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A Study to Compare Single Dose Versus Multidose Antimicrobial Treatment in Elective Laparoscopic Cholecystectomy

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Abstract **Original Research Article**

Background: Gallstones are the most common cause of emergency hospital admission for people with abdominal pain worldwide. In most of cases they don't cause any symptoms and no need to be treated. ***Material and methods:*** A prospective study conducted on 100 patients involving all diagnosed patients of cholelithiasis admitted and supposed to undergo Laparoscopic Cholecystectomy. The first fifty patients undergoing elective Laparoscopic Cholecystectomy will be given injection Ceftriaxone 1.5 gm i.v. after the test dose outside the operation theater in the wards and the antibiotics were continued for 2 days. The next fifty patients were given a single dose of injection Ceftriaxone 1.5 gm i.v. after the test dose just before the induction of anaesthesia. ***Results:*** Majority of the cases belongs to 35 patients were in 18-30 years age group, 86 (86%) were females. Our study shows that incidence of Cholelithiasis is more among females which is consistent with general population. Out of the 100 cases of elective Laparoscopic Cholecystectomy, drain were placed in 45 (45%) patients, and no drain required in 55 (55%) of patients. Out of 50 patients of single dose antimicrobial group 32 (64%) developed post-operative fever, 3 patients (6%) had post-operative raised WBC count and 3 patients (6%) had post-operative surgical site infection. Out of 50 patients of multidose antimicrobial group 31 (62%) had post-operative fever, 2 patients (4%) had post-operative raised WBC count and 2 patients (4%) had post-surgical site infection. ***Conclusion:*** There is no statistical difference between single dose and multi dose antimicrobial treatment in terms of surgical site infections and post-operative hospital stay.

Keywords: Antimicrobial, Cholelithiasis, Gallstones, Laparoscopic cholecystectomy.

INTRODUCTION

Gallstones are small stones, usually made of cholesterol, that form in the gallbladder. In most of cases they don't cause any symptoms and no need to be treated. When gallstones cause symptoms or complications e.g. persistent pain, jaundice, fever etc. it's known as gallstone disease or cholelithiasis. Gallstones constitute a significant health problem in developed societies, affecting 10% to 15% of the adult population [1]. Gallstones are the most common cause of emergency hospital admission for people with abdominal pain worldwide [2].

Patients with asymptomatic gallstones develop complications at an annual rate of 1-2%. In symptomatic patients, the complication rate increases to 1-3% [3]. Lifetime probability of death from complications of gallstone disease has been reported at 6%, with most deaths occurring in persons older than 65 years as incidence of cholelithiasis increases with age. Gallstones are composed mainly of cholesterol and can be less often pigment stones. Cholesterol stones form as a result of cholesterol super-saturation, accelerated cholesterol crystal nucleation and impaired gall bladder motility [4].

The treatment modalities include laparoscopic or open cholecystectomy, ERCP (Endoscopic Retrograde Cholangio-pancreatography).

Endoscopic sphnicterotomy and new investigational procedure called Natural Orifice Translumenal Endoscopic Surgery (NOTES). During the past 20 years, Laparoscopic Cholecystectomy (LC) has become the procedure of choice in the surgical treatment of symptomatic billiary lithiasis [5]. The operation is not completely risk-free, some incidents and complications being more frequent than with Open

Cholecystectomy (OC). In fact, a complicated LC is considered to be one of the most difficult laparoscopic procedures worldwide.

MATERIAL AND METHODS

A prospective study conducted on 100 patients involving all diagnosed patients of cholelithiasis admitted and supposed to undergo Laparoscopic Cholecystectomy at department of general surgery, Gajra Raja Medical College and JA Group of hospital Gwalior during study period of December 2019 to November 2020.

Inclusion criteria

- Symptomatic Patients diagnosed with cholelithiasis on ultrasonography and planned for Laparoscopic Cholecystectomy.
- Age more than 18 and less than 60 years.
- Patients giving consent for undergoing in the study.

