

# Antibiotics Versus Appendectomy for Acute Appendicitis

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## ABSTRACT

**Objective:** To compare the efficacy of antibiotic treatment versus appendectomy in treatment of acute appendicitis.

**Study Design:** Retrospective study

**Place and Duration of Study:** Department of Surgery, Shahida Islam Medical Complex, Lodhran from 1<sup>st</sup> January 2021 to 31<sup>st</sup> March 2022.

**Methodology:** One hundred patients of age >18 years were enrolled after the complete assessment and confirmation of acute appendicitis. The clinical confirmation included the complete assessment of signs and symptoms of patients through Modified Charlson Index and Alvarado score. Patients were further divided into two groups with each group having 50 patients and matched for their clinical symptoms and duration. Group A had those patients who were only given antibiotics for the treatment of their acute appendicitis while Group B had those patients which were planned for appendectomy. A course of amoxicillin with clavulanic acid or fluoroquinolone was given for 7 to 10 days and the metronidazole/tinidazole was added in 60% of the cases. Patient's data was recorded on well structured questionnaire.

**Results:** The mean age was 37.5±11.2 years in group A and 38.1±10.9 years in group B. There were higher numbers of males in both groups. The average incidence of complications like perforation as well as peritonitis and surgical wound infection were significantly less in appendectomy patients and was reported as 17, 12 and 1% respectively. The long-term outcomes of antibiotic treatment plan for acute appendicitis showed requirement of appendectomy in 26% cases in group.

**Conclusion:** Antibiotic treatment can be used effectively for acute appendicitis in selected patients with careful follow up/ monitoring for complications and as an interim treatment option for patient's not opting for surgery or cannot undergo surgery, however appendectomy remains the most appropriate treatment for acute appendicitis overall.

**Keywords:** Acute appendicitis, Antibiotics, Appendectomy, Efficacy

## INTRODUCTION

Acute appendicitis is one of the most common emergencies requiring intervention globally. It is estimated that 1/10<sup>th</sup> of individual will develop acute appendicitis in their lifetime.<sup>1</sup> In cases where acute appendicitis is left untreated for longer period, the risk of complications increases. More than a century the standard treatment plan for acute appendicitis is appendectomy. The procedure has been related with a low incidence of mortality during the surgery while there has been little post-operative risk of morbidity in some cases.<sup>2</sup>

The association between the appendicitis and pelvic abscess formation has resulted in high mortality rates.<sup>3,4</sup> Appendectomy has been reported in previous studies to be the only life saving in cases where no antibiotics used. The conservative treatment plan for acute appendicitis has shown to lower down the risk of uncontrolled pelvic related infections. Appendectomy may be applied in the conservative treatment plan as well but at later stages. Various previous studies have elaborated the fact that use of antibiotics can reduce the requirement of appendectomy and can serve as an additional/ alternative treatment in acute appendicitis cases. However, the recurrence rate for appendicitis has been reported in 14.4% cases.<sup>6</sup>

Antibiotics usage can reduce the risk of acute appendicitis in various cases and have been reported to be equally efficient as appendectomy as determined in various randomized controlled trials.<sup>7-10</sup> The present study was also designed to serve the same objective and determine the exact efficacy of antibiotics for treatment of acute appendicitis. The results of this study provided evident support in opting the accurate procedure for treatment of acute appendicitis.

## MATERIALS AND METHODS

This retrospective study was carried out at Department of Surgery, Shahida Islam Medical Complex, Lodhran from 1<sup>st</sup> January 2021 to 31<sup>st</sup> March 2022. A total of 100 patients had been enrolled after the complete assessment and confirmation of acute appendicitis. The sample size was generated through WHO sample size calculator using 95% confidence interval and 80% power of test and margin of error was taken as 5%. The clinical confirmation included the

