

## Comparison of antibiotic therapy and appendectomy in acute appendicitis

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### Abstract:

**Objective:** To determine efficacy of antibiotic therapy and appendectomy in acute appendicitis in tertiary care hospital

**Study design:** Randomized controlled trial

**Study settings and duration:** Study was conducted at department of surgery, CMH hospital, Muzaffarabad. Study duration was 6 months (June 2018-Novembet 2018)

**Material and methods:** A sample size of 60 patients was calculated using WHO calculator. Non Probability consecutive sampling was used for patient's selection. Ethical approval and consent forms were taken. Patients were randomly divided into two groups; group-A was given antibiotics while group-B patients were undergone appendectomy. Patients were followed after 8 days. Efficacy of both interventions was measured. Data was analyzed using SPSS version 24. Chi-Square test was applied. P value  $\leq 0.05$  was considered significant.

**Results:** Total 60 patients were included in study (1:1 randomization 30 patients in each group). There were 38(63.3%) male and 22(36.7%) female. Mean age of patients was  $31.9 \pm 8.8$ SD. Efficacy of appendectomy group was higher than antibiotic group ( $p=0.002$ ). Surgical group had significant less hospital stay( $p=0.00$ ), recurrence rate( $p=0.04$ ), pain scores ( $p=0.00$ ) and sick leaves( $p=0.000$ ) as compare to antibiotic group. Surgical wound infection 13.3% was most common complication in appendectomy group while appendicular mass 10% was most common complication of antibiotic.

**Conclusion:** Appendectomy is an effective treatment option in adults patients diagnosed with acute appendicitis as compare to antibiotic therapy. Appendectomy had efficacy  $>50\%$  in terms of low recurrence rate, reduction in pain scores, less hospital stay and sick leaves. Further research in needed to reveal more precise indications on acute appendicitis treatment efficacy

**Keywords:** Acute appendicitis, appendectomy, antibiotics

### Introduction:

Acute appendicitis is most common abdominal emergencies, world wide.<sup>1</sup> Acute appendicitis is associated with 40000 hospital admissions per years in United Kingdom.<sup>2</sup> Acute appendicitis is common in early ages from 10-20 years of age. However, it may occur at any age. Males are at high risk of developing acute appendicitis as compare to female (life time risk 8.6% vs 6.7%) in United States.<sup>3</sup> An estimated decline in acute appendicitis had been reported after 1980s. Prevalence of acute appendicitis was

48% in 2008 at Pakistan Ordinance Factories, Wah Cantt.<sup>4</sup>

Clinically acute appendicitis is defined as acute inflammation associated with vermiform appendix.<sup>5</sup> Moreover, the inflammation is due to obstruction of appendix lumen. The obstruction might be due to infective agents, stools, lymphoid hyperplasia and faecolith.<sup>6</sup> Acute appendicitis is presented with abdominal pain, vomiting, nausea, loss of appetite and constipation. Murphy described migration of pain to

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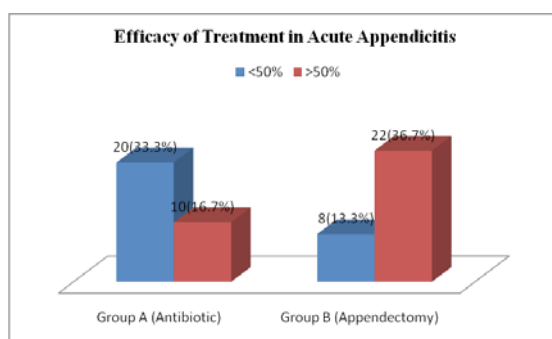


Figure 1: Efficacy of treatment in acute appendicitis

right iliac fossa in 50% of patients as diagnostic sequence (colicky central abdominal pain).<sup>7</sup> Literature reported that initial pain is termed as referred pain while the pain intensifies within 24 hours and become sharp or constant within this duration. Visceral innervations of midgut are responsible for referred pain while parietal peritoneum is responsible for localized pain in acute appendicitis patients.<sup>8</sup>

Acute appendicitis investigations involve plain radiography, ultra-sonography, computed tomography scanning and magnetic resonance imaging. Acute appendicitis treatment includes medical and surgical treatment.<sup>9</sup> Medical treatment involves antibiotics and analgesics use while surgical treatment involved open and laparoscopic approach. Evidence exist that laparoscopic approach is associated with early recovery, abdominal exploration through small incision and lower pain level. Wound infection, postoperative abscesses and hematoma formation are common complications of acute appendicitis surgery.<sup>10</sup>

Salminen et al reported that antibiotics are found to be effective in 67% patients while 9% require urgent appendectomy. Approximately, 24% patients undo relapse after 1-year. Moreover, appendectomy group was associated with less complications than antibiotic group.<sup>11</sup> Zaidi et al reported that efficacy of antibiotic therapy was 90% while appendectomy efficacy was 88%. They reported that a comparable efficacy in antibiotic group was reported in acute appendicitis patients.<sup>12</sup>

Limited literature is available on comparison of antibiotic and surgical therapy of acute appendi-

citis. Present study aims to determine efficacy of antibiotic therapy and appendectomy in acute appendicitis in tertiary care hospital.