Exclusion criteria

- Age less than 18 and more than 60 years.
- Having acute cholecystitis, obstructive jaundice /acute cholangitis
- Having Comorbid conditions like Diabetes Mellitus, Hypertension, Tuberculosis, Asthma etc.
- History of Previous biliary intervention.

Method of collection of data

The study will be conducting on 100 symptomatic patients of cholelithiasis admitted and supposed to undergo Laparoscopic Cholecystectomy giving consent for undergoing in the study at Department of General Surgery, Gajra Raja Medical College and JA Group of hospital Gwalior during study period. The study comprised of 100 patients admitted for elective laparoscopic cholecystectomy. The first fifty patients undergoing elective Laparoscopic Cholecystectomy will be given injection Ceftriaxone 1.5 gm i.v. after the test dose outside the operation theater in the wards and the antibiotics were continued for 2 days. The next fifty patients were given a single dose of injection Ceftriaxone 1.5 gm i.v. after the test dose just before the induction of anaesthesia.

The surgical site was prepared inside the operation theater. The standard aseptic precautions were followed at each step and extraction of gallbladder was done through the operating port without using a bag or at the surgeon's preference. Incisions were closed at the end of the operation with absorbable or non-absorbable suture. Post-operatively the wounds were examined on second day, time of discharge; the sutures were removed in outpatient department (OPD) between 10-12 days.

Statistical analysis

Then data will be collected by assessing admitted cholelithiasis patients through preformed proforma & later all these datas will be analysed using Microsoft office excel & Statistical analysis software SPSS version 23. The data was subjected to descriptive analysis. Mean and range were determined from continuous data. Student's t-Test was applied to continuous variables and chisquare and Z-test for two independent proportions were applied to categorical data and on the basis of these analysis detailed results will be prepared.

RESULTS

100 cases of Cholelithiasis over the period of a year were included in the present study spanning from December 2019 to November 2020, conducted in department of surgery, Gajra Raja Medical College and JA Group of hospital Gwalior. All the cases were followed up throughout the study period.

Table-1: Incidence of cholelithiasis age wise

Age group	No of patients
18-30	35
31-40	30
41-50	16
51-60	19

Out of 100 cases 35 patients were in 18-30 years age group, 30 (30%) in 31-40 years age group, 16 (16%) in 41-50 years of age group and remaining 19 (19%) in 51-60 year age group.

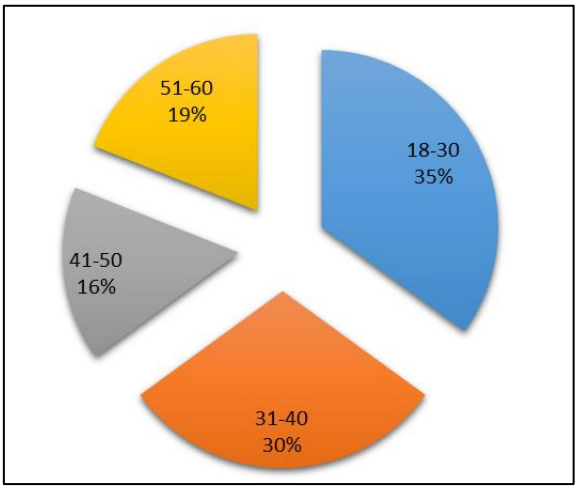

Fig-1: Incidence of cholelithiasis age wise

Table-2: Incidence of cholelithiasis sex wise

Sex	No of Patients
Male	14
Female	86
Total	100

Out of the 100 cases 14 (14%) patients were males and 86 (86%) were females as per Table (2).i.e. our study shows that incidence of Cholelithiasis is more among females consistent with general population.