complete assessment of signs and symptoms of patients through Modified Charlson Index and Alvarado score. A written informed consent was signed by each study participant. The duration of symptoms was also documented. Radiological imaging included ultrasonography and MRI in some cases was also performed. A 3 cc blood was withdrawn from each participant and transferred to EDTA vials for complete blood analysis showing total leucocyte count was also recorded on well structures questionnaire. The patients who were having chronic appendicitis and recurring pain episodes for more than 30 days were excluded from the study. Patient below the age of 18 years were also kept in exclusion criteria. The patients were further divided into two groups with each group having 50 patients and matched for their clinical symptoms and duration. Group A had those patients who were only given antibiotics for the treatment of their acute appendicitis while Group B had those patients which were planned for appendectomy. A course of amoxicillin and clavulanic acid or fluoroquinolone was given for 7-10 days and the metronidazole/tinidazole was added in 60% of the cases. The appendectomy procedure included macroscopic identification and removal of appendix by open and/or laparoscopically. Acute appendicitis was characterized by the presence of Poly-morph nuclear leukocytes inside the mucosa /sub mucosa. Antibiotic were given prophylactically before surgery to all the patients undergoing appendectomy. In cases where complications were suspected, the antibiotic course was continued for 5 to 7 days in appendectomy group. Three ports were used in the laparoscopic surgical procedure for appendectomy with 10mm umbilical working port, a 05 mm camera port (supra pubic) and 05 mm supplementary working-port (lateral port). Pus cultures were taken and vessels of appendix were cauterized prior to clipping and division of mesoappendix. With the support of clips and endo loops the base of appendix was separated entirely. Midline/Mc-Burnys incisions were used in the cases of open surgery. Peritoneal lavages were mandatory in each surgical procedure with warm saline prior to the closure of the wound. Pus less than 50ml in drain was taken as standard for removal of drain in patients where drain was used. Data was analyzed using SPSS-25. Student's 't' test and Chi square test were applied and p value <0.05 as significant.

**RESULTS**

There was mean age of 37.5±11.2 years in Group A and 38.1±10.9 years in group B which underwent appendectomy. The demographic pattern of both group A and B were insignificant from each other than the higher number of males in both groups. The health insurances were claimed by only 36% in Group A and 38% cases in Group B (Table 1).

The BMI of group A was slightly higher than group B, however the difference was not significant with a p value higher than 0.05. Duration of clinical symptoms was also taken similar for preventing bias in the study with a mean value as 1.8±1.2 in Group A and 1.7±1.1 in Group B. The history of fever was 24% in Group A while 26% complained fever in group B (Table 2)

A course of amoxicillin with clavulanic acid or fluoroquinolone was given for 7 to 10 days and the metronidazole/tinidazole was added in 60% of the cases. The numeric rating scale at day 5 and Visual Analogue Scale at day 7 of antibiotic presented a significant variance from the appendectomy group (Table 3).

Table 1: Age and gender distribution in both groups (n=100)

Variable	Antibiotic Group	Appendectomy Group
Age (years)	37.5±11.2	38.1±10.9
Gender		
Males	33 (66%)	35 (70%)
Females	17 (34%)	15 (30%)
Health insurance	18 (36%)	19 (38%)
Commercial cases	32 (64%)	31 (62%)

Table 2: Comparison of clinical characteristics of Group A and B cases

Variable	Antibiotics Group	Appendectomy Group	P value
Body Mass Index	29±3.3	27.5±2.9	0.8
Modified Charlson Index	0.23±0.53	0.24±0.55	1.1
Duration of Symptoms	1.8±1.2	1.7±1.1	1.9
Alvardo score	6.5±1.4	6.6±1.5	1.3
Fever history	12 (24%)	13 (26%)	1.2

Table 3: Comparison of pain score in Group A and B

Pain Score	Antibiotics Group	Appendectomy Group	P value
Abdominal Pain			
Numeric Rating Scale at day 5	3	5	<0.05
Visual Analog scale at Day 7	2	5	
Mean stay at hospital days	0.4±0.2	2±1	
Mean sick leaves in days	5.7±0.3	10.2±2.1	

Table 4: Long term prevalence of appendectomy in group A

Treatment Time	Appendectomy
≤ 30 days	1 (2%)
30 -89 days	3 (6%)
90 days	13 (26%)
Total appendectomy	17 (34%)

