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ORIGINAL ARTICLE

A Randomized Control Trial to Determine the Need for Postoperative Antibiotics after Laparoscopic Appendicectomy in Nonperforated Appendicitis

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ABSTRACT

Background: Acute appendicitis is the most common cause of acute abdominal pain. Postoperative surgical site infections (SSIs) can be avoided with the proper administration of prophylactic antibiotics. Nevertheless, there is no definitive recommendation about the length of time that antibiotics should be used. A sole preoperative preventive dosage has been commended by a number of random trials.

Objective: The research goal was to study the postoperative use of antibiotics afterwards laparoscopic appendectomy for appendicitis of nonperforated nature.

Methods: This study was carried out at the Surgery Department, BMC/Bolan Medical Complex Hospital Quetta for a period of six months from October 2022 to March 2023. Two groups of 150 patients with nonperforated appendicitis received laparoscopic appendiciectomy. One preoperative antibiotic therapy was given to 75 patients in group A, while three postoperative antibiotic doses were given to 75 patients in group B. Along with other procedures including abdominal ultrasonography, standard tests like serum creatinine, blood urea, and total blood count were performed. The surgical site from the laparoscopic appendectomy was inspected 48, 72, and 7 hours later to examine the signs of SSI subsequently the operative procedure. To evaluate the gathered data, SPSS 24 was utilized. Fisher's exact test was used to compare infection rates, the chi-square test was used to compare demographic data, and the unpaired t-test was used to assess the mean length of hospital stay.

Results: The mean age of group B was 31.82±9.56 years (p=0.621), whereas the mean age of group A was 31.14±10.69 years. Every research participant had discomfort in the right iliac fossa. SSIs of grade III were treated conventionally in four patients (6%) and three patients (4%), respectively, in group A and B. Statistically, there was no difference in the incidence of SSIs between the two groups (p=1.000).

Conclusions: This study concluded that a single dose of metronidazole and cefotaxime prior to surgery can decrease the chances of SSIs after surgery.

Keywords: Nonperforated appendicitis, Surgical site infection, Laparoscopic appendicectomy

INTRODUCTION

Inflammation of the appendix, or appendicitis, is the most frequent reason for surgery. At first, appendicectomy was thought to be the most effective way to treat acute appendicitis. The best conjoint medical procedure is laparoscopic appendicectomies. The result is better when acute appendicitis is treated with surgery as soon as possible. According to the assessment, the risk of acute appendicitis is around 7% for women and almost 9% for males, with both sexes experiencing a top numbers in the age bracket of of ten to thirty years. [1,2]. One of the major causative factor to postoperative surgical site infections (SSIs) afterwards appendicectomy is the pathological condition of the vermiform appendix.[3,4] The incidence of SSIs is greater in patients with gangrenous or perforated appendicitis than in those without.[5] SSIs consider as primary reason leading to postoperative morbidities, such as discomfort, anxiety, and longer hospital stays, and economic loss.[6] In addition to medication, surgeons have made significant and ongoing efforts to avoid sepsis. Nevertheless, one of the main limiting factors in surgery remains postoperative wound infection. SSIs typically arise along the surgical process and include an intraabdominal space, an organ, deeper tissues, or superficial tissues. The prognosis for superficial incisional infections, which account for sixty to eighty percent of SSIs, is grander than that of organ related SSIs.[5]. When antibiotics are utilized properly, the postoperative SSI risk is reduced by fourty to sixty percent.[7] Clinical trials conducted have sated guidelines for the selection of preventive antibiotics, how they should be administered, and when to take them following an emergency appendectomy. However, no significantly proven guidelines are present for the time period of use of antibiotic.[8, 9]

Antibiotics administered before surgery, are crucial in preventing surgical site infections.[10] The ability of antibiotics to reduce the rate of SSIs after operations in no perforated patients is still unclear, though.[11-13] Therefore, this study was conducted to determine the role of postoperative antibiotics to lower SSI following laparoscopic appendectomy for nonperforated appendicitis.

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METHODOLOGY

This study was carried out at the Surgery Department, BMC/Bolan Medical Complex Hospital Quetta for a period of six months from October 2022 to March 2023. A total of 150 patients were enrolled in our study.

