THE PATTERN OF COMPLICATIONS OF OPEN VS LAPAROSCOPIC CHOLECYSTECTOMY; A COMPARATIVE STUDY

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ABSTRACT

Objective: *To compare the pattern of complications of open vs laparoscopic cholecystectomy*

Materials and Methods: *A Randomized Controlled Trial was carried out at the Department of Surgery, Khyber Teaching Hospital, Peshawar from January 2019 to July 2019 laparoscopic cholecystectomy.*

A total of 200 patients (100 in each group) with the indication of cholecystectomy fulfilling the inclusion criteria were subjected to open and laparoscopic cholecystectomy. The complications were observed and plotted in terms of frequencies and percentages; were compared through SPSS (Statistical Package for Social Sciences) version 21.

Results: *A total of 200 patients with indication of cholecystectomy were operated on, which were divided into two equal groups. The mean age was 42.14 years ±9.34 2SD. Out of 200 patients, 21% were male while 79% were female. No common bile duct, duodenal or colonic injuries were noticed while wound infection was reported more in the open group (5%). Intraoperative bleeding (02%) and gallbladder perforation (10%) was seen more in the LC group as compared to the open group with a 1% occurrence of such complications.*

Conclusion: *The open technique will remain valid as long as the laparoscopic technique remains in motion since the laparoscopic technique has shortfalls that are managed by the open approach only. Thus, the importance of both techniques is justified.*

Keywords: *Open Cholecystectomy, laparoscopic cholecystectomy, complications*

INTRODUCTION

Gallstone disease is a commonest disease affecting the biliary tree. The prevalence of forming gallstones increases with age and the female gender.[1]

Gallbladder surgeries are one of the most common procedures performed worldwide. The incidence of cholecystectomy found in the literature ranges from 91 per 100000 inhabitants in Taiwan to 116 per 100000 in Sweden.[2]

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Biliary tract injuries are rare but possibly distressing complications of biliary tract surgery and the incidence has increased since the introduction of laparoscopic surgeries. The incidence of biliary injuries increased from 0.2% in open cholecystectomies to 0.5% after the introduction of laparoscopic cholecystectomies. Biliary injuries carry high morbidity and mortality, impaired quality of life, and put an economic burden on the community.[3]

The causes of iatrogenic biliary injuries are most often laparoscopic cholecystectomies, open cholecystectomies, interventions like endoscopic retrograde cholangiopancreatography (ERCP), and percutaneous transhepatic cholangiography (PTC).[4]

Approximately 17-20 % of Biliary injuries are recognized Intraoperatively. When biliary injuries occur, the management outcomes are shown to be better if they are managed at a specialized hepatobiliary center having multidisciplinary services.[5]

The first cholecystectomy was performed by Carl Langenbuch in July 1882. The first successful laparoscopic cholecystectomy was performed by a German surgeon Phillipe Pouret in march 1987.[6] Since the introduction of laparoscopic cholecystectomy it has replaced open cholecystectomy as the procedure of choice for gall stones.[7] After the introduction of laparoscopic cholecystectomy the intraoperative complications have increased from 0.67 % in 1980-90 to 1.33% in 1993-1994. Similarly, other injuries like biliary leaks, vascular injuries, and injuries to the bowl have increased.[8]

Since laparoscopic surgery has emerged as the gold standard for gallbladder surgery even in developing countries, we aimed to know about our safety profile of laparoscopic surgeries by looking and comparing the results and complications of both open and laparoscopic surgeries and to know how do they compare in terms of complications.

MATERIALS AND METHODS

The study was conducted in the department of surgery, Khyber Teaching Hospital from 6th January to 6th July 2019. Informed written consent was taken from patients and approval from the ethical board and research committee. 200 patients were enrolled through non-probability consecutive sampling. All patients meeting the inclusion criteria which included patients with symptomatic gallstones between the age of 20 and 60 years of either gender were counted in the study. All the patients after history and clinical examination were subjected to relevant investigations.