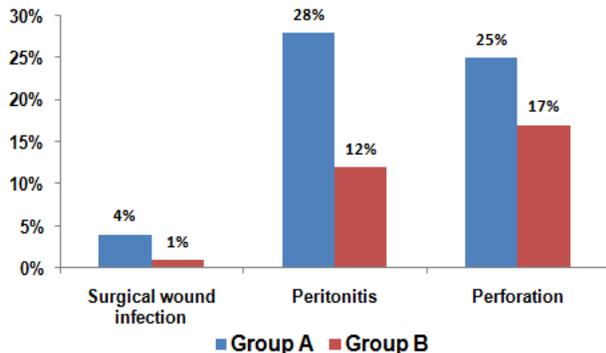


Fig. 1: Complications with Group A and B

The clinical presentation and overall patient stability were similar in Antibiotic using patients for acute appendicitis and also for those who were planned for appendectomy until 30 days. The long-term outcomes of antibiotic treatment did not have supportive results. As 26% cases from group A required appendectomy by 90 days of their symptom's onset (Table 4).

The average incidence for complications like perforation as well as peritonitis and surgical wound infection were significantly less in appendectomy patients and was reported as 17, 12 and 1% respectively (Fig. 1). Within the group A, who underwent appendectomy due to complications there were 51% of those cases which had appendicolith and while the rest of the cases were without appendicolith formation (Fig. 2).

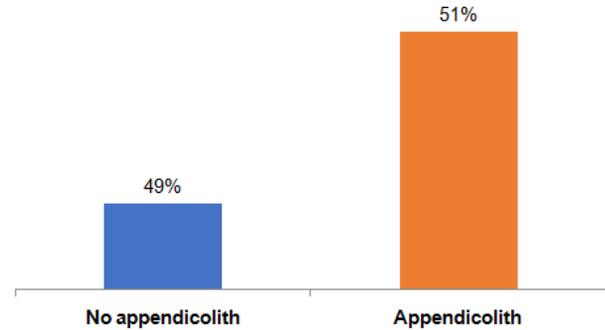


Fig. 2: Distribution of appendicolith in Group A appendectomy cases

**DISCUSSION**

The primary treatment for acute appendicitis has been appendectomy in majority of the cases. The reason being the low mortality rate related with early appendectomy in acute appendicitis cases and reduction in recurrence rate as well as that of perforation. The present study was conducted for comparing the two treatment plans and identifying the most appropriate option for treatment of the acute appendicitis. Similar research has been conducted in form of a meta-analysis where 2700 patients were compared for their advantages and disadvantages relevant to antibiotic therapy and appendectomy. The results of the study presented with higher accumulative treatment efficiency in antibiotic group as well with lower requirement of surgical intervention. However the study also pointed higher number of complication risk and potentially prolonged stay in hospital in the cases where antibiotic treatment was taken as the first treatment plan for acute appendicitis treatment.<sup>11</sup>

In another research in similar context the complication rate was presented as 11.6% in cases which were treated with antibiotics and as 19% in the appendectomy selected cases.<sup>12</sup> There has been a list of advantages mentioned and elaborated in various studies regarding usage of antibiotics as a conservative treatment plan for acute appendicitis patients. The advantages included shorter duration of hospital stay, avoidance of surgical intervention, and reduced pain as well as no blood loss involved.<sup>13-16</sup>

The antibiotic treatment was given for eight to fifteen days in the form of amoxicillin with clavulanic acid or fluoroquinolone as most appropriate choice. Similar regime has been used in other study as well with high efficacy reported with recurrence chance as only 13.8%.<sup>17</sup> The efficacy involved with antibiotic treatment is highly debatable topic and requires further extensive research. However as in the current study as well as studies reported elsewhere the efficacy has been reported to be analyzed with a follow-up in patients who have developed clinical symptoms more than 90 days up to a year. This can assist in identifying any changes and risk involvement at timely manner and reduction in chances of complication development due to acute appendicitis.<sup>18-21</sup>

## CONCLUSION

Antibiotic treatment can be used effectively for acute appendicitis in selected patients with careful follow up/ monitoring for complications and as an interim treatment option for patient's not opting for surgery or cannot undergo surgery, however appendectomy remains the most appropriate treatment for acute appendicitis overall.

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