



**“COMPARISON OF ANTIBIOTIC USAGE-THIRD GENERATION
CEPHALOSPORIN SINGLE DOSAGE VS MULTIPLE DOSAGE IN CASE OF
EMERGENCY OPEN UNCOMPLICATED APPENDICECTOMY IN A
TERTIARY MEDICAL CENTRE”**

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ABSTRACT

Aims & Objectives: To know the outcome of single dose antibiotic (cefaperazone sulbactam) in cases of emergency open uncomplicated appendectomy. To compare single dose (cefaperazone sulbactam) with multiple doses of antibiotics in case of emergency open uncomplicated appendectomy.

Methodology:

Study Design: Prospective study.

Sample Size: 300.

Duration: Jan 2021 to September 2021

Inclusion Criteria: Patients presenting with clinical features suggesting of acute appendicitis – anorexia, right iliac fossa pain, nausea, vomiting and fever are included in the study.

Exclusion Criteria: Patients with perforated appendicitis, appendicular abscess, appendicular mass formation Patients presenting with clinical features suggesting of acute appendicitis, anorexia, right iliac fossa pain, nausea, vomiting and fever admitted in emergency department of our hospital. These patients will be given single dose of cefaperazone sulbactam 1.5gm IV half an hour prior to incision. The above group will be compared to those cases with administration of multiple doses of antibiotics. The results are analyzed using Microsoft Excel for tabular transformation and graphical representation. For comparing the parameters and statistical analysis 2 sample z-test will be used.

Conclusion:- It is evident that prophylactic multiple doses of Cefaperazone sulbactam postoperatively confer no additional benefit over a single preoperative dose. With additional benefits of the greater ease of administration and decreased cost, single dose Cefaperazone sulbactam is the prophylaxis of choice for appendectomy in patients with nonperforated appendicitis in our study. It is essential for Surgeons and Surgical departments to update their routine practice of antibiotic prophylaxis to comply with updated guidelines and evidence base so as to avoid overuse of antibiotics and their multiple dosage schedule in order to prevent the emerging menace of drug resistance as well prevent the side effects in patient's perspective.

KEYWORDS : Antibiotic, Appendectomy, Cefaperazone sulbactam

INTRODUCTION

Acute Appendicitis is the most common general surgical emergency and early surgical intervention improves outcome which makes appendectomy, the most commonly performed emergency operation with a postoperative wound infection rate of 1-10% in the world.

Appendicitis is a polymicrobial infection, with some series reporting up to 14 different organisms cultured in patients with perforation. The principal organisms seen in normal appendix, in acute appendicitis, and in perforated appendicitis are Escherichia coli and Bacteroides fragilis.

Wound infection following open appendectomy is a major cause for post-operative morbidity, prolonged hospitalization and increased costs. The incidence of wound infection in patients with complicated appendicitis (perforated or gangrenous appendix) is nearly four to five times greater than that of nonperforated cases.

The efficacy of antibiotic prophylaxis in reducing wound infection in patients undergoing open appendectomy is well established. Many randomized and observational studies have shown that appropriate use of antibiotics reduces the risk of infection by 40–60%. Based on prospective clinical studies, guidelines have been established regarding the choice of prophylactic antibiotics, its timing and route of administration. For emergency appendectomy duration of antibiotic usage remains a contentious issue and there is no definite consensus among the surgical community.

If simple acute appendicitis is encountered, there is no benefit in extending antibiotic coverage beyond 24 hrs. For intraabdominal infections of GI tract origin that are of mild to moderate severity, the Surgical Infection society has recommended single-agent therapy with cefoxitin, cefotetan or ticarcillin-clavulanic acid. But in daily practice multiple doses are used to prevent complications like wound infection and intra-abdominal abscess. Antibiotics should be administered 30 minutes prior to incision to achieve adequate tissue levels. In non-perforated appendicitis single preoperative dose of antibiotic suffices. In cases of perforation, an extended course of at least 5 days of antibiotics is advocated.

This prospective study is designed to compare the outcome of usage of antibiotic single dose cefaperazone sulbactam vs multiple doses in cases of emergency open uncomplicated appendectomy.

