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SINGLE SHOT OF ANTIBIOTIC IN LAPAROSCOPIC APPENDECTOMY

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ABSTRACT:

Background: Acute appendicitis is one of the most common acute surgery events. Appendicitis must be considered in every patient who presents with acute abdominal pain. Its main treatment is surgery. However medical management before and after the surgery has an important impact on the treatment. Single or multiple-dose regimens of antibiotics may rely on the patient's medical situation and the patient's susceptibility to infection. The present study was therefore planned to evaluate the effectiveness and outcomes of the single dose of antibiotics in patients undergoing laparoscopic appendectomy. Aim of the study is whether a single dose of antibiotic in laparoscopic appendectomy is sufficient.

Materials and Methods: The retrospective case study was conducted in Department of General Surgery, Dhiraj Hospital, SBKS, Vadodara, Gujarat, India from March 2023 -September 2023 among 50 patients scheduled for laparoscopic appendectomy.

Results: Out of 50 patients, majority 80% were males and 20% were females. Most common symptom was right iliac fossa pain. Out of 50, 34 patients underwent planned laparoscopic appendectomy while 16 underwent emergency laparoscopic appendectomy. Out of 50 patients, 10 patients had SSI. In 10 patients with SSI, swab culture of the wound was done out of which 8 patients were negative and 2 patients were positive for infection. Only 10% of the patients had wound infection.

Conclusion: For basic, uncomplicated acute appendicitis, single dose of prophylactic antibiotics will help in cases of laparoscopic appendectomy. There is no necessity for the post-operative administration of antibiotics.

Keywords: Antibiotics, Complications, Laparoscopic appendectomy, Surgical Site Infection, Single dose of antibiotic

Introduction

The appendix isa smalltube of length2-20 cm, of average length is9 cm. The diameter of appendix is about 5 mm. It constantly arises from the site at which the three taenia coli converge lies in the right iliac fossa. There are various anatomical positions ofappendix; most common is retroceacal in position.[1]

Appendicitis is an inflammation of the appendix. Appendicitis must be considered in every patient who presents with acuteabdominal pain. It is one of the most common abdominal diseasesrequiringsurgicalinterventions,withlifetimeriskof6%to20%.Oneinevery 100,000 people is infected with acute appendicitis.[2] About two third (2/3) of patients are
men and two third (2/3) of patients age from 20-0years old. The potential origin of appendicitisis a blockage in the lining of the appendix that induces inflammation. The bacteria multiply quickly, so the appendix is inflamed, swollen and pus-filled. If not treated promptly, theappendixcanrupture.BacteriamostcommonlyinvolvedincludeEscherichiacoli,
Pseudomonasaeruginosa,Klebsiellapneumonia,Bacteroidesfragilisandenterococci.
Faecolith(mostcommoncause),lymphoidhyperplasia,concretions,localedemaofthe mucosa, stricture, gallstones, external pressure bands and adhesions, twists and strangulation of appendix in hernia sac, foreign bodies, parasites: pinworms, thread worms, round worms; carcinoma caecum or carcinoid tumors in elderly population (least common).[3] Distension of appendix is responsible for the initial vague abdominal pain often experienced by the affected patient. The pain typically does not localize to the right lower quadrant until the tip becomes inflamed and irritates the adjacent parietal peritoneum (somatic) or perforation occurs, resultedin localized peritonitis. If patients do not get appropriate treatment as soon as possible after the diagnosis of acute appendicitis, they could develop perforated appendicitis, which may lead to abscess or peritonitis. Even worse, it can progress to bacteremia or septicemia.[4]

The gold standard treatment of acute appendicitis remains appendectomy. The patient should undergo fluid resuscitation as indicated, and the intravenous administration of broad spectrum antibiotics directed against organisms. Appendectomy can be performed through open or laparoscopic surgery. When a laparoscopy appendectomy is done, three incisions are made, each approximately 1 to 2.5 cm long. An incision is made near the umbilicus or navel and onebetween the pubis and the umbilicus. The other incision is smaller on the right side of the lower abdomen. The doctor then slides into these incisions a camera and special equipment. The surgeon checks the abdominal organs visually and recognizes the appendix using this device.The appendix is then freed from all of its attachments and removed. The site of the cecum at which the appendix was previously connected is stitched. One of the incisions is used to remove theappendix. Theinstrumentsareremovedandalltheincisionsareclosed.[5]Theaimofthestudy is whether a single dose of antibiotics in laparoscopic appendectomy is sufficient.[6]

In acute appendicitis cases that have not received prophylactic antibiotics before surgery, over 25%woundinfectionisreported.Antibioticsprescriptionpriortosurgeryisconsideredtobe

effective in reducing the infectious complications of appendectomy. As a result, most surgeons prescribe antibiotics before surgery for patients diagnosed with appendicitis.[7]

MATERIALSANDMETHOD:

A retrospective clinical study of 50 cases of laparoscopic appendectomy performed with the use of single dose per-operative antibiotics in general surgery department of Dhiraj Hospital, SBKS, Vadodara. The study was conducted over a period of 7 months i.e. March 2023 to September 2023. It is an observational study. The patient selection was by convenience sampling.

