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Assessment of the efficacy of non-operative management of uncomplicated acute appendicitis

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Abstract

Appendicitis is a common surgical emergency that has traditionally been treated with surgery. However, there is increasing interest in non-operative management of uncomplicated acute appendicitis with antibiotics alone. This study aimed to assess the efficacy of non-operative management of uncomplicated acute appendicitis. This was a retrospective study of patients with uncomplicated acute appendicitis who were managed with antibiotics alone. Patients were identified from electronic medical records, and data were collected on demographics, clinical presentation, laboratory and radiological investigations, treatment, and outcomes. The primary outcome was successful non-operative management, defined as resolution of symptoms and signs of appendicitis without the need for surgery. A total of 42 patients were included in the study. Successful non-operative management was achieved in 35 patients (83.3%), while the remaining 7 patients (16.6%) required surgery due to persistent or worsening symptoms. No major complications were reported in the non-operative management group. Non-operative management of uncomplicated acute appendicitis with antibiotics alone appears to be a safe and effective alternative to surgery. Our findings are consistent with previous studies that have reported high success rates for non-operative management. However, further research is needed to determine the optimal patient selection criteria for non-operative management and to compare the long-term outcomes of non-operative and surgical management.

Keywords: Appendicitis, Surgery, Non-operative management

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Introduction

Acute appendicitis (AA) is the most common surgical emergency worldwide, with one in ten people experiencing it at some point in their lives [1]. For more than a century, appendectomy has been the conventional treatment for AA. Despite the fact that appendectomy is a common surgical operation with a low fatality rate, it can cause postoperative morbidity [2].

However, in 15-30% of cases the appendix is found to be free of disease upon resection [3]. Many complications may arise after an appendectomy, including surgical wound infection, intestinal obstruction related to adhesions, pneumonia, and tubal infertility in women [4]. Non-operative antibiotic treatment, on the other hand, may be a cost-effective alternative to surgery in a significant majority of patients, reducing hospital stay and expenses while reducing risk. Conservative treatment has appeared to be safe and successful as a first-line treatment for AA in the last ten years, however with an unclear long-term risk of recurrence or other problems [5].

The reason for the conservative treatment of AA is that it is widely believed that the appendix serves no purpose in humans. In 2006, De Coppi et al. discovered that the vermiform appendix can produce mesenchymal stem cells [6]. And Depending on the stimulation, these cells can differentiate into osteoblasts, lipoblasts, or myoblasts. They believed that the vermiform appendix could serve as a reservoir for stem cells capable of intestinal repair over time [7].

Some authors also hypothesized that the appendix could function as a reservoir for bacteria from the gut flora, enabling recolonization of the bowel after bacterial infections [8]. This approach offers a number of benefits, including high success and low recurrence rates, lower morbidity and mortality, less pain, shorter hospitalization and sick leave, and lower expenses [9]. The aim of this study was to see how successful non-operative therapy was in treating uncomplicated acute appendicitis using antibiotics as the first line of treatment and how treatment failure was measured.

Patients and Methods

This study was conducted at Ibn Sina Training hospital from June 2019 to December 2020. All patients gave their informed consent and ethical approval from the hospital scientific committee were obtained.

This study included all patients who had pain in the right iliac fossa for less than 72 hours and were clinically identified as having their first incident of appendicitis with an Alvarado score of ≥ 5 (Table 1). All patients had ultrasonographic imaging of their abdomen and pelvis

to confirm the clinical diagnosis of acute appendicitis and rule out the possibility of other intra-abdominal diseases. All of them had tubular, non-compressible bowel loop with increased wall thickness >6 mm.

Exclusion criteria

Included chronic/recurrent appendicitis, patients presented with complicated appendicitis such as perforation, abscess, mass on clinical examination or radiological reports, those who are lost during follow-up and patients unwilling for conservative management, patients with a medical disease such as diabetes mellitus and hypertension, immunocompromised patients, pregnancy and allergy to antibiotics.

All patients who met the inclusion criteria defining acute appendicitis of both ultrasonographic findings (tubular, non-compressible bowel loop with increased wall thickness) and clinical correlation following Alvarado scoring system were hospitalized and given intravenous antibiotics for at least 24 hours (ceftriaxone 1 g twice day and metronidazole infusion 500 mg/100 ml three times daily).

