EFFECTIVENESS OF USE OF SINGLE DOSE PREOPERATIVE ANTIBIOTIC VERSUS BOTH PRE AND POST OPERATIVE ANTIBIOTICS IN PATIENTS UNDERGOING LAPAROSCOPIC UNCOMPLICATED APPENDECTOMY IN BIRAT MEDICAL COLLEGE TEACHING HOSPITAL(BMCTH).

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ABSTRACT

Introduction

Acute appendicitis is one of the most common surgical emergency. Rationalized use of antibiotics prevents the risk of post operative complications. There is no conclusive recommendation on the duration of antibiotic usage and role of postoperative use of antibiotics in preventing complications in uncomplicated cases remains controversial till date.

Objectives

To compare the effectiveness of single dose preoperative antibiotic with preoperative and postoperative antibiotics for patients undergoing laparoscopic uncomplicated appendectomy.

Methodology

A total number of 113 patients who fulfilled the selection criteria underwent laparoscopic appendectomy for uncomplicated appendicitis and were randomly divided into two groups. Group A patients received only preoperative antibiotics whereas Group B patients received both preoperative and postoperative antibiotics. Patients of both the groups were followed up postoperatively till discharge from the hospital

Result

In this study, patients who received only pre-operative antibiotic were 57 (50.4%) and patients who received both preoperative and postoperative antibiotics were 56(49.6%). SSI was detected in total of 2 patients (1.8%) one from each group and post operative lump noted in right iliac fossa (RIF) in 2 patients (1.8%)one in each group intraoperatively in which further antibiotic was continued postoperatively. Hematoma, seroma and peritonitis were absent in both the groups. The difference between the two groups for incidence of SSI and postoperative RIF lump was statistically insignificant with P value of 0.748.

Conclusion

Single dose preoperative antibiotic is sufficient in preventing postoperative complications in patients undergoing laparoscopic appendectomy for uncomplicated appendicitis. This can be recommended for implementation as standard operating protocol in such cases.

KEYWORDS

Laparoscopic appendectomy, uncomplicated appendicitis, prophylactic preoperative antibiotics, post-operative antibiotic, SSI.

INTRODUCTION

Appendicitis is the one of the common acute abdomen condition requiring immediate surgical intervention and emergency appendectomy is routinely performed operation. The risk of acute appendicitis estimates 6.7% for women and 8.6% for men, with peak incidence between 10 and 30 years in the both sexes.[1]Appendicitis results due to obstruction of the appendiceal lumen from varied etiologylike fecolith, appendicolith, intestinal parasites, hypertrophied lymphatic tissues,carcinoid tumors, appendiceal adenocarcinoma etc. Appendix luminal obstruction results into increased mucus production and bacterial overgrowth causing increased intraluminal pressure and in turn it decreasing blood flow to the appendiceal wall resulting in necrosis and perforation of the appendix.[2] In this era of minimal invasive surgery, laparoscopic appendectomy is most commonly performed surgical intervention for uncomplicated non perforated acute appendicitis. This is a clean contaminated surgery.[3]The chance of wound infection in non-perforated acute appendicitis is less than 10% while perforated appendicitis has an infection rate of 15-20%.[4]However with advent of standard sterilization protocol and practices, studies showed no statistically significant difference in wound infection between the simple and gangrenous or perforated appendicitis groups.[5]

Preoperative antibiotic is given as standard in all appendicitis at the time of induction of general anesthesia across globe. However antibiotics is continued postoperatively in complicated cases to reduce contamination of wound and peritoneal cavity to minimise surgical site infections (SSIs) and abscess formation.[6] There is general practise of continuing antibiotics postoperatively in uncomplicated cases and there is no provenconsensus on efficacy of this practise and needs further studies.[7] Antimicrobial overuse results to the emergence of antimicrobial resistance and increase cost of treatment, hence optimized use of antibiotics is also required. The study aims to determine the role of postoperative antibiotics in uncomplicated appendicitis undergoing laparoscopic appendectomy. Also we aim to establish evidence based departmental standard operating protocol(SOP) for such group of cases at our institute.

METHODOLOGY

Between July 2020 to Nov 2021, randomized descriptive, cross sectional observational comparative study was conducted in department of general surgery, Birat Medical College & Teaching Hospital in patients with diagnosis of acute appendicitis who presented in emergency and OPD.113 patients meeting the inclusion criteria of uncomplicated appendicitis were included in the study and were randomized into two groups. All patients with diagnosis of acute appendicitis who presented within 48 hours of onset of symptoms with no evidence of perforation on imaging and patients of age above 13 years and less than 70 years were included in this study. All patient who presented after 48 hours of duration from onset of symptoms or diagnosed as perforated appendicitis, appendicular mass or abscess, gangrenous appendicitis or in state of shock, localised or diffuse peritonitis due to appendicular perforation were excluded from study. All patients who had history of drug allergy to third generation cephalosporins or had taken multiple dose of antibiotic of antibiotic prior to admission or 2 hours prior to emergency appendectomy were excluded. Those having co morbidities like diabetes mellitus, heart lung, liver or generalised infection before surgery or immunocompromised were excluded.

All patients underwent laparoscopic appendectomy, similar preoperative third generation cephalosporin ceftriaxone was used in both the group. Similar pre and post operative protocol were followed in both group including sterilization, instrument and suture material, general anesthesia and post operative analgesia and care. Adequate hemostasis and less tissue handling with no undue traction were taken into consideration throughout the procedure in both group. Postoperative antibiotic was similar as preoperative in that group. Data related to the patients demographics, history of illness, details of clinical examination were recorded on a predesigned proforma after informed consent for study.