Duringthisstudyperiod50patientswereadmittedofappendicitis.

Each patient was evaluated clinically taking into consideration history, general examination, abdominal examination and investigations and analyzed according to data collected on a planned proforma.

Inclusion criteria: Patient who undergone planned laparoscopic appendectomy, patient who underwent emergency laparoscopic appendectomy.

Exclusion criteria: Patient those who went emergency laparoscopic appendectomy having perforated appendix, gangrenous appendix, patient undergoing open standard appendectomy, patient on multiple dose of antibiotic, pregnant female. Patients who had received antibiotics within 72 hours of admission, patient who are immune compromised, subjects with diabetes, heart failure and anemia were excluded.

PatientsweregivenasingledoseofintravenousPiperacillin4gm+Tazobactam0.5gmantibiotic half an hour before operation.

Stasticalanalysis

All statistical analysis were performed using SPSS2 5(Statistical Package for Social Science).

Quantitative variables were presented as means or as median (range)

RESULTS:

Theresultsof50patientswereanalyzedandreportedasfollows:

According to sex, appendectomy is more common in male than female. Out of 50 patients 80% were males and 20% were females. **(Table 1)**

SEX	NO.OF CASES
MALE	**40**
FEMALE	**08**

Table 1:SEXINCIDENCE

Appendicitisismorecommon in agegroup to 20-40 years of age.

In the present study, 34 planned laparoscopic appendectomy and 16 emergencies laparoscopic appendectomy are taken. Patient where was managed conservatively when presented with acute episode of attack of appendicitis, called for interval appendectomy after one and half month. **(Table 2)**

Typeofoperation	**Planned(Interval) appendectomy**	**Emergency appendectomy**
No. of patients	34	16
SSI	00	05

Outof16emergency appendectomy,5patientshad SSI.

In the clinical features or symptoms, the majority of the patients around 72% had pain in right iliac fossa (RIF), followed by nausea in 20% of the patients and the least symptom was fever in 8% of the patients. **(Table 3)**

CLINCAL FEATURES	NO.OF CASES	PERCENTAGE
PaininRIF	**36**	**72%**
Nausea	**10**	**20%**
Fever	**4**	**8%**

TABLE3:CLINICALPROFILEOFPATIENTS

Out of 50 patients, the condition of the appendix in 28 patients was normal. Inflamed tip was seen in 12 patients followed by adherent tip in 6 patients and the mildly inflamed appendix was seen in 4 patients.

Out of 28 normal appendix cases, 6 had SSI (Surgical Site Infection) and out of 12 inflamed tip appendix, SSI was seen in 3 patients. Out of 4 mildly inflamed appendix patients, 1 had SSI.

Sooutof 50patients,10 patientshadSSI

In 10 patients with SSI, swab culture of the wound was done out of which 8 patients were negative and 2 patients were positive for infection. **(Table 4)**

Swab culture of wound	**No.ofcases**
Positive	2
Negative	8

TABLE4:SWABCULTUREOFWOUND

Itwassensitivetolevofloxacinandtheinfectionrespondedtoa-5daycourseofinjectable intravenous levofloxacin. In this case the stitch removal was delayed by 4 days.

Mostofthepatientswerekeptinthehospitalonlytilltheyrequiredinjectableantibioticsand analgesicsforpainrelief.Assoonastheywererelievedofpainandpassedstoolorflatusand

started taking orally, they were sent at home. They were then called back on the 10 th day for stitch removal.

All of the patients had a preoperative stay of only 1-2 days. Increasing the hospital stay has been shown to increase the risk of post-operative wound infection. Hence preoperative stay should be kept to minimum, only enough for the patient to become slightly familiar with the surroundings and the staff. This is of great use in the post-operative period.

Only 10% of the patients had wound infection. None of the patients had any sort of discharge (Grade 3 or 4 wound infections) or wound gap. 2 out of the 3 patients having wound infection had only erythema which was cured without the use of any antibiotics.

