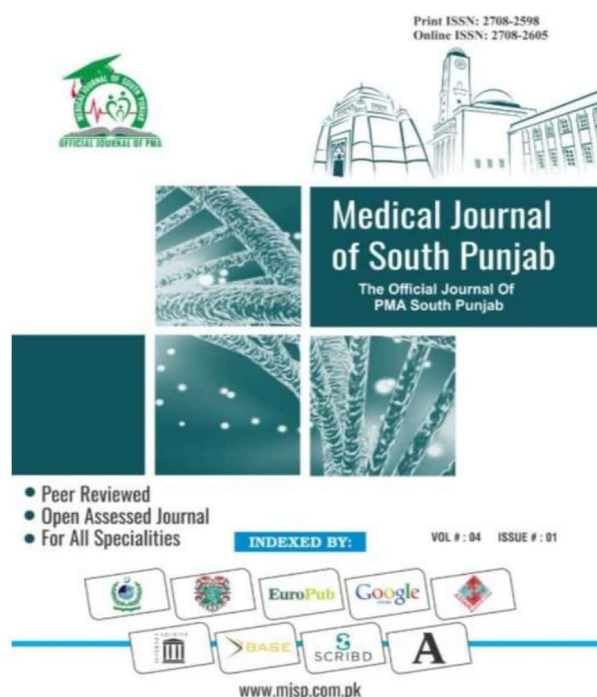


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ABSTRACT

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Comparison of antibiotic therapy versus appendectomy in patients with Acute appendicitis

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ABSTRACT

Objective: To compare antibiotic therapy versus appendectomy in patient with acute appendicitis.

Methods: A randomized controlled trial was conducted at Nishtar Hospital Multan, from May 2023 to November 2023 in 6 months' duration. Ethical approval was approved by Collage of Physicians and surgeons of Pakistan and chairman ethical committee of hospital. The two groups in this study are receiving different treatments: antibiotic therapy and appendectomy. Visual analogue scoring system was used for measurement of pain ranging from 0 (indicating no pain) to 10 (severe pain).

Results: The mean pain experienced of Group A and B was 3.53 ± 0.88 days and 3.65 ± 0.87 , respectively ($p=0.404$). The mean length of stay in hospital of Group A and B was 4.51 ± 2.19 days and 4.94 ± 1.77 days, respectively ($p=0.155$). The mean VAS score was observed at discharge, after one and two months. The mean VAS score of Group A at discharge was 1.98 ± 0.68 whereas after one week and at one month was 1.17 ± 0.55 and 1.01 ± 0.46 . The mean VAS score of Group B at discharge was 3.18 ± 0.68 whereas after one week and at one month was 1.89 ± 0.65 and 1.18 ± 0.54 ($p < 0.050$).

Conclusion: Findings of this study reveal that antibiotics can be used as an alternative to surgery if the patient's condition is not severe and there is no perforation of the appendix during the six-month follow-up period. This suggests that antibiotic treatment was effective in managing the condition in these patients.

Keywords: Appendicitis, Conservative treatment, Appendectomy, Hospital stay, Pain score

1. INTRODUCTION

In young adults appendicitis is a common cause of acute abdomen. The appendicitis causes severe pain in the lower right quadrant of abdomen¹. Pain of appendicitis usually worsens with worsening of inflammation and eventually become serious complicating to peritonitis, abscess, or sepsis². Risk factors includes age in 20's and teens. It is more common in males. Family history carries greater risk. It is classified as acute or chronic. Signs and symptoms include constipation, vomiting, nausea, diarrhea, low grade fever and loss of appetite³.

According to BMC surgery 2023, in some cases, antibiotics may be a suitable alternative to surgery, while in others; surgery may be the preferred option⁴. The cure rate of uncomplicated acute appendicitis treated with antibiotics is 73-88%, within five years 54-61%⁵. Meta-analysis and systematic review of such trials have yielded supportive conclusion. Data obtained from Pak Armed forces journal 2017 acute appendicitis can still be challenging to diagnose despite the availability of modern diagnostic modalities such as CT scans. The negative appendectomy rate, refers to the percentage of patients who undergo surgery for suspected appendicitis but do not actually have appendicitis, can indeed range from 10% to 25% and 0.24% mortality in 30 days^{5,6}. One RCT that compared antibiotic therapy with appendectomy in young adults found that 88% improved without surgery and 14% had recurrent appendicitis within 1 year in total⁷.