AIMS & OBJECTIVES

- To know the outcome of single dose antibiotic (cefaperazone sulbactam) in cases of emergency open uncomplicated appendectomy.
- To compare single dose (cefaperazone sulbactam) with multiple doses of antibiotics in case of emergency open uncomplicated appendectomy.

Review Of Literature

Historical Background

Leonardo da Vinci first drew the appendix but this was not published until the eighteenth century. Jean Fernel first described appendiceal disease in a paper published in 1544. Lorenz Heister provided the first description of classic appendicitis in 1711.

First known appendectomy was performed in 1736 by Claudius Amyand in London. In 1886, Reginald H. Fitz presented the findings of appendicitis and recommended operative treatment. In 1889, Charles McBurney published the indications for early laparotomy in appendicitis.

Clinical Diagnosis

The sequence of events in acute appendicitis is usually characteristic and follow like this-

It usually starts with diffuse pain, followed by anorexia, nausea and vomiting. Later the pain shifts to right side of the abdomen accompanied by a slight rise in body temperature. This is known as Murphy's syndrome (triad).

Complications of acute appendicitis are perforation and its consequences (19-32%), abscess formation and its complications (Appendiculo-cutaneous fistula, Appendico vesical fistula), diffuse peritonitis due to contamination of peritoneal cavity before defensive adhesion formation and secondary rupture of intra-abdominal

abscesses that were produced by ruptured appendicitis.

Laboratory Investigations And Scoring

Total WBC count and differential count-Less than 4% of patients have both a normal total WBC count and a normal differential count. Moderate leukocytosis, ranging from about 10,000-18,000 cells/cumm, with neutrophilia, is the common picture in acute appendicitis. If the WBC count is more than 18,000 cells/cu.mm and shift to the left is extreme, perforated appendicitis or an acute inflammatory disease of greater magnitude than appendicitis is more possible. (4,5,6)

Treatment

Patients with acute, non-perforated appendicitis should undergo urgent appendicectomy. There has been a difference of opinion however concerning the optimal timing for ruptured appendicitis with frank peri appendiceal abscess formation. Expectant treatment was advocated by A.T. OCSHNER in 1901.If progression occurs, the abscess is drained. If the patient improves, conservative treatment is continued. With these measures, the majority of appendiceal abscesses resolve satisfactorily, although many days of hospitalization is required. (25) An interval appendicectomy 6 weeks to 3 months later is strongly advised, since the recurrence rate is very high. (36)

Laparoscopic and minimal access surgery continues to expand in the field of general surgery, and diagnostic laparoscopy and laparoscopic appendectomy have become accepted procedures in many surgeons' practices. (27)

Complications

Postoperative complications occur in 5% of patients with an unperforated appendix but in more than 30% of patients with a gangrenous or perforated appendix. The most frequent complications after appendectomy are wound infection; pelvic, subphrenic intra-abdominal abscess; fecal fistula; pylephlebitis and intestinal obstruction.

MATERIALS AND METHODS

- **DURATION:** JAN 15th 2021 TO SEP 15th 2021
- **STUDY DESIGN:** Prospective study
- **SAMPLE SIZE:** 150

METHODOLOGY

Patients presenting with clinical features suggesting of acute appendicitis- anorexia, right iliac fossa pain, nausea, vomiting and fever admitted in emergency department of our hospital from the above-mentioned period will be enrolled in our study.

Before performing an emergency open appendicectomy, the patients were randomized into two groups. Group 1 received single dose of Cefaperazone sulbactam 1.5gm i.v. at time of induction of anesthesia. In group 2, two further doses of cefaperazone sulbactam were given intravenously 12hourly for 3 days. Appendicectomy was carried out in all the patients by the standard protocol of open surgical technique. The surgical wound was closed in layers.

During the post-operative period, the progress of the surgical wound was monitored on a daily basis for all the patients included in the study. Wound infection was graded using the Southampton scoring system Wound healing was taken as normal for grades 0, 1 and 2. Infection of the wound was categorized as minimal for grade 3 and as major for grades 4 and 5. Patients who developed major infection were treated appropriately with daily wound irrigation and antibiotics based on culture reports. Informed consent was obtained from all the patients and the study was carried out with prior clearance from the ethical committee.

OBSERVATION AND RESULTS

In our study, 150 patients were included with a diagnosis of acute appendicitis and randomized to two groups, with seventy-five patients in each group.