Patients were given IV fluids and had no oral intake throughout this time, with 8 hourly follow-up charts for assessing the patients vitally.

Patients with improved signs and symptoms were sent home the next morning and instructed to continue taking oral antibiotics for a total of 10 days (ciprofloxacin 500 mg twice a day and metronidazole 500 mg three times a day). Patients were advised to contact instantly if they had pain, vomiting, or a fever. A two-month follow-up was done after the end of the treatment.

Successful non-operative treatment was defined as being the patient sent home after symptomatic relief was achieved without the urge for surgical procedure during a follow-up of 2 months.

There were two sections to the failure of conservative treatment. First, treatment failure shows a lack of clinical improvement, necessitating appendectomy in the admitted patient while undergoing conservative treatment. Second, recurrence, which refers to the return of symptoms or disease in a previously successfully conservatively managed patient after a 2-month follow-up period.

Table 1.
Alvarado score.

Variable		Score
Symptoms	Migratory RIF pain	1
	Anorexia	1
	Nausea & Vomiting	1
Signs	Tenderness (RIF)	2
	Rebound tenderness	1
	Elevated temperature	1
Laboratory	Leukocytosis	2
	Shift to left	1
Total		10

Statistical Analysis

Statistical package for social science version 20 (SPSS 20) was used for both data entry and data analysis. Discrete variable presented as number (%). Chi-square test (or fisher exact test when appropriate) used to test the significance of association for the discrete variable. p-value of <0.05 were considered significant.

The Results

In this observational analytic study, 42 cases of uncomplicated acute appendicitis were managed conservatively. Regarding the gender of the patients, 46.7% were males (N=20), while 52.3 % were females (N=22). Regarding the age of the patients, we found that (13 of patients were <20 years, 17 of patients were 20-29 years, 7 of patients were 30-39 years and just 5 of patients were more than 40 years), mean age was 24.714 (range, 18-82) years (Table 2).

Regarding the duration of presenting symptoms, (N=29) of the included patients (69%) presented to the hospital with signs and symptoms of acute appendicitis with time interval ≤24 h, while (N=9) patients presented with time interval 24-48 h (21.5%) and (N=4) patients presented with time interval 48-72 h (9.5%) as shown in Table 3.

In patients who were managed conservatively (N=42) for uncomplicated acute appendicitis, non-operative treatment was found successful in (83.3%) patients (N=35) with no recurrence in the follow-up period of 2 months. However, in the remaining (16.6%) patients (N=7), non-operative treatment failed and were operated after 1-3 days of treatment (Table 4).

Gender and age ($P = 0.66$), ($P = 0.78$) respectively, were found non-significant factors. for the success of non-operative management of the patients.

Table 2

Age and gender distribution of the study.

Age (years)	No. of patients (%)	Mean Age
<20 years	17 (40.4)	14.6
20-29 years	13 (30.9)	23.5
30-39 years	7 (16.6)	34.4
>40 years	5 (11.9)	48.4
Total	42 (100)	24.7

Gender	No. of patients (%)
Male	20 (41.25)
Female	22 (58.75)

