



## Original Article

# ANTIMICROBIAL THERAPY IN PREVENTING WOUND INFECTION FOLLOWING APPENDICECTOMY IN UNCOMPLICATED APPENDICITIS: A COMPARATIVE STUDY BETWEEN SINGLE DOSE AND MULTIPLE DOSES IN ADULTS

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### Abstract

**Objectives:** To find out the efficacy of single dose antibiotic vs multiple doses in preventing wound infection following appendicectomy for uncomplicated appendicitis.

**Methods:** A prospective comparative study was conducted in the Department of Surgery, Chittagong Medical college Hospital from January'2009 to June'2009. 100 patients with uncomplicated appendicitis who underwent appendicectomy during that period were included in this study. Among them 50 cases were included in study group (SG) who were given only single dose of combination drugs ( Inj. Cefuroxime + Inj. Metronidazole).In rest of the 50 cases (CG), antibiotics were continued for 7 days postoperatively.

**Result:** Maximum incidence of acute appendicitis was in the 2<sup>nd</sup> and 3<sup>rd</sup> decade of life with male preponderance .Rate of wound infection in the study group and control group was 4% and 2% respectively which was not statistically significant .The duration of antibiotic therapy had no significant effect on the length of hospital stay between the two groups ; 2.48 days vs 2.9 days [mean + s.d. 69.6 # 16.8 hours ] in the study and control group respectively, though treatment cost was higher in control group in comparison to the study group .

**Conclusion:** Single dose of preoperative antibiotics is adequate for prevention of postoperative wound infection following appendicectomy for uncomplicated appendicitis.

**Key words:** appendicectomy, single dose prophylactic antibiotics, Multiple doses post operative antibiotics, wound infection.

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### Introduction:

Acute appendicitis is the most common abdominal surgical emergency in the world requiring operation. Approximately 7 percent of the population will have appendicitis in their lifetime, with the peak incidence occurring between the ages of 10 and 30 years<sup>1</sup>.

The standard treatment for acute appendicitis is appendicectomy. The mortality from acute appendicitis is less than 0.3%, rising to 1.7% after operation<sup>2,3</sup>. The most common complication of appendicectomy is wound infection, occurring in 5-33% of cases<sup>4</sup>. In spite of improvement in diagnosis and treatment,

appendicitis continues to cause significant morbidity and still remains, although rarely a cause of death. Despite the fact that the mortality rate has been dramatically reduced following appendectomy over the last six decades, septic complications continue to be a significant problem, occurring in a large percentage of patients. The frequency of wound sepsis after appendectomy depends on the severity of the inflammatory process and the degree of contamination of the abdominal parietes at operation<sup>4</sup>. The use of prophylactic antibiotics in nonperforated appendicitis has been questioned by some authors because of the relatively minor degree of bacterial inoculation in these patients and the relatively low incidence of infection. But in some study incidence of infection in patients who received no prophylactic antimicrobials for nonperforated appendicitis was 10.2%-12%<sup>5</sup>. This is of sufficient magnitude to justify prophylactic antimicrobial administration.

To reveal the efficacy of single dose prophylactic antimicrobial therapy in appendectomy for uncomplicated appendicitis in adult population we conducted a prospective comparative study. In our country there is a study in child group in Bangladesh Institute of Child Health conducted by M.A.Mushfiqur Rahman (2005). There he showed that multiple doses of antibiotics are not superior to single dose for preventing wound infection<sup>6</sup>. There are similar type of result in studies conducted abroad<sup>5,7-10</sup>.

There is no such study among adult population in Bangladesh in recent years. The aim of the study was to examine the efficacy of single dose prophylactic antibiotics in preventing wound infection following appendectomy in uncomplicated appendicitis contrary to multiple dose continued antibiotic drugs.

#### Methods:

This was a prospective comparative study which included 100 patients who underwent appendectomy for uncomplicated acute appendicitis, in the department of surgery, Chittagong Medical College Hospital from January 2009 to June 2009. Among them 50 cases were included in study group (SG) and rest of 50 cases included in control group (CG). Among the SG we had given only single dose of combination drugs (Inj.Cefuroxime + Inj.Metronidazole) during induction of anaesthesia. In the CG postoperative intravenous antibiotics were continued till patients were on oral diet, and then switched over to oral formulations up to 7<sup>th</sup> postoperative day.

Patients with peroperative findings of gangrenous or perforated appendix, who received antibiotics prior to

hospital admission, patients with other systemic diseases that needed modification of antibiotics, and patients who did not accept the protocol after proper explanation were excluded from the study.

#### Results:

Sample size was n=100; Study Group n<sub>1</sub>=50; Control Group n<sub>2</sub> = 50.