The patients were randomly allocated into two groups by lottery method; Group A was open cholecystectomy while group B being the laparoscopic group. All patients were induced and maintained with standard anesthetic technique and a single dose of 2g IV Ceftriaxone given in both groups. For open cholecystectomy, it was performed through the right transverse subcostal incision while laparoscopic cholecystectomy was performed through standard 4 ports incision. Post-operatively, all patients in both groups were interviewed and kept under observation until discharged and then followed for 1 month. Both procedures were conducted by a single surgeon with more than 10 years post-fellowship experience. Strict exclusion criteria (HBsAg or HCV positive, pregnant, jaundiced, diabetic,) was followed to control biases in the study results. Data was analyzed by using the statistical software SPSS version 21.0. Mean ± Standard deviation were calculated for quantitative variables like age. Qualitative variables like gender and complications were presented in the form of frequencies and percentages. P-value of < 0.05 was considered significant. Outcomes were stratified among age and gender. All the results were presented in the form of graphs and tables.

RESULTS

A total of 200 patients with indication of cholecystectomy were operated on, which were divided into two equal groups. Patients in group A were subjected to open cholecystectomies and patients in Group B were subjected to laparoscopic cholecystectomies.

Out of 100 patients, 22(22%) were male and 78(78%) were female in Group A while in group B, 20(20%) were male and 80(80%) were female. The male to female ratio was 0.28:1.

The mean age was 42.14 years ± 9.34 2SD with a range of 20-65 years. The majority of patients were in the age group between 40 and 50+ followed by younger age groups between 20 to 40 years of age (Table 01). Further stratification of complications based on age group is summarized in table 02.

The complications for both the groups were calculated in terms of frequencies and percentages (Table 02). The wound infection rate was higher in open technique with an overall 5% occurrence while it was low, at 2% occurrence in laparoscopic technique. Intraoperative major bleed occurred more in laparoscopic technique.

While out of the 02 LC group who were bleeding, 01 was managed with laparoscopic cauterization while 01 was converted to open as it was taking too much time to be controlled through laparoscopic technique. Also noted from our further stratification, that such bleeding almost always occurred exclusively in males (table 03)

Gallbladder perforation was noted almost 10%

Table 1: Age Wise Distribution in Both the Groups

Variable	Catagories	Groups		Total	P-value
		A (LC)	B (laparoscopic)		
Age	<= 30.00	16	17	33	0.781
	31.00 - 40.00	18	15	33	
	41.00 - 50.00	31	34	65	
	51.00+	35	34	69	

Table 2: Frequency and percentage of major complications

	Groups		P-value
	A (LC)	B (laparoscopic)	
Wound infection (Yes/No)	(5.0%)	2 2.0%	0.44
Intraoperative bleeding (Yes/No)	1 1.0%	2 2.0%	0.56
Gallbladder perforation (Yes/No)	1 1.0%	10.0%	0.002

in the laparoscopic technique which is quite higher compared to the open technique where we had only one perforation overall. That is attributed to the learning curve of a surgeon in laparoscopic skills. Furthermore, it is noted in both groups, that gallbladder perforation occurred more in males, owing to harsh and difficult anatomy encountered more often while operating on male gallbladders.

No CBD, duodenal or colonic injuries were noticed. No 30-day mortality was noted.

DISCUSSION

A study conducted in New York state by Hanan et al comparing complication rates of open vs laparoscopic cholecystectomies show that inexperience centers the mortality associated with laparoscopic cholecystectomy was lower than with open cholecystectomy (0.23% vs 1.9%), their study also shows that the complication rates of laparoscopic cholecystectomy were very low.[10]

Laparoscopic cholecystectomy is considered the standard procedure for gallstones; though there will always be a need to perform open cholecystectomies.[11] The iatrogenic injuries occur more often in LC, resulting in CBD injuries, nonetheless, duodenal and colonic injuries. Also, when it comes to cost-effectiveness, the burden of complications has to be balanced with the shorter hospital stays and less post-operative pain as compared to the open technique.[12]

Glaser et al reported having better outcomes of patients undergoing LC in terms of wound complications such as wound infections in the post-operative period or a week after discharge.[13] Same is the case in our study, in which the reported wound infections were more for the open technique as compared to the group undergoing LC. Out of 100 patients in the open group,[5] reported having wound infections, while it was a single figure for the LC group.