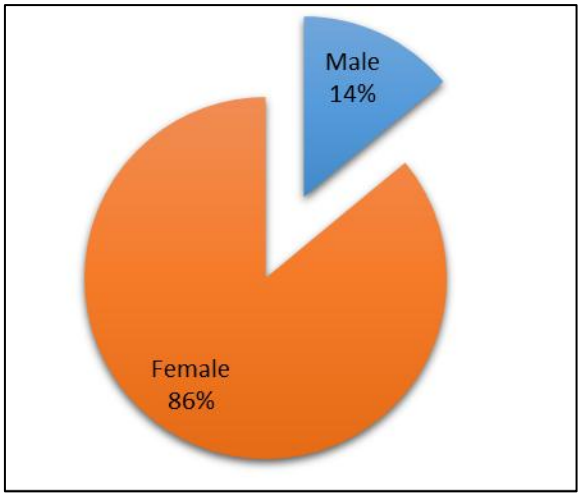

Fig-2: Incidence of cholelithiasis sex wise

Table-3: Drain placement in elective Laparoscopic Cholecystectomy in our study

Drain +/-	No of patients
Present	45
Absent	55
Total	100

Out of the 100 cases of elective Laparoscopic Cholecystectomy drain were placed in 45 (45%) patients and no drain required in 55 (55%) of patients.

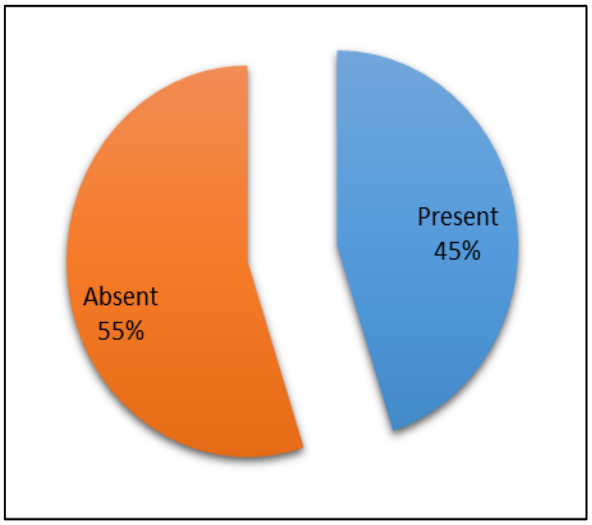

Fig-3: Drain placement in elective Laparoscopic Cholecystectomy in our study

Table-4: Post-operative fever

Presence or absence of post fever	Present	Absent
Among single dose group	32	18
Among multiple dose group	31	19

P value = 0.836

Out of 50 patients of single dose antimicrobial group 32 (64%) had post operative fever and similarly out of 50 patients of multidose antimicrobial group 31 (62%) had post operative fever. P>.05, hence there was no statistically significant difference observed between the two study group. (Table 4)

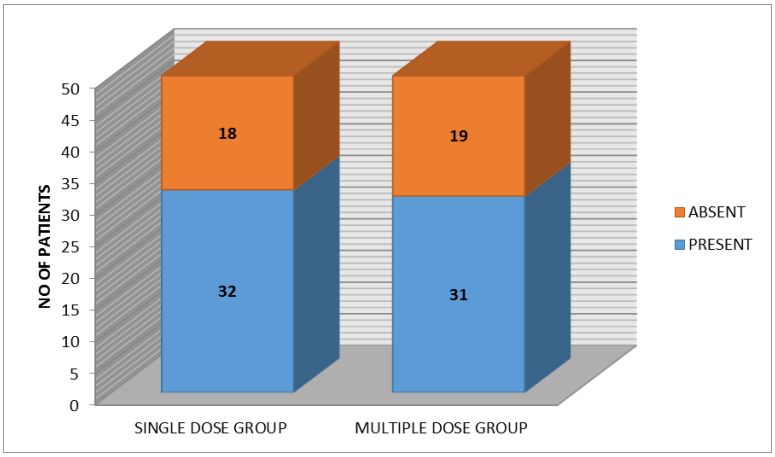

Fig-4: Postoperative fever

Table-5: Postoperative WBC count

WBC count	Increase	Normal
Among single dose group	3	47
Among multiple dose group	2	48

