COMPARATIVE RISK OF SURGICAL SITE INFECTION WITH OPEN CHOLECYSTECTOMY VS LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT

OBJECTIVES

This study aimed to compare the risk of surgical site infection with open vs laparoscopic cholecystectomy.

METHODOLOGY

This randomized control trial was done at the Department of Surgery, Hayatabad Medical Complex, Peshawar, for 12 months from 11/5/2018 to 11/5/2019. 116 patients were recruited for this study, 58 for each group randomly allocated to a group by lottery method and concealed Allocation. Patients in Group A underwent laparoscopic cholecystectomy, while patients in group B underwent open cholecystectomy. According to ward protocol, post-operative analgesia & antibiotics were given to patients in both groups. Expert consultant general surgeons did all the evaluation & procedures; all the patients were followed up to 30 days after the procedure & any surgical site infections, if found, were noted.

RESULTS

The mean age was 36 years ± 12.19 SD and 38 years ± 11.88 SD in laparoscopic and open cholecystectomy, respectively. In laparoscopic cholecystectomy, 28% of patients were male, and 72% of patients were female, while in open cholecystectomy, 29% of patients were male, and 71% of patients were female. 07% of laparoscopic and 26% of open cholecystectomy patients had surgical site infections.

CONCLUSION

Our study concludes that the frequency of surgical site infection was found less in laparoscopic cholecystectomy than in open cholecystectomy.

KEYWORDS: *Laparoscopic Cholecystectomy, Open Cholecystectomy, Surgical Site Infection*

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INTRODUCTION

Gallstone disease is one of the most common surgical encounters. According to world literature, it occurs among 3-20% of the world population. Gallstones must have been known to humans for many years since they have been found in the gallbladders of Egyptian mummies dating back to 1000 BC. However, this disease is a global medical problem, even though there are geographical variations in gallstone prevalence. Gallstones are becoming increasingly common;

they are seen in all age groups, but the incidence increases with age, and about a quarter of women over 60 years will develop them. In most cases, they do not cause symptoms, and only 10% and 20% will eventually become symptomatic within 5 years and 20 years of diagnosis. Thus, the average risk of developing the symptomatic disease is low and approaches 2.0-2.6%/year. Cholecystectomy has been the gold standard surgical treatment of gallstone disease for ages. [1,2] With the advent of laparoscopic cholecystectomy, the scenario of surgical management of gallstones has changed drastically. It has opened new horizons in the management of gallstones. Theoretical benefits of the laparoscopic approach include reduced hospitalization and cost, decreased pain, avoidance of large incisions with improved cosmesis and reduced post-operative recovery time with an early return to work. So elective laparoscopic cholecystectomy is considered the gold standard for treating symptomatic gallstones.[3,4] Although it showed early promising results, recent trials show an increase in the incidence of operative complications. Expensive instruments, specialized training and long learning curve also limit the use of laparoscopy. This has led to many soul searching and numerous attempts to compare the merits and demerits of laparoscopic open cholecystectomy. Although both of these procedures are fairly well tolerated, wound infection remains the most common post-operative complication that prolongs hospital stay, increases the cost of treatment, and leads to long-term complications.[5] A researcher conducted a retrospective cohort of commercially insured persons aged 18–64 years to identify the risk factors for surgical site infection after cholecystectomy. The incidence of wound infection or surgical site infection (SSI) was significantly higher after an open (4.93%) versus laparoscopic cholecystectomy (0.64). Independent risk factors for SSI included male gender, preoperative chronic anemia, diabetes, drug abuse, malnutrition/weight loss, obesity, smoking-related diseases, previous Staphylococcus aureus infection, laparoscopic approach with acute cholecystitis/obstruction, open approach with or without acute cholecystitis/obstruction, conversion to open approach with or without acute cholecystitis/obstruction, bile duct exploration, post-operative chronic anemia, and post-operative pneumonia or urinary tract infection. [6,7] In a randomized clinical trial consisting of 100 patients undergoing cholecystectomy– 50 patients in the group Laparoscopic cholecystectomy and 50 patients in the Open cholecystectomy group. Their results showed that the frequency of wound infection is much less than 6% in the Laparoscopic cholecystectomy group compared to the Open cholecystectomy group at 22%.[8,9] Another study compared open and laparoscopic cholecystectomy in post-operative morbidity and hospital stay. They observed no wound infection in patients with laparoscopic cholecystectomy.On the other hand, 11 cases (57.8%) in the open cholecystectomy group had wound infection.[10] A few research studies on SSI during laparoscopic vs open cholecystectomy are available. Even the existing research publications have a huge difference in results from one another. This study will contribute to the existing research and will be helpful for future research.