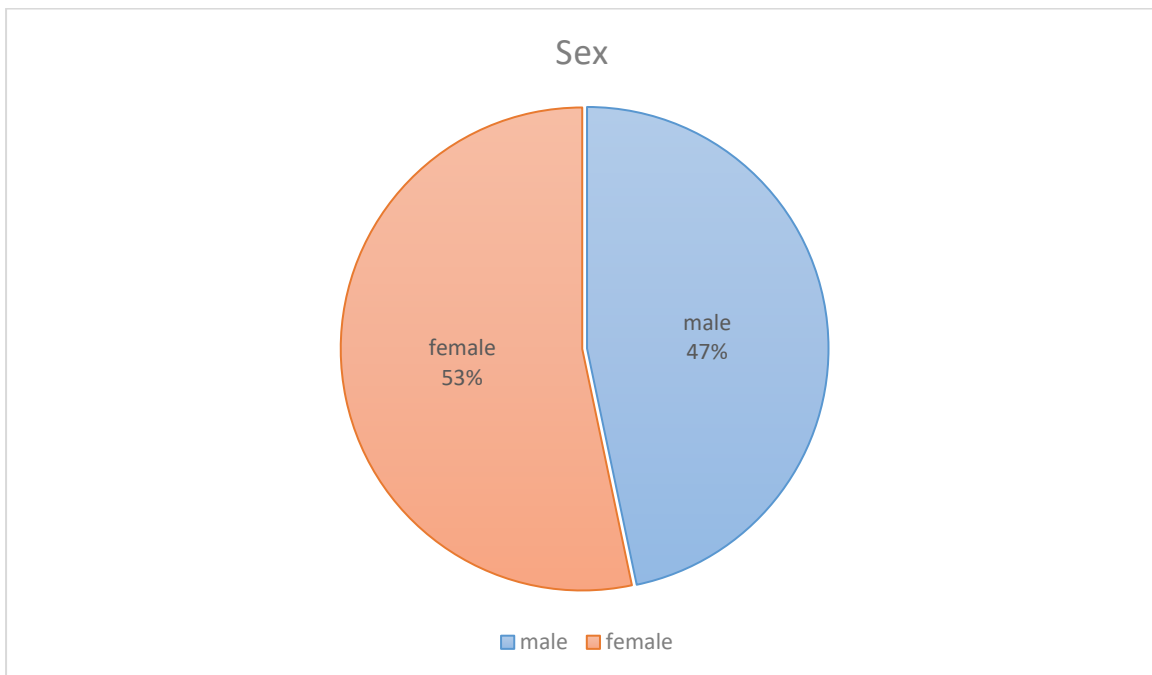


Figure 1.

Gender distribution of patients

Table 3.

Number of the patients according to the duration of presenting symptoms.

Hours of attack of appendicitis	No. of patients (%)
≤24 h	29 (69)
24–28 h	9 (21.5)
48–72 h	4 (9.5)
Total	42 (100)

Table 4.

Outcomes of non-operative management

Outcome	No. of patients (%)
Successful	35 (83.3)
Un successful	7 (16.6)
Total	42 (100)

Table 5.

Comparison between the outcomes of non-operative management across different variables.

Variables	Outcomes of non-operative treatment		P-value	
	Success	Failure		
Gender	Male	16 (80%)	4(20%)	0.66
	Female	19 (86.4%)	3 (13.6%)	
Age group	<20 years	14(82%)	3(18%)	0.78
	20-29 years	12(92%)	1(8%)	
	30-39 years	4(57%)	3(43%)	
	> 40 years	5(100%)	0	
Hours of attack	≤24 h	23(79%)	6(21%)	0.02
	24–28 h	8(89%)	1(11%)	
	48–72 h	4(100%)	0	

Discussion

The non-operative management of uncomplicated acute appendicitis has been a topic of discussion for several years [10]. Our research aimed to evaluate the efficacy of non-operative management in patients with uncomplicated acute appendicitis. The results of our study indicate that non-operative management was successful in 83.3% of patients, with only 16.6% of patients requiring surgery.

These findings suggest that non-operative management can be a viable option for patients with uncomplicated acute appendicitis, reducing the need for surgery and its associated risks. However, further studies are needed to determine the long-term outcomes of non-operative management and to identify patient populations that may benefit most from this approach. Nevertheless, our research contributes to the growing body of evidence supporting the use of non-operative management for uncomplicated acute appendicitis. Comparing our results with other studies on non-operative management of uncomplicated acute appendicitis, our findings are consistent with the existing literature. A meta-analysis conducted by Wilms et al. (2019) reported a success rate of 81% for non-operative management, which is similar to our result of 83.3% [11]. In addition, our success rate is comparable to those reported in other studies, such as a systematic review by Salminen et al. (2018) which found a success rate ranging from 63% to 95% across different studies [12].

However, it should be noted that there are some variations in the definition of uncomplicated acute appendicitis and criteria for non-operative management across different studies, which could affect the outcomes. For example, some studies exclude patients with comorbidities or with a high risk for complications, while others include them. Despite these differences, the overall trend in the literature suggests that non-operative management can be a safe and effective alternative to surgery for uncomplicated acute appendicitis in selected patients.

Ethical approval

Ethical approval was obtained from the relevant institutional review board (Ibn Sina Training Hospital). Informed consent was obtained from all patients prior to their inclusion in the study, and all procedures were carried out in accordance with the principles of the Declaration of Helsinki. The potential benefits and risks of non-operative management were fully explained to all patients, and they were given the opportunity to choose between non-operative and surgical management.

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