Data was entered in manually in windows excel sheet and coded and recorded digitally using an IBM Statistical Package for the Social Sciences (IBM SPSS Statistics; Armonk, NY, USA) on Windows version 20.0.The chi-square, Fisher's exact tests and cross tabulation were used to compare the groups in terms of demographic characteristics and SSI rate.

RESULT

A total of 113 patient were divided in 2 groups. In group A 57 patients (50.4%) received pre-operative anti-biotic, whereas 56 patients(49.6%) in group B received both pre-operative and post operative antibiotics. Among 113 patients, 39 patients(34.5%) were female whereas 74 patients (65.5%) were male. SSI was detected in 2 patient (1.8%), one from each groups. Postoperative RIF Lump (in 2 patients (1.8%) one in each group intraoperatively in which further antibiotic was continued postoperatively. Hematoma, seroma and peritonitis were absent in both the groups.

Variables	Preoperative Aantibiotics	Pre and post Operative Aantibiotics
SSI	1	1
HEMATOMA	0	0
SEROMA	0	0
Postoperative RIF Lump	1	1
PERITONITIS	0	0

DISCUSSION

In this current era, there has been much advancement in general operating practice interms of diagnostic measures, imaging, modular operating room, sterilization measures and instruments and postoperative care. Minimal invasive technique has been preferred in most surgical procedures wherever feasible and is being patient and surgeon friendly too. SSI is worrisome concern that both surgeon and patient don't prefer. Factors like host defense, bacterial innoculum and virulence and intra-operative management play important role in SSI.[8] Because of this worrisome factor surgeons still prefer use of antibiotic in both pre and postoperative uncomplicated appendicitis.

Dinkkim Le *et al* in 2009 in his retrospective review of 10 years data concluded that the use of postoperative antibiotics in patients with non perforated appendicitis does not decrease the rate of SSIs, while it may increase the cost of care. There was no significant differences in the rates of all SSIs (10% vs 9%, P = .64), superficial SSIs (9.3% vs 5.4%, P = .13), deep SSIs (0.3% vs 0.5%, P = 1.0) among two groups which didn't receive and those who receive antibiotic postoperative.[9] Similarly Daskalakis *et al*in 2013 concluded that all patients with non perforated appendicitis, there is no need of post operative antibiotic treatment and preoperative treatment is sufficient.[10] SimilarlyMui *et al* concluded that single dose of peri-operative antibiotic was adequate for prevention of post operative complications and prolong use of antibiotics was cost ineffective.[11] The rate of postoperative infective complication was not significantly different among the groups (6.5% group A, 6.4% group B, 3.6% group C). Group A received single dose preoperative antibiotic, group B received three-doses and group C 5-day perioperative regimens of cefuroxime and metronidazole. Tiono B *et al*concludedsingle dose of pre-operative antibiotics is enough to prevent ineffective complications following laparoscopic appendectomy.[12] Risk of SSI in single dose group was 7.3% and multiple-dose group was 5.5% with relative risk (RR) = 1.33% (95% CI RR: 0.31-5.68, p= 1.000). Our study also showed no significant difference between the two groups of patients as SSI was seen in both groups in similar rate. The overall rate of SSI is less than above studies.

Laparoscopic appendectomy has shown reduced rate i.e 72 percent less chance of SSI.[13]This is associated with minimum intraoperative tissue handling which lowers contamination, lower postoperative pain and shorter hospital stay. Specimen extraction in laparoscopic appendectomy is in controlled way either through the larger sized port or use of gloves as extraction bag.[14] This minimizes contact between the infected specimen and skin surface and hence contamination is avoided. We frequently use gloves as extraction bag intraoperatively as and when required specially if diameter of appendix is around 8 mm to 1 0 mm. Our this practise also validate our result in having less SSI rate at our centre.

Overall hospital stay was higher in those who received postoperative antibiotic. No antibiotic related complication was observed in either group. However increased additional cost towards antibiotic was observed in patients receiving postoperative antibiotic. Continuation of postoperative antibiotic has been commonly practised among our fraternity in this part of world possibly because of fear of SSI. Antibiotic use are always associated with increased risk of bacterial resistance, adverse drug reaction, prolonged hospital stay and increased financial burdern.[15] Practise of good surgical and aseptic techniques, minimal tissue handling can lower use of postoperative antibiotics.

Moreover, our results are further strengthened by the recent studies showing that the prolong use of antibiotics even in patients with complicated appendicitis does not reduce the post- operative infectious complications

CONCLUSION

We conclude single dose preoperative antibiotic is sufficient in preventing postoperative complications in patients undergoing laparoscopic appendectomy for uncomplicated appendicitis. Also it will prevent unwanted antimicrobial resistance and minimize cost of treatment.

RECOMMENDATION

We would like to recommend use of single dose preoperative antibiotic instead of both pre and post operative antibiotics for patients undergoing laparoscopic uncomplicated appendectomy at BMCTH. We would also like to implementation this as standard operating protocol for such case.

LIMITATION OF STUDY

We have small sample size so we encourage further study into this.

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CONFLICT OF INTEREST

We have no conflict of interest to declare for this research work.

FINANCIAL DISCLOSURE

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