The present study showed maximum incidence of acute appendicitis was in the 2<sup>nd</sup> and 3<sup>rd</sup> decade of life. There were 72 male and 28 female patients with male female ratio of 2.57: 1. Most of the patients were operated within 12 hours of admission. All patients underwent appendectomy by open method. The length of hospital stay in CG on average was 2.9 days and in SG it was 2.48 days. The present study showed wound infection in two patients of SG (4%) and in one patient (2%) in CG. The duration of antibiotic therapy had no significant effect on the length of hospital stay but treatment cost was higher in CG (1311/= Taka) in comparison to SG (243/= Taka).

**Table-I**

*Patients demography and perioperative data (n=100)*

Variables	Study Group (SG) n=50	Control Group (CG) (n=100)	Total
Age (in years)			
11-20yrs	26	22	48
21-30yrs	18	24	42
31-40yrs	5	3	8
41-50yrs	1	0	1
51-60yrs	0	1	1
Gender			
Male: Female	39:11	33:17	72:28
		[ M:F=2.57:1]	
Symptoms[Mean±SD (1.76±0.68 days)]			
Duration<24 hrs	18	20	
Duration 24-48 hrs	26	22	
Duration>48 hrs	6	8	
Time lapse (Admission to operation)			
<12 hrs	46	48	94
>12hrs	2	4	6
Hospital Stay	2.48(days)	2.90(days)	[ Mean±SD
Wound infection	2 (4%)	1(2%)	(69.6 ±16.8
			hrs ]
Comparison of costs	1311 tk	(n <sub>1</sub> :n <sub>2</sub> =1:5.39)	
	243 tk		

### Discussion:

The most generally accepted treatment of appendicitis is prompt surgery. Treatment of perforated appendicitis is more complicated than that of uncomplicated appendicitis. Perforation or gangrene leads to peritonitis or abscess formation<sup>11</sup>. Uncomplicated appendicitis is termed as acute inflammation of appendix without gangrene or perforation<sup>11</sup>.

Several studies with various antibiotic regimens have been published within the last decade. In those studies metronidazole has been used alone or in combination with penicillins or cephalosporins. Two drugs or more are used, because bacteriologic examination of both the inflamed appendix and pus from subsequent wound infection after appendectomy often are a mixture of both anaerobic and aerobic organisms (i.e. *Bacteroides fragilis* and *Escherichia coli*)<sup>7</sup>.

The optimum duration of prophylactic antibiotic administration for non-perforated appendicitis (NPA) has not been fully elucidated. For the majority of procedures, prophylaxis does not need to exceed 24 hours, usually resulting from a single dose<sup>11</sup>. Several trials have shown that prophylactic antibiotic can significantly reduce the number of postoperative infective complications in NPA compared with placebo<sup>8,10</sup>. For perforated appendicitis antibiotic treatment should be continued as long as five days<sup>12</sup>. Karim (1989), had observed wound infection rate of 28% without antibiotics in appendicectomy for uncomplicated appendicitis – which is not acceptable<sup>13</sup>.

In this study majority (90%) of the patients were in between 2<sup>nd</sup> and 3<sup>rd</sup> decades which is well consistent with the study of Azad MAS<sup>14</sup>, where it was 86%.

There was male preponderance with M:F ratio of 2.57:1 in our series. Male predominance was also seen by Azad<sup>14</sup> and Alam<sup>15</sup>.

We have observed symptoms duration of 1.76±0.68 days. (Table -I) and most of these patients were first seen by the doctors of this hospital and were given admission without unnecessary delay. Hassan et al<sup>16</sup> observed symptom duration of 30.8±1.4 hours until hospitalization. MUI et al<sup>8</sup>, showed 1.6±1 day duration for uncomplicated appendicitis.

In our study wound infection were noted in 2 patients (4%) in the study group and in 1 patient (2%) in the control group. Mui et al<sup>8</sup> found 6.5% wound infection in study group and 3.6% in control group. It signifies

that single dose of antibiotics is as effective as multiple doses for preventing wound infection. In our study length of hospital stay in control group was 2.9 days and in study group it was 2.48 days (Mean±SD 69.6 ±16.8 hours). Mui et al<sup>8</sup> showed it was 4.8 days and 4.3 days and Hassan et al<sup>16</sup> showed it was 3.8 days. Here we have seen that the control group had to stay more in hospital than the study group to ensure antibiotic therapy.

### Conclusion:

Though the study is carried out in a limited number of patients it is found that prophylactic single dose combined antimicrobial therapy is sufficient to prevent wound infection following appendicectomy for uncomplicated appendicitis. It is safe as well as cost effective and use of extended period of post operative antibiotics will increase the cost and side effects without any added benefit.

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