Conservative therapy with antibiotics involves administering antibiotics to treat the infection associated with acute appendicitis without immediately performing surgery⁸. This approach is typically considered for patients with uncomplicated, non-perforated appendicitis⁹. Research

conducted over the last decade has shown that conservative therapy with antibiotics can be a safe and effective option for some patients with uncomplicated acute appendicitis. It can resolve the infection and symptoms in many cases, avoiding the need for surgery¹⁰.

The results of this study can help inform medical guidelines and clinical practice, potentially providing a more evidence-based approach to the treatment of acute appendicitis. However, it's important to note that the specific results may vary, and the choice between surgery and antibiotics may depend on individual patient factors and the severity of the condition.

2. METHODOLOGY

A randomized controlled trial was conducted at Nishtar Hospital Multan, from May 2023 to November 2023 in 6 months' duration. Ethical approval was approved by Collage of Physicians and surgeons of Pakistan and chairman ethical committee of hospital [CPSP/REU/SGR-2019-099-10854]. Calculated a sample size of 166 using the WHO sample size calculator with the following parameters, level of significance 95%, power of the test 80%, mean hospital stay in the conservative group = 3.22 ± 1.59 days, mean hospital stay in the appendectomy group = 3.02 ± 1.52 days.

The two groups in this study are receiving different treatments: antibiotic therapy and appendectomy. Visual analogue scoring system was used for measurement of pain ranging from 0 (indicating no pain) to 10 (severe pain). This scale is commonly used to assess the severity of pain described by patients. Pain duration was measured in days; starting from the day pain description to the day of patient had a VAS score of 2 or below. This suggests that the study is interested in understanding how long it takes for patients to experience a reduction in pain to a certain level after receiving their respective

treatments. The use of a lottery method for randomizing patients into the two groups helps ensure that the groups are comparable and reduces potential bias in the assignment of treatments.

Adult patients with age greater than 13 years, with uncomplicated acute appendicitis based on clinical examination, clinical symptoms indicating acute appendicitis, such as fever or acute abdomen, presence of localized tenderness, ultrasound showing the presence of an echogenic tubular structure in the abdomen were included. Patients with an appendicular lump present clinically, patients with certain comorbidities, including diabetes mellitus, tuberculosis, asthma, hypertension. Pregnant women, previous abdominal surgery and abnormal blood clotting (deranged coagulation) excluded from the study.

Patients in this group received medications, Injection Ceftriaxone 1 gram BD (twice a day), Injection Metronidazole 500mg TDS thrice a day, Injection Paracetamol 1 gram TDS thrice a day for pain management. Demographic data, including age and gender, were recorded for the patients. Medical data, such as the presence of systemic illness, Visual Analog Scale (VAS) scores for pain assessment, hospitalization details, and the results of investigations, were also documented. Patients were advised followed up for six months regularly after the initial treatment. Patients were considered to have a successful outcome if they were discharged from the hospital without any surgery. Successful outcomes also included the absence of recurrent appendicitis during follow-up duration. In the appendectomy group, patients underwent surgical removal of the appendix using an open approach. SPSS version 27 was used for all possible numerical and categorical variables in terms of association with outcome variables like hospital stay, pain score and sepsis. Student

t-test and chi square tests were applied to see association among variables. At the end analysis significant probability values of 0.05 was taken as significant.

3. RESULTS

Overall, 166 patients were included in our study, both genders. There were 80 (48.2%) patients treated with antibiotic (Group A) and 86 (51.8%) patients treated with appendectomy (Group B). The average age of Group A was 29.35 ± 10.73 years. Most of the patients 32 (40.0%) were between 13-25 years. There were 54 (67.5%) males and 26 (32.5%) females. The mean hemoglobin and TLC of Group A was 12.15 ± 1.71 g/dl and 11135.51 ± 48.47 /mm³, respectively. The mean age of Group B was 31.74 ± 11.34 years. Most of the patients 49 (57.0%) were between 26-45 years. There were 52 (60.5%) males and 34 (39.5%) females. The mean hemoglobin and TLC of Group A was 12.48 ± 1.69 g/dl and 11141.86 ± 66.01 /mm³, respectively. Antibiotic to appendectomy conversion rate was 47 (28.1%) (Table. I).