In this study observed that when preoperative appendix is normal, it required less dissectiontime, such that average duration of surgery is just 34.50 ± 9.20. **(Table 5)**

Duration in minutes	Cases (n=50)
20-40	32
40-60	18
Total	50

TABLE5:DURATIONOFSURGERY

In this study, half of the patients required hospitalization for only one post-operative. One thirdof patient required hospitalization for 2 days because of pain. One sixth of patients whom appendix dissection required more time, required hospitalization for more than 2 days for pain relief.

DISCUSSION:

A clinical study of 50 cases of laparoscopic appendectomy was performed with the use of single dose per-operative antibiotics in general surgery department in Dhiraj Hospital, SBKS,Vadodara.

Laparoscopic appendectomy isa widely performed technique due tomanyadvantages,including smaller surgical wound, reduced scope of infection, reduced post-operative pain, reduced hospital stay and quick rehabilitation than open appendectomy.[8]

Most of the patient whom appendicitis episode happened, belongs to 20-40 years age group (40%), and were males (80%).

The most common symptom of acute appendicitis is right iliac fossa discomfort ,the second most common is nausea and the least frequent is fever.

The most common problem after appendectomy is surgical site infection. The Center for Disease Control and Prevention (CDC) also identified basic guidelines for surgical site infections. Throughout laparoscopic surgery, the risk of infection occurs when the skin becomes incised and

the first natural layer is removed, but the highest risk of infection is at the moment of tissue processing, which may also contribute to post-operative infection.[9]Many surgical diseases at the site are minor while they contribute significantly to surgical morbidity and mortality. Because laparoscopic incisions are smaller than those of traditional open surgery, the former has a decreased frequency of SSIs. Wound infection can cause serious complications such as burst abdomen, incision hernia, necrotic fasciitis and septicemia unless controlled. A single efficient non-toxic drug is used for the reduction or eradication of an infection with a particular microorganism. In order to prevent surgical infection or treating wound, single or multiple doses of antibiotics are required. In our study there was no SSI in planned appendectomy while 5 patients had SSI in emergency appendectomy.

Patient, whom either appendix tip inflamed or adherent (44%) was found, required extensive dissectionwhichlateronresultsinmorepost-operativepainepisodeandmorehospitalstaytime. Also such patients have more surgical site infection rate.[10] In this study overall surgical site infection rate (20%). In other studies the SSI were found to be following - seyedmohammadrezaetal.(15.6%),[11]himabinduetal.(13.8%),[12]yogendraetal.(11.97%),[13]soonminet al.(12.5%)[14] and liberman et al. (11.11%).[15]

In this study when per-operative appendix is normal, it required less dissection time. Such that ouraveragedurationofsurgeryisjust34.50±9.20min,much lesser hanotherauthorsaverage 42.34 ± 8.30 min.

Our post-operative patient were discharged as soon as their pain subsides and patients tolerating orally,allbecauseofnormalpreoperativeappendix,lessdissection,newertechnologyofdissection and preoperative higher antibiotic (piperacillin + tazobactam) use, which states in our average postop hospital stay duration which is 2.0 ± 0.4 day compared to seyed et al 3.1 ± 0.3 days,[11]himabinduetal. 2.9±0.3days,[12]yogendraet al2.0± 0.7days,[13]soonminetal. 2.5±0.7 days,[14]liberman et al. 3.0 ± 0.4 days.[15]

Thus, it can be concluded that laparoscopic appendectomy is safe and effective alternative to open surgery. It can be done with the use of single dose antibiotic in selected group of patients if certain criterions are fulfilled. Restricting the unnecessary use of antibiotic would definitely help to reduce the emergence of resistant strains of micro-organisms. The rate of infusion site thrombo-phlebitis is reduced, and thus the associated pain and morbidity is also less. The post-operative hospital stay of the patients decreases.

Surgical site inflammation in 20% of cases was reported, with only 2% positive and 8% negative in swab culture.

So it has to be noted that the group who were administered a single dose of antibiotics pre-operatively had reduced post-operative stay, the lesser financial burden on the patient and lesser side effects compared to the group with multiple doses of antibiotics.[16]

CONCLUSION:

It concludes that a single dose of antibiotic is sufficient for patient undergoing laparoscopic appendectomy. Restricting the unnecessary use of antibiotic would definitely help to reduce the emergence of resistant strains of micro-organisms, chances of thrombophlebitis and associated pain, leads to less post-operative hospital stay which reduces the cost of treatment to patients as well as decreases the economic burden on society.

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