The age group varied from 11 to 45 years in both groups, with a mean age of 20.9 years in group 1 and 24.1 years in group 2

Table 1- Age Wise Distribution

Age Group	Number of Cases	Percentage(%)
11-20	64	42.67
21-30	57	38

31-40	27	18
41-50	2	1.33
51-60	Nil	Nil

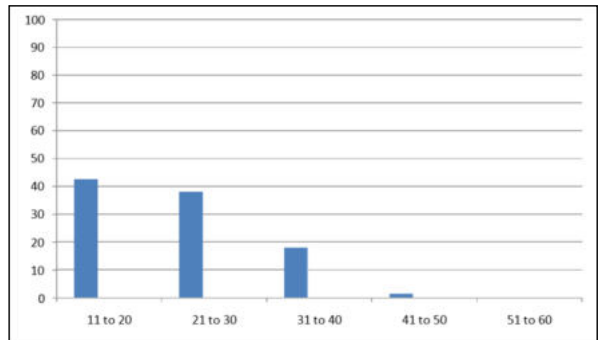


Figure 1 - Age Wise Distribution In Percent

In the study, total of 75 patients were male and 75 were female with the age group in 2nd and 3rd decade being the greatest number of cases.

Table 2 – Sex Wise Distribution

Age Group	Male	%	Female	%
11-20	36	24	28	18.67
21-30	25	16.67	32	21.33
31-40	12	8	15	10
41-50	2	1.33		

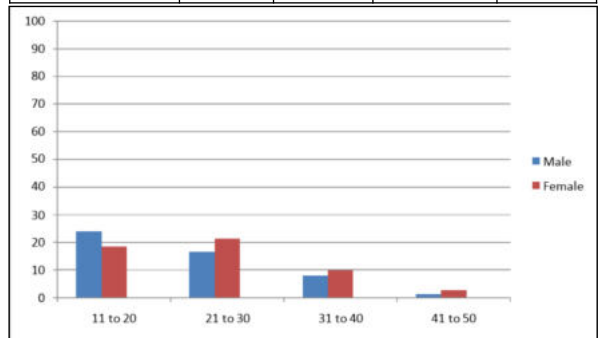


Figure 2- Sex Wise Distribution In Percent

The total number of cases who developed post-operative infection is 13 with the peak incidence of infection being in the 4th decade of life.

Table 3- Age Wise Distribution Of Infection

Age Group	Total No. of cases	No. of cases Infected	Percentage
11-20	64	Nil	0
21-30	57	2	1.33
31-40	27	9	6
41-50	2	2	1.33
51-60	Nil	Nil	0
Total	150	13	8.66

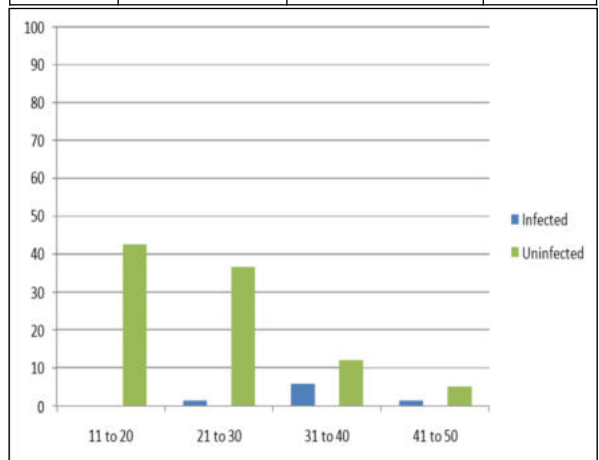


Figure 3 – Age wise Distribution of Infection in Percent

Of the 13 cases who developed infection post-operatively 7(9.33%) of them belonged to the study group and 6(8%) of them belonged to control group

Table 4 – Distribution Of Infected Cases In Test And Control Group

	Test Group	Control Group
Total No.Of Cases	75	75
No.of cases Infected	7	6
Infection Rate	9.33%	8%