The mean pain experienced of Group A and Group B was 3.53 ± 0.88 days and 3.65 ± 0.87 , respectively, ($p=0.404$). The mean length of stay in hospital of Group A and B was 4.51 ± 2.19 days and 4.94 ± 1.77 days, respectively, ($p=0.155$). The mean VAS score was observed at discharge, after one and two months. The mean VAS score of Group A at discharge was 1.98 ± 0.68 whereas after one week and at one month was 1.17 ± 0.55 and 1.01 ± 0.46 . The mean VAS score of Group B at discharge was 3.18 ± 0.68 whereas after one week and at one month was 1.89 ± 0.65 and 1.18 ± 0.54 . The differences between the group were statistically insignificant, ($p < 0.050$). (Table. II).

Table. I

Demographic and baseline characteristics of the study groups

Characteristic	Antibiotic 80 (48.2%)	Appendectomy 86 (51.8%)	p-value
Age (years)	29.35±10.73	31.74±11.34	0.391
13-25 years	32 (40.0)	26 (30.2)	0.367
26-45 years	41 (51.3)	49 (57.0)	
46-65 years	7 (8.8)	11 (12.8)	
Sex			
Male	54 (67.5)	52 (60.5)	0.346
Female	26 (32.5)	34 (39.5)	
Hemoglobin (g/dl)	12.15±1.71	12.48±1.69	0.212
TLC (/mm ³)	11135.51±48.47	11141.86±66.01	0.484
Conversion 47 (28.1%)			

Table. II
Comparison of outcome variables of the study groups

Variable	Antibiotic 80 (48.2%)	Appendectomy 86 (51.8%)	p-value
Duration of pain (days)	3.53±0.88	3.65±0.87	0.404
LOS (Days)	4.51±2.19	4.94±1.77	0.155
VAS (pain score)			
At discharge	1.98±0.68	3.18±0.68	<0.001
At one week	1.17±0.55	1.89±0.65	<0.001
At two months	1.01±0.46	1.18±0.54	0.040

4. DISCUSSION

The treatment of acute appendicitis has been a subject of ongoing debate and research in the medical field. While for many years, the surgical removal of the inflamed appendix has been the standard treatment for acute appendicitis, there has been growing interest in exploring non-surgical

alternatives, such as antibiotic therapy. This approach is sometimes referred to as "antibiotic-first" or "non-operative" management¹¹.

In this study mean age of patients was 29.35±10.73 in antibiotic group and 31.74±11.34 in appendectomy group and male patients were dominant. In a study conducted by Rather et al¹² reported similar findings that appendicitis is more common in the younger age group, specifically between the ages of 13 and 25 years. Another study was conducted by Bajwa et al¹³ in 2019 also reported that appendicitis can affect people of all ages, but it is more common in the younger age group, particularly in individuals between the ages of 10 and 30.

Jalil et al¹⁴ conducted a study on acute appendicitis patients and found a male predominance with a male-to-female ratio of 1.3:1. This suggests that in their study, there were more male patients with acute appendicitis compared to female patients. In another previous study conducted by Yalima et al¹⁵ in 2019 and reported that acute appendicitis is more common in male patients as compare to female gender.

In this study, 28.1% of patients underwent appendectomy in antibiotic group. Observation is consistent with a similar study by Salminen et al¹⁶, in which 29.6% of patients initially treated with antibiotics. Vons et al¹⁷ reported a conversion rate of 37%, which means that 37% of patients initially treated with antibiotics ended up needing an appendectomy. Hansson et al¹⁸ reported a higher conversion rate of 48%, indicating that 48% of patients in their study who received antibiotic treatment ultimately required an appendectomy.

Talan et al¹⁹ reported a lower frequency of a particular result (6.25%), and then mentions that in a study, 72.8% of patients were successfully treated with conservative method for uncomplicated acute appendicitis. In this study mean period of

pain in two study groups was not significantly different. This result is consistent with a study conducted by Malik et al²⁰ in 2009, which also found similar results.

Group that received antibiotics have longer hospital stay as compared to the group that did not (3.22±1.59 days vs. 3.02±1.52 days; p=0.521). Other studies conducted by Podda et al²¹ and Salminen et al¹⁶ reported similar results, implying that the findings of this study align with the findings of those earlier studies regarding the impact of antibiotics on hospital stays.

5. CONCLUSION

Findings of this study reveal that antibiotics can be used as an alternative to surgery if the patient's condition is not severe and there is no perforation of the appendix during the six-month follow-up period. This suggests that antibiotic treatment was effective in managing the condition in these patients.

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