Selection Criteria: All individuals, male or female, in the age of 18 to 50 suffered from appendicitis of non-complicated nature were categorized as eligible for this study. Those with gangrenous or perforated appendicitis, diabetes, immunosuppression, heart, kidney, or liver failure, cephalosporin allergies, refusal to give written consent, or history of antibiotic use outside of the study were not allowed to participate in the study. Before giving their signed and informed consent, each patient who was enrolled in the experiment was informed about the procedure's nature, required tests, recommended therapies, and possible side effects.

Data Collection: A total of 150 individuals randomly assigned in in equal number 75 each into two groups i.e A (study group) and the remaining 75 in group B (control group). Patients were distributed into any of the groups by draw.

Intervention: The individuals of both groups undertook laparoscopic appendicectomies in accordance with accepted

guidelines. Both teams used comparable suture supplies and tools. Basic surgical guidelines, such as appropriate hemostasis and avoiding severe tissue traction, were followed by each group. Each group were given a single intravenous infusion of 100 ml metronidazole and 1 gm cefotaxime to produce anesthesia. Nevertheless, group A did not get any postoperative antibiotics, but group B received three more doses of the same antibiotics at eight, sixteen, and twenty four hours following the index operation. Additionally, analgesics, intravenous fluids, and supplementary supportive medicines were given at the surgeon's suggestion. The surgical site was checked for signs of a postoperative wound infection at 48h, 72h, and 7th day. The scores at each dressing were plotted in a pre-made table to assess wound infection using the Southampton scoring system (Grades 0-5).3. Wound healing for grades 0, 1, and 2 was seen as typical. Grades 4 and 5 wound infections were categorized as dangerous, whereas grade 3 wound infections were categorized as mild.

Statistical analysis: To evaluate the gathered data, SPSS 24 was utilized. Fisher's exact test was used to compare infection rates, the chi-square test was used to compare demographic data, and the unpaired ttest was used to assess the mean length of hospital stay. At the 95% confidence level, P≤0.05 was regarded as statistically significant.

RESULTS

Table 1 displays the clinical features, demographics, and medical histories. There were no notable differences between the two groups in terms of total leukocyte count, bowel sounds, McBurney's tenderness, discomfort, fever, nausea/vomiting, gender distribution, mean age, or ultrasonography. The histology report and medical diagnosis are shown in Table 2 (p>0.05). A summary of the Southampton scoring system for SSIs after 7, 48 hours, and day 7 is shown in Table 3. There were no grade 4 or 5 SSIs among the participants in this research. For patients with grades 0, 1, and 2, wound healing was seen as normal; however, individuals with grade 3 were thought to have an infection.

Following a conservative course of treatment that included daily cleaning and dressing, only three patients (6%) in group A and two patients (4%) in group B suffered grade 3 SSIs at 72 hours. Although group B's average hospital stay was longer than group A's, the difference (2.24±0.45 days vs. 3.18±0.34 days; p = 0.415) was not statistically significant.

Table 1: Demographic and Clinical Findings of Individuals

Outcomes	Group A (n=75)	Group B (n=75)	p-value
Age (mean)	31.14±10.69	31.82±9.56	0.621
Discomfort	75 (100%)	75 (100%)	1.000
Fever	18 (24%)	23 (30.60%)	0.479
Nausea/vomiting	45 (60%)	51 (68.00%)	0.489
Bowel sounds	75 (100%)	75 (100%)	1.000
Leukocyte count			
6000-11000	36(48%)	34 (45.3%)	0.578
>11,000	40(53.3%)	43 (57.3%)	
Ultrasonography, inflamed appendix, probe tenderness	12 (16.0%)	18 (24.0%)	0.297

Table 2: Medical Diagnosis of the Individuals

Diagnosis	Group A, n=50	Group B, n=50	P value
Acute appendicitis	60 (80.0%)	63 (84.0%)	0.314
Chronic appendicitis	10 (13.3%)	3 (4.00%)	
Recurrent appendicitis	5 (6.7%)	6 (8.0%)	
Sub-acute appendicitis	2 (2.6%)	3 (4.00%)	
Histopathology report			
Acute appendicitis	62 (82.6%)	66 (88%)	0.399
Chronic appendicitis	14 (18.6 %)	9 (12%)	

Table 3: Southampton Scoring.