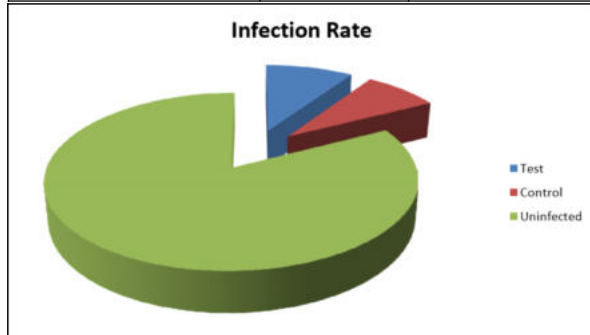


Figure 4- Infection Rate

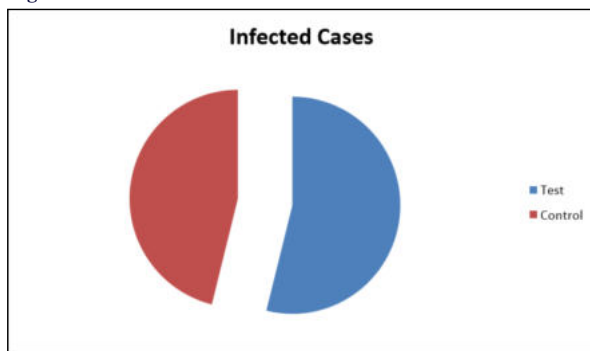


Figure 5 – Distribution Of Infection

Table 5 Median Hospital Stay

Test Group	Control Group
5 days	5 days

Summary

In the postoperative period, the surgical wounds were examined and graded using the Southampton scoring system.

- In the study, total of 75 patients were male and 75 were female with the age group in 2nd and 3rd decade being the greatest number of cases
- The total number of cases who developed post-operative infection is 13 with the peak incidence of infection being in the 4th decade of life.
- Of the 13 cases who developed infection post-operatively 7(9.33%) of them belonged to the study group and 6(8%) of them belonged to control group
- Normal wound healing was observed in 63(84%) patients in group 1 and 64(85.3%) in the other group.
- Minimal wound infection which resolved spontaneously was present in 5 out of 75 patients (6.6%) in group 1 and 5 of 75 (6.6%) patients belonging to group 2.
- Discharge of pus (grade 4) was observed in 7(9.3%) patients in group 1 and 6(8%) in group 2.
- No patients in either group developed grade 5 wound infection.

Using 2 sample z-test for analysis, the incidence pattern and the grade of wound infections in both the study groups were found statistically not significant. There was no significant difference in length of hospital stay between the two groups.

DISCUSSION

Usage of appropriate antibiotics is well known to control wound infection rates following open appendicectomy for uncomplicated acute appendicitis. While antibiotic prophylaxis is common in surgical procedures, inappropriate use of antibiotics occurs in 25–50% of general elective surgeries.

The choice of antibiotic for prophylaxis varies widely in different centers and even among the different surgical units attached to the same Institute. The American Society of Health System Pharmacists (ASHP) recommends cephalosporins as drug of choice for prophylaxis for nonperforated appendicitis and gentamicin with metronidazole only in cases of penicillin allergy. The major controversy lies in the optimum duration of prophylaxis in cases of acute nonperforated appendicitis. Many studies have shown that single preoperative dose of antibiotic is as effective as multiple postoperative doses in preventing wound complications following appendicectomy.

In our study, we have used a more objective method to assess the progress of the surgical wounds by correlating with the Southampton scoring system. There was no significant difference between wound infection rates of the single dose group (9.3%) and the multiple dose group (8%). These findings are in full agreement to the similar studies in the literature A possible benefit that can be derived from our study is that by using a single preoperative dose, the surgeon can be certain of having given an effective prophylaxis at induction of anesthesia without the need to monitor further postoperative doses. Moreover, avoiding further intravenous doses of antibiotics may lead to savings in terms of nursing effort, time and the cost of treatment.

CONCLUSION

It is evident that prophylactic multiple doses of Cefaperazone sulbactam postoperatively confer no additional benefit over a single preoperative dose of Cefaperazone sulbactam. With additional benefits of the greater ease of administration and decreased cost, single dose Cefaperazone sulbactam is the prophylaxis of choice for appendicectomy in patients with nonperforated appendicitis in our study. It is essential for Surgeons and Surgical departments to update their routine practice of antibiotic prophylaxis to comply with updated guidelines and evidence base so as to avoid overuse of antibiotics and their multiple dosage schedule in order to prevent the emerging menace of drug resistance as well prevent the side effects in patient's perspective.

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