were divided into two groups (Group A & Group B).

Patients in Group A were subjected to non-operative management with antibiotics while patients in Group B were subjected to appendectomy. All patients were evaluated at hospital discharge, at 30-days and at a median follow-up on year. The primary outcome was the success rate of the non-operative management. Secondary outcomes were the difference of length of hospitalization, time to return to normal activity, and quality-of-life measures between both groups.

**Results:** The success rate of non-operative strategy was 95% (38 of 40) at hospital discharge, 90% (36 of 40) at 30-days and 85% (34 of 40) at a median follow-up of one year. Patients in Group A have a significantly shorter time to return to normal activities. They reported higher quality of life scores. The length of hospitalization was significantly shorter in Group B.

**Conclusion:** Giving intravenous antibiotics to some patients with Alvarado score of Five or less with uncomplicated acute appendicitis instead of having them undergo surgery may be safe and effective.

**Keywords:** Appendicitis, antibiotics, conservative, appendectomy

### Introduction

Acute appendicitis is one of the most common surgical emergencies seen in general surgery practice. Complications can be severe and include perforation and generalized peritonitis. Currently, appendectomy has been the primary treatment, even in cases of unconfirmed diagnosis, given the low incidence of major complications. However, in 15-30% of cases the appendix is found to be free of disease upon resection<sup>[1-2]</sup>. Appendectomy can result in many complications such as surgical wound infection, intestinal obstruction due to adhesions, pneumonia, and tubal infertility in females.

Non-operative treatment of an uncomplicated acute appendicitis has safety implications. But delaying surgery may increase the risk of perforated appendicitis, intra-abdominal abscesses, and localized or diffuse peritonitis. Surgery may be associated with a longer hospital stay and higher costs compared with nonoperative management with antibiotics, but delayed treatment and a perforated appendix may worsen morbidity, duration of sick leave and costs. However, nonoperative management with antibiotics may be a cost-effective alternative to surgery in a large percentage of patients without increasing the risk and may reduce hospital stay and costs in both developed and third world countries<sup>[3]</sup>. There is considerable discussion regarding the application of conservative treatment compared with surgical treatment in selected cases of acute appendicitis, as few studies have addressed this issue to date<sup>[4-8]</sup>.

Other authors suggest that appendectomy may not be necessary for the majority of patients with acute uncomplicated appendicitis, as the condition resolves spontaneously without the need for a surgical procedure in many patients and in others may be treatable with antibiotics alone [9]. This approach has many advantages, including high success and low recurrence rates, reduced morbidity and mortality, less pain, shorter hospitalization and sick leave, and reduced costs [10].

The aim of this study was to evaluate the effectiveness of conservative treatment in uncomplicated acute appendicitis using antibiotic as a first treatment plan and to assess the treatment failure.

## Methods

### Type of study

This is a prospective study of patients with age group > years 14 who have acute uncomplicated appendicitis.

### Study Population

The patients were divided into two groups (Group A & Group B).

Patients in Group A were subjected to non-operative management with antibiotics while patients in Group B were subjected to appendectomy.

### Duration of the study

The study was carried out between January 2017 to December 2018 at NIZAMS Institute of Medical sciences Panjagutta & Bibinagar.

## Procedure

The diagnosis of acute uncomplicated appendicitis with fewer than 48 hours of symptoms was made according to history, physical examination result, WBC count, and ultrasonographic findings showing evidence of non-ruptured appendicitis with an appendiceal diameter of 0.8 cm or less [13]. Exclusion criteria included age group less than years, suspicion of perforation, Phlegmon, symptoms lasting more than 48 hours, recurrent appendicitis, localised/ generalised peritonitis, peri appendiceal collection.

Enrolling into either group was depending on the choice of the patient or his/her family after clarification of both types of management and the possibility of turning to appendectomy at any time. An informed consent was taken from each patient or his/her family.

**Follow-up:** Patients who did not improve within 24 hours were considered to have failed non-operative management and underwent appendectomy. Patients in Group B were evaluated at hospital discharge, at 30-days and at a median follow-up on year.

## Outcome Measures

The primary outcome was the percentage of patients who were successfully treated non-operatively. Secondary outcomes were the difference of length of hospitalization, time to return to normal activity, and quality-of-life measures between both groups.