METHODOLOGY

This 12-month randomized control trial study was conducted at the Department of Surgery, Hayatabad Medical Complex. Peshawar included 58 patients in each group, i.e., open and laparoscopic cholecystectomy, by non-probability consecutive sampling. Patients in both groups were of both genders, 18-60 years old and with symptomatic gallstone disease. Systematic gall stone disease was labelled on a patient presenting with right hypochondrium pain and having gall stones on ultrasonography. Gall stones were showing acoustic shadows on ultrasonography. The Exclusion criteria were patients having a history of surgery, especially in the upper abdomen, diabetes mellitus or any other comorbidities, e.g, hypertension, and patients using oral contraceptives and steroids as these drugs increase the chances of infection. These conditions can act as confounders and, if included, introduce bias in the study results, hence excluded. With the approval of the ethical committee, the purpose and benefits of the study were explained to all patients, and written informed consent was taken. All the patients were admitted to the ward through OPD and prepared by taking a detailed history of the disease, relevant clinical examination, and investigations like ultrasound abdomen, serum alkaline phosphatase, and full blood count to confirm the diagnosis of gallstones. All the patients presenting to surgical OPD or emergency room with gallstones were included in the study. All patients satisfying the inclusion and exclusion criteria were included in the study and were further evaluated in a single-blinded way. The patients were then randomly allocated to a group by lottery method (Concealed Allocation) &

subsequent patients were divided into groups by simple random sampling. Patients were divided into two groups; Group A was undergoing laparoscopic cholecystectomy, and Group B was undergoing open cholecystectomy. The patient's biodata (Name, age, sex, weight, height) were entered in the predesigned proforma. Laparoscopic cholecystectomy & open cholecystectomy was done for respective groups. Both the procedure was done under general anesthesia. According to ward protocol, post-operative analgesia & antibiotics were given to patients in both groups. All the evaluation & procedures were done by expert consultant general surgeons or senior residents under their direct supervision, all having sufficient skills and experience in both types of procedures. All the patients were followed up to 30 days after the procedure & any surgical site infections, if found, were noted. Data were stored and analyzed in SPSS version 20. Mean ± SD were calculated for continuous variables like age, weight and duration of hospital stay. Frequencies and percentages were calculated for categorical variables like gender & Surgical site infection (SSI). SSI was compared between the two groups using the chi-square test, keeping P-value ≤ 0.05 as significant. SSI was stratified among age, gender, and duration of hospital stay. Post-stratification, chi-square test, was applied. P-value ≤ 0.05 was taken as significant. All results were presented in the form of tables and graphs.

RESULTS

The study's mean age was 36 years ± 12.19 SD and 38 years ± 11.88 SD in laparoscopic and open cholecystectomy, respectively. There were 16 (28%) males and 42 (72%) females in group A (Laparoscopic cholecystectomy). Whereas in Group B (open cholecystectomy), 17 (29%) were male and 41 (71%) were female. Duration of hospital stay was analyzed as in group A (Laparoscopic cholecystectomy) 48 (83%) patients had a duration of hospital stay ≤ 2 days and 10 (17%) patients had a duration of hospital stay > 2 days. Whereas in Group B (open cholecystectomy), 21 (36%) patients had a duration of hospital stay ≤ 2 days and 37 (64%) patients had a duration of hospital stay > 2 days.

Table 1: Stratification of Surgical Site Infection for Age

Age	SSI	Group A	Group B	P-Value
18-30 years	Yes	1	1	0.8577
	No	3	4	
31-40 years	Yes	1	8	0.0098
	No	30	22	
41-50 years	Yes	1	4	0.1664
	No	15	13	
51-60 years	Yes	1	2	0.4164
	No	6	4	

Group A: Laparoscopic Cholecystectomy, Group B: Open Cholecystectomy

Table 2: Stratification of Surgical Site Infection for Gender

Gender	SSI	Group A	Group B	P-Value
Male	Yes	1	4	0.1664
	No	15	13	
Female	Yes	3	11	0.0166
	No	39	30	

Group A: Laparoscopic Cholecystectomy, Group B: Open Cholecystectomy

Table 3: Stratification of Surgical Site Infection for Duration of Hospital Stay

Duration	SSI	Group A	Group B	P-Value
≤ 2 days	Yes	2	5	0.0128
	No	46	16	
> 2 days	Yes	2	10	0.6511
	No	8	27	

Group A: Laparoscopic Cholecystectomy, Group B: Open Cholecystectomy

DISCUSSION

Gallstone disease is one of the most common surgical encounters. According to world literature, it occurs among 3-20% of the world population. In the present study mean age in laparoscopic cholecystectomy was 36 years with SD ± 12.19, while the mean age in open cholecystectomy was 38 years with SD ± 11.88. In laparoscopic cholecystectomy, 28% of patients were male, 72% were female, 29% were male in open cholecystectomy, and 71% were female. In laparoscopic cholecystectomy, 7% of patients had SSI, whereas in open cholecystectomy 26% were SSI. Similar findings were observed in the study in which the incidence of wound infection or surgical site infection (SSI) was significantly higher after an open (4.93%) versus laparoscopic cholecystectomy (0.64).[11,12] In another study, half patients underwent laparoscopic cholecystectomy, and half patients underwent open cholecystectomy. Their results showed that the frequency of wound infection is much less than 6% in laparoscopic cholecystectomy compared to open cholecystectomy at 22%. A study reported no wound infection in patients with laparoscopic cholecystectomy.[13,14] On the other hand, 11 cases (57.8%) in the open cholecystectomy group had wound infection. A study reported only one case

of Class - II wound infection in the LC group, i.e., 2%. In the case of OC, there were three cases of wound infection, i.e., 6%. Out of these, two were of Class-III and one of Class-II.[15,16] A study was conducted in Germany, to evaluate the gender-related risk factors for surgical site infections. The results showed that the males were more exposed to surgical site infection than females.[17,18]

CONCLUSION

Our study concludes that the frequency of surgical site infection was found less in laparoscopic cholecystectomy than in open cholecystectomy.

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