P value = 0.646

Out of 50 patients of single dose antimicrobial group 3 (6%) had post-operative raised WBC count and similarly out of 50 patients of multidose antimicrobial group 2 (4%) had post-operative raised WBC count. P>.05, hence there was no statistically significant difference observed between the two study groups. (Table 5)

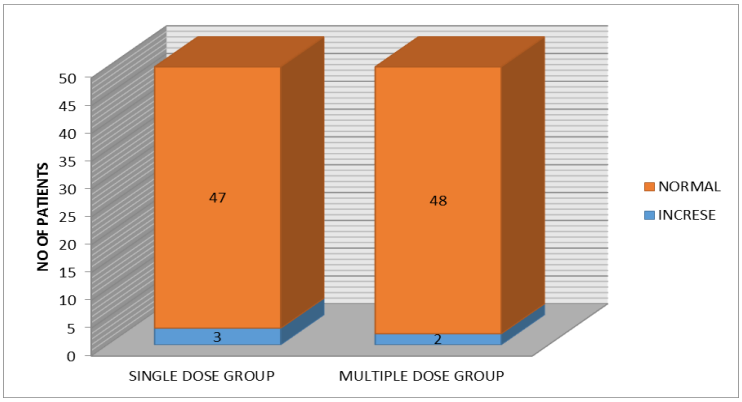

Fig-5: Postoperative WBC count

Table-6: Duration of post op hospital stay

Duration of post op stay	0-2	3-4	5-6
Among single dose group	6	35	9
Among multiple dose group	8	36	6

P value = 0.638

Post op hospital stay among single dose and multidose antimicrobial were compared. 6 patients in single dose and 8 patients in multidose discharged within 2 days, 35 patients in single dose and 36 patients in multidose discharged within 3-4 days and 9 patients in single dose and 6 patients in multidose discharged within 5-6 days post op. P>.05, hence there was no statistically significant difference observed between the two study group. (Table 6)

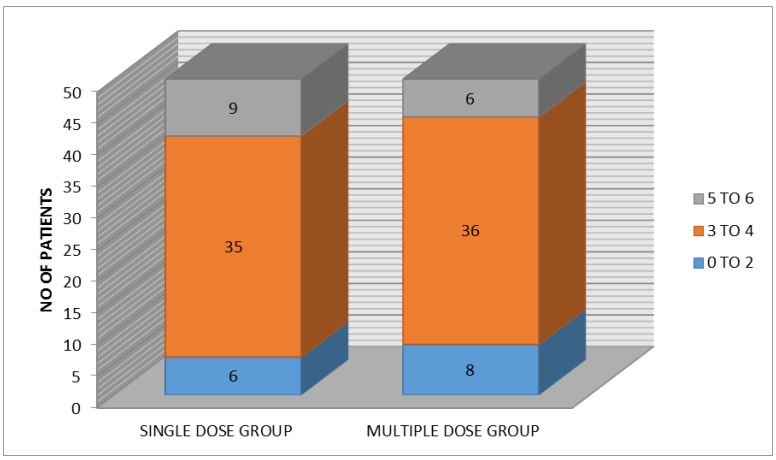

Fig-6: Duration of post op hospital stay

Table-7: Presence or absence of post op SSI

Post op SSI	Present	Absent
Among single dose group	3	47
Among multiple dose group	2	48

P value = 0.646

Out of 50 patients of single dose antimicrobial group 3 (6%) had post-operative surgical site infection and similarly out of 50 patients of multiple dose antimicrobial group 2 (4%) had post-surgical site infection. P>.05, hence there was no statistically significant difference observed between the two study group. (Table 7)