### Material and Methods:

A randomized controlled trial was conducted at department of surgery, Combined Military Hospital, Muzaffarabad. Study duration was 6 months (June 2018-November 2018). A sample size of 60 patients was calculated with P1 84.2%, P2=5.3% 13, 5% significance level and confidence interval 95% using WHO calculator. Patients were selected through non probability consecutive sampling. Patients age >15 years, both gender and diagnosed with acute appendicitis using Alvarado scoring system (score  $\geq 6$ ). An exclusion criterion was based upon positive pregnancy test, irritable bowel disease, acute appendicitis with diffuse peritonitis and patients with allergic to antibiotics. Ethical approval was taken from ethical review board. Consent forms were taken from all participants. After selection, patients were randomly divided into two groups using simple random sampling (lottery method). Patients in group-A was given antibiotics ciprofloxacin (200mg) and metronidazole (500mg) three times a day (intravenously) for 3 days. Patients were undergone appendectomy and prophylactic antibiotics (single dose) and intravenous antibiotics post-operatively were given. Treatment efficacy was measured in terms of hospital stay, complications, recurrence, visual analogue scores (VAS) for abdominal pain and sick leave after 8 days of treatment. Data was analyzed using SPSS version 24. Mean and Standard deviation (Descriptive statistics) was calculated for quantitative data while frequency and percentage was calculated for qualitative data. Effect modifiers like age, gender and duration of diseases were controlled with stratification. Post stratification chi-square test was applied. P value  $\leq 0.05$  was considered significant.

### Results:

Total 60 patients were included in study (1:1 randomization 30 patients in each group). There were 38(63.3%) male and 22(36.7%) female. Mean age of patients was  $31.9 \pm 8.8$ SD.

Table-1: Comparison of Independent variable in both interventional groups

Gender	Interventional Groups		Total	P value
	Group A (Antibiotics)	Group B (Appendectomy)		
Male	24(40%)	14(23.3%)	38(63.3%)	0.01
Female	6(10%)	16(26.7%)	22(36.7%)	
<b>Hospital stay</b>				
≤1 week	6(10%)	22(36.7%)	28(46.7%)	0.00
>1 week	24(40%)	8(13.3%)	32(53.3%)	
<b>Recurrence</b>				
No	22(36.7%)	28(46.7%)	50(83.3%)	0.04
Yes	8(13.3%)	2(3.3%)	10(16.7%)	
<b>Sick leave</b>				
≤7 days	7(11.7%)	22(36.7%)	29(48.3%)	0.000
>7 days	23(38.3%)	8(13.3%)	31(51.7%)	
<b>Total</b>	30(50%)	30(50%)	60(100%)	

Table-2: Comparison of Visual Analogue Scores of pain in both interventional groups

Pain	VAS scoring	Interventional Groups		Total	P value
		Group A (Antibiotics)	Group B (Appendectomy)		
No pain	0-1	9(15%)	24(40%)	33(55%)	0.000
Mild pain	2-4	0(0%)	6(10%)	6(10%)	
Moderate pain	5-7	13(21.7%)	0(0%)	13(21.7%)	
Severe Pain	8-10	8(13.3%)	0(0%)	8(13.3%)	
Total		30(50%)	30(50%)	60(100%)	

appendectomy group was higher than antibiotic group (p=0.002) as shown in figure 1.

There were 24(40%) male and 6(10%) female in antibiotic group while 14(23.3%) male and 16(26.7%) female in appendectomy group (p=0.01). Majority of patients 24(40%) in antibiotic group had hospital stay >1 week while majority of patients 22(36.7%) in appendectomy group had hospital stay ≤1 week (p=0.00). Recurrence was found to be higher in antibiotic group as compare to appendectomy (13.3% vs 3.3%, p=0.04). Majority of patients in antibiotic group 23(38.3%) had sick leave >7 days while majority of patients 22(36.7%) in appendectomy had sick leave ≤7 days (p=0.000) as shown in table-1.

Majority of patients in antibiotic group had moderate pain 13(21.7%) following severe pain 8(13.3%) and no pain 9(15%). Majority of patients in appendectomy had no pain 24(40%) following mild pain 6(10%) (p=0.000) as shown in table-2. Surgical wound infection 13.3% was most common complication in appendectomy group while appendicular mass 10% was most common complication of antibiotic group as shown in figure-2.