## Results

**Table 1:** Socio-demographic characteristics, clinical features and blood test in both groups

Characteristics	Group A(n=40)	Group B (n=70)	p-value
Age in years	35 (21-42)	28 (17-40)	0.38
Male (n %)	30 (75)	50 (71.4)	0.32
Duration of abdominal Pain N (%)	12 (7-20)	15 (10-25)	0.26
Fever n (5%)	13(32.5)	14 (28)	0.23
Vomiting n (%)	20 (40)	26 (52)	0.28
Diarrohea n (%)	5 (12.5)	35 (50)	0.45
White blood cell count	13.4 (9.5-14.0)	14.5 (10-15.0)	0.27

Forty chose to follow the non-operative strategy (Group A) while seventy chose to undergo appendectomy (Group B). There were no significant differences between the two groups as regards the socio-demographic characteristics, duration of complaint, presenting symptoms, or white blood cell counts (Table 1). In Group B, the pathological analysis of the removed appendix demonstrated complications in 1.42% of patients (n=1) this patient had impending perforation. Five appendices were perforated and three were gangrenous. The appendix was normal in 10% (n = 7).

Fortunately; all patients in Group A could be followed up for one year. The success rate of non-operative strategy was 95% (38 of 40) at hospital discharge, 90% (36 of 40) at 30-days and 85% (34 of 40) at a median follow-up of one year. There were four patients shifted to appendectomy during their initial admission because of lack of improvement or clinical progression within 24 hours of antibiotic administration. The pathology of their appendices revealed. Two patients presented with recurrent abdominal pain within 30 days after being discharged. One of them came

back after 7 days and the other after 22 days. Both of them were operated upon for appendicitis. None of them exhibited progression of his appendicitis to rupture or gangrene at the time of appendectomy. The pathology of first patient showed acute uncomplicated appendicitis while that of the second patient (after 22 days of discharge) showed normal appendix. Three patients presented with clinical picture suggestive of acute appendicitis between 30 days after being discharged and approximately one year of follow up. The pathological study of their appendices revealed acute appendicitis.

Patients in Group A have a significantly shorter time to return to normal activities. The length of hospitalization was significantly longer in Group A (A median of 40 hours versus a median 23 hours). Patients in Group A reported higher quality of life scores (measured by WHO standardized quality of life questionnaire). The comparison between both groups as regards the secondary outcomes is shown in Table 2.

**Table 2:** Secondary outcomes in both groups

Outcomes	Group A(n=40)	Group B (n=70)	p-value
Days to return to normal activities	3.5 (2-7)	17 (10-23)	<0.0001
Length of Hospitalization	42 (25-45)	24 (18-35)	<0.0001
QOL questionnaire	96 (88-98)	85 (80-92)	<0.001

### Discussion

Acute appendicitis is one of the commonest causes of acute abdomen. Although appendectomy has been regarded as the gold standard, conservative management with antibiotics is gaining more and more acceptance. There are many advantages of conservative treatment (i.e. antibiotic treatment) over surgical treatment. Antibiotics give the chance to treat acute appendicitis when surgical means are not readily accessible particularly in developing countries and isolated areas. Conservative treatment is associated with less cost effect balanced to surgery<sup>[11]</sup>. Antibiotic treatment can reduce the mortality and morbidity risk associated with surgery.

In a recent systematic review and meta-analysis conducted by Liu and Fogg 2011, they analyzed six reports comprised of 1,201 patients. They reported that the mean antibiotic failure rate was 6.9% (range 0% to 11.8%) and the mean recurrent appendicitis rate was 14.2% (range 5.3% to 35%). A mean of 7.3% of patients (range 3.2% to 10%) had a normal appendix at appendectomy. Also they found that complications were considerably less likely to occur with antibiotic treatment than with appendectomy. Major surgical complications included enterocutaneous fistula and reoperation<sup>[12]</sup>. These results and conclusion is largely match with that of the current study.

### Conclusion

Conservative treatment can be applied safely in the majority of cases of the first attack of uncomplicated acute appendicitis with Alvarado score five therefore, avoiding appendectomy and its associated morbidity and mortality. However, conservative treatment requires close monitoring and repeated re-evaluation of the clinical condition of the patients to recognize a failure in improvement of clinical status, which needs to be treated immediately by surgery. Treatment failure on initial admission as well as the short-term recurrence after conservative treatment is low and acceptable.

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**Conflict of Interest:** None

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