Studies also suggest that Bile Duct injuries are more encountered in LC, at a rate of 0.3% to 0.5%, which is comparatively high to just 0.1% for open cholecystectomies. This not only increases the cost of hospital stay, but also the efforts of making LC a cost-effective procedure go in vain as the management of Bile duct injuries puts an extra burden on patients in terms of money, hospital stay, and even could be life-threatening.[14] Bile duct injury is the most dangerous complication of laparoscopic cholecystectomy. Major biliary injury is the recognized interruption of the major extrahepatic biliary system. Biliary leakage is the clinically significant biliary fistula and bile accumulation in the presence of an intact extrahepatic biliary system.[3] In our study, the biliary injuries were not reported in both groups. Hence, with inexperienced hands, the figures can be significantly improved avoiding unnecessary damage. Moreover, it is difficult to learn laparoscopic surgeries and most of the injuries occur during this learning period.

A study conducted in Egypt followed up on 69 patients, who underwent definitive surgical management of Laparoscopic cholecystectomy related bile duct injuries. The nature of bile duct injury ranged from obstruction, leakage, obstruction + leakage, leakage + vascular injury, and obstruction + vascular injury. Despite the increased surgical skill and experience regarding laparoscopic cholecystectomy, the incidence of Laparoscopic cholecystectomy-related bile duct injuries is still considerably higher than open cholecystectomy i.e 0.2%-1.5% and 0.1%-0.2% respectively.[15]

One of the reasons for the conversion of LC into open surgery is profuse bleeding. A study conducted at Isra university hospital Hyderabad shows that in laparoscopic surgery bleeding and port site infections were the commonest complications, followed by common bile duct and colonic injuries. Cystic artery was the commonest site of bleeding while port site infection was due to gross spillage of bile.[9]

In our study, only one of the patients undergoing open cholecystectomy suffered from profuse bleeding from the cystic artery and despite that, it was easily identified and controlled. On the other hand, two patients undergoing laparoscopic cholecystectomy endured intraoperative bleeding and were managed with laparoscopic cautery and no conversion needed. Uncontrollable hemorrhage occurs in 0.1%-1.9% of all cases of laparoscopic cholecystectomy, ultimately converting them into open cholecystectomy.[16]

According to a study conducted in Kashmir, out of 400 patients who underwent laparoscopic cholecystectomy, 30 (7.5%) required conversion to open surgery. The most common reason for conversion was the incapacity to identify the Calot's triangle in patients with an inflamed or contracted gallbladder and uncontrolled bleeding. The study concluded that complications of laparoscopic cholecystectomy can be minimized if we maintain a low threshold for elective conversion to open cholecystectomy. Thus, the safety profile of conventional cholecystectomy cannot be dismissed and all other minimally invasive techniques of cholecystectomy, whether multi-port or single-port should be determined against this standard.[17]

In a study, the cleanliness of surgery was dictated by the neat and meticulous dissection of the gallbladder off the liver bed. The perforation of gallbladder and bile contamination was reported more in LC when compared to the open technique.18 This not just converts a clean-contaminated surgery to a contaminated one, but the operation time is also enhanced, increasing the morbidity of the patient due to chemical peritonitis as well as the effects of anesthesia are prolonged.[19]

In our study, the perforation rate was 1% in the open technique, while it was 10% for the LC group, which is consistent with the existing evidence.

A study conducted in Saudi Arabia observed 496 patients who underwent laparoscopic cholecystectomy. The rate of conversion to open cholecystectomy in these patients was only 4.9% and a majority of that was attributed to obscure anatomy. They concluded that LC is still superior to open cholecystectomy in terms of complications provided it is performed by experienced surgeons, thus making it a gold standard approach.[20]

The study is carried out in a single setup makes it a limited data resultant study; hence a more comprehensive study would be the need of the hour to assess whether this could be applied to a larger population. When it comes to experienced hands, the laparoscopic technique should be advised. However, if the setup is not standard and properly trained surgeons are not around, then we advise going for an open technique to reduce the morbidity of patients.

CONCLUSIONS

The overall complication pattern in our study considers open techniques superior to LC. However, the immediate post-op complications are less in laparoscopic technique. The open technique will remain valid as long as the laparoscopic technique remains in motion since the laparoscopic technique has shortfalls that are managed by the open approach only. Thus the importance of both techniques is justified.

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