**Discussion:**

Acute appendicitis is still ranked world-wide as most common surgical emergency leading towards morbidity. In present study, total 60 patients were included in study. Efficacy of appendectomy group was higher than antibiotic group (p=0.002). Vons et al reported that efficacy of antibiotic and surgical therapy is comparable.<sup>14</sup> Varadhan et al reported that conservative treatment (antibiotics) is more preferable in terms of morbidity, quality of life and hospital cost as compare to surgical intervention.<sup>15</sup>

In present study, there were 24(40%) male and 6(10%) female in antibiotic group while 14(23.3%) male and 16(26.7%) female in appendectomy group (p=0.01). Sallinen et al reported that acute appendicitis is more common in men as compare to women with more precise surgical outcomes.<sup>16</sup> Another similar study re-

There were 44(73.3%) patients in 16-35 years age group and 16(26.7%) patients in age group >36 years. Duration of diseases was ≤1 month 42(68.9%) and >1 month in 18(29.5%) patients. Hospital stay was ≤1 week in 28(45.7%) and >1 week in 32(52.5%) patients. Efficacy of

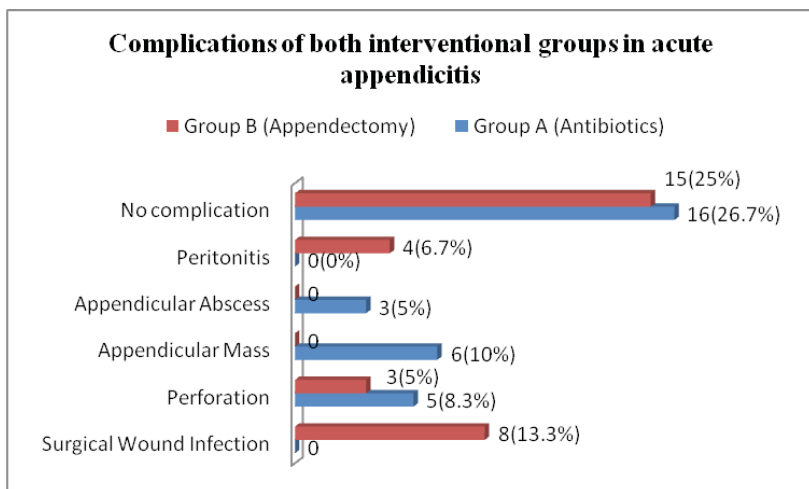


Figure 2: Efficacy of treatment in acute appendicitis

ported that there males had more accuracy of appendectomy as compare to female (RR: 1.3, 95%: C.I,  $p=0.01$ ).<sup>17</sup>

In present study, majority of patients 24(40%) in antibiotic group had hospital stay >1 week while majority of patients 22(36.7%) in appendectomy group had hospital stay  $\leq 1$  week ( $p=0.00$ ). Mason et al reported that patients treated with antibiotic in acute appendicitis had less hospital stay as compare to patients undergone appendectomy (3.4 days $\pm$ 1.2SD vs 7.3 days $\pm$ 2.1SD,  $p=0.000$ ).<sup>18</sup> Ansaloni et al reported that appendectomy in patients age > 21 years is associated with less hospital stay and more efficacy in patients diagnosed with acute appendicitis.<sup>19</sup>

Recurrence was found to be higher in antibiotic group as compare to appendectomy (13.3% vs 3.3%,  $p=0.04$ ). Gorter et al reported that acute appendicitis patients treated with antibiotics had 20% more recurrence rate than patients undergone appendectomy (20% vs 1%,  $p=0.01$ ).<sup>20</sup> Another similar study reported that there is no significant difference in diseases relapse of acute appendicitis treated with medical and surgical interventions ( $p>0.05$ ).<sup>21</sup>

In present study, majority of patients in antibiotic group 23(38.3%) had sick leave >7 days while majority of patients 22(36.7%) in appendectomy had sick leave  $\leq 7$  days ( $p=0.000$ ). Higgins et al reported that open appendectomy is associated with higher sick leaves in acute appendicitis patients and more work day loss ( $p=0.02$ ).<sup>22</sup> However, Minneci et al reported that patients treated with laparoscopic appendectomy had less hospital stay as compare to patients treated with antibiotics for 7 days ( $p=0.05$ ).<sup>23</sup>

**Limitation:** Small sample size and conduction of study at single center limits generlizability of study

### **Conclusion:**

Appendectomy is an effective treatment option in adults patients diagnosed with acute appendicitis as compare to antibiotic therapy. Appendectomy had efficacy >50% in terms of low

recurrence rate, reduction in pain scores, less hospital stay and sick leaves. Further research in needed to reveal more precise indications on acute appendicitis treatment efficacy.

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**Funding source:** None

**Role and contribution of authors:**

Dr Farzana Sabir, data analysis and write ups

Dr Naheed Akhtar, data collection

Dr Shafiq Ur Rahman, study designing and acquisition

Dr Naila Rahman, data analysis

Dr Anam Altaf, critical review

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