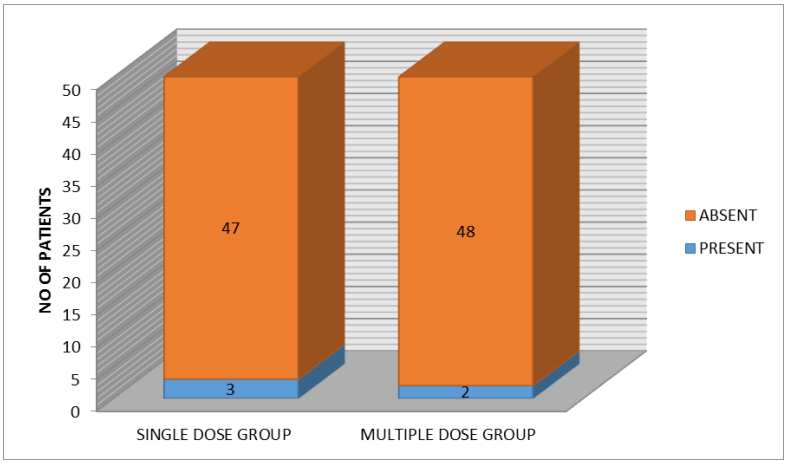

Fig-7: Presence or absence of post op SSI

DISCUSSION

The Surgical Site Infection (SSI) has their implications in term of prolonged hospital stays, increased cost of antibiotics and increased chances of resistant strains of bacteria. The cost of care for patients with surgical site infections is nearly three folds higher than that for surgical patients without the infections.

The gall stone disease is more frequently seen among the female patients in the middle age group. In our study, 84% of the patients were females comprising the male: female ratio as 1:6.14. Similar observations were made by Chaudhary *et al* 91.48% were females, similarly Hussain *et al* and Youseif *et al* who also observed that gall stone disease was more common in females (88%) as compared to males (12%).

	Female	**Male**
Chaudhary *et al* [6] (n=94)	91.5%	8.5%
Hussain *et al* [7] (n=40)	80%	20%
Youseif *et al* [8] (n=150)	88%	12%
Our study (n=100)	86%	14%

More number of SSI were seen by Chaudhary *et al* , 5 (10.63%) patients in single dose and 7 (14.89%) in multidose antimicrobial as compare to our study in which 3 (6%) patients in single dose and 2 (4%) patients in multidose antimicrobial which is supporting our observations in similar aspect. Overall SSI percentage was less in our study as compare to other studies as we had included only laparoscopic procedure which carry less infection rate as compare to combined, open and laparoscopic patients.

	SSI in single dose	**SSI in multidose**
Chaudhary *et al* [6] (n=94)	10.63%	14.89%
Ajit B. Gohil *et al* [9] (n=300)	15.4%	13.2%
Our study (n=100)	6%	4%

In our study, out of 50 people who were administered a single dose of Ceftriaxone 1.5 gm, 3 (6%) patients developed infection while the surgical site infection rate was 4% in the multiple dose group as 2 patients developed surgical site infection. All patients having SSI had increased WBC count. Overall infection rate was 5%. In this study, the rate of wound infection is higher in patients with single dose of injection Ceftriaxone as compared to multidose antibiotic treatment (p=0.646). Thus, it can be inferred that single dose antibiotic prophylaxis is as good as multiple dose regimen.

In our study out of 50 patients of single dose antimicrobial group 32 (64%) had post-operative fever and similarly out of 50 patients of multidose antimicrobial group 31 (62%) had post-operative fever. There were no significant difference in single dose and multidose group. All the patients which had SSI had complaint of fever but the reverse was not true.

The mean post-operative hospital stay in single dose group is equivalent to multiple dose group, so it can be inferred that there is no significant difference in post op hospital stay in both study groups. Only benefit is that cost of multidose antibiotics can be reduced as compare to single dose hence financial burden can be decreased on health system.

CONCLUSION

In elective Laparoscopic Cholecystectomy a single dose of intravenous Ceftriaxone given

preoperative doesn't lead to a higher Surgical Site Infection (SSI) rate as compared to the conventionally given antibiotics which are continued post operatively for a variable length of time. Single dose of antibiotic can certainly decrease the cost of antibiotic therapy to the patient and the institution.

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