Duration	Group N	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4 & 5	P value
48 h	Group A	62 (82.6%)	9 (12%)	3 (4%)	0	0	0.210
	Group B	71 (94.6%)	2 (2.66%)	2 (2.66%)	0	0	
72 h	Group A	63 (84.0%)	2 (2.66%)	6 (8.0%)	4 (6.0%)	0	1.00
	Group B	65 (86.6%)	3 (4.0%)	4 (6.0%)	3 (4.0%)	0	
7th day	Group A	72 (96.0%)	2 (2.66%)	0	0	0	1.00
	Group B	73 (97.3%)	2 (2.6%)	0	0	0	

DISCUSSION

SSI is a troubling obstacle that neither the patient nor the doctor ever pursues after surgery.[13,14] The progress of SSIs is influenced by a number of variables, including host defenses, perioperative care, bacterial concentration and virulent factors, and intraoperative treatment.[15] Moreover, SSIs have a immense impression on financial stature of the individuals. According to a Davey et al., hospital costs rose when a surgical site became infected. [16] For all individuls with nonperforated appendicitis, the prior use of antibiotics before surgery is sufficient, however postoperative antibiotic use is not recommended, as per the systematic review by Daskalakis et al.[17] In another study it was found that using antibiotics to treat patients with simple appendicitis reduces postoperative complications better than using a placebo; however, they came to the conclusion that there is no way to specify how long antibiotic use should last.[18] However, patients with acute appendicitis should continue on a full course of antibiotics because of their elevated risk of infection complications.[19]. Reduced incidence of postoperative SSIs is the primary goal of these preventative antibiotics.[20] Using broad-spectrum antibiotics repeatedly and for longer than advised might result in improper prophylactic treatment. These activities might make adverse outcomes more likely and promote the emergence of resistant strains, increasing morbidity and mortality.[21]

In both groups, the majority of the patients were between the ages of 22 and 31. Group A's mean age was higher than group B's (31.14±10.69 years against 31.82±9.56 years, p=0.621). These findings, which showed a mean age of around thirty one years, were in line with studies showing appendicitis is more prevalent in those between the ages of thirty two and thirty four.[22, 23] The most important indicator of appendicitis, according to the literature, is right iliac fossa pain, also referred to as McBurney's tenderness, which was observed in each individual in both groups upon the abdomen inspection.

Although white blood cell counts can vary, people with acute, simple appendicitis usually have moderate leukocytosis, which can range from 10,000 to 18,000 cells/mm3.[24, 25] Similarly, in the current study, leukocytosis was observed in 53.3% of individuals in group A and 57.3% of participants of group B; however, there is no statistical significance among the genders (p=0.578). The results of the trial demonstrated that prophylactic postoperative antibiotic dosages having no apparent effect on the risk of growing SSIs following appendicectomy, nor did they provide any benefits over a single preoperative prescription.

However, there are additional variables that also greatly reduce the incidence of postoperative SSIs and, in turn, minimize morbidity, such as maintaining asepsis, performing competent surgery, and providing proper postoperative care. According to a related RCT by Mui et al., individuals who have surgery for uncomplicated appendicitis can prevent infective wound problems with just one dose of perioperative antibiotic.[26] Additionally, they concluded that the long-term usage of antibiotics was not cost-effective and created unwanted complications. A small number of other trials have found that one preventative antibiotic dosage is

adequate to prevent infection following appendicectomy for nonperforated appendicitis.[27–30]

CONCLUSION

This study concluded that a single dose of metronidazole and cefotaxime prior to surgery can decrease the chances of SSIs after surgery. However, these outcomes are limited to a specific procedure—laparoscopic appendicectomies. More thorough study covering a range of other abdominal procedures is required to determine the actual need for postoperative prophylactic antibiotics to lower the SSIs.

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