ORIGINAL ARTICLE

Comparison of Fundus-first Dissection versus Conventional Dissection in Laparoscopic Cholecystectomy

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ABSTRACT

Aim: To compare the outcome of the fundus-first dissection versus conventional dissection with electrocautery in laparoscopic cholecystectomy in terms of operative time and overnight hospital stay.

Methods: This study was done in Surgical Unit IV, SIMS / Services Hospital, Lahore in 6 months [June 20, 2018 till December 20, 2018]. This was a Randomized control trial in which two groups were made randomly using lottery method. In Fundus-First Laparoscopic Cholecystectomy (FFLC) group after insertion of the standard 4 ports, the gallbladder was retracted at the fundus and dissected from the liver fossa to create a space to insert the triangle liver retractor. In Conventional Lap Chole (CLC) group the gallbladder was dissected at Calot's triangle to divide the cystic duct and artery between clips. The organ was then dissected off the liver bed.

Results: Mean duration of surgery in FFLC group was 46.44±6.71 minutes and in CLC group the mean duration of surgery was 57.61±13.31 minutes. The mean duration of surgery in FFLC group was statistically lower as compared to CLC group, p-value < 0.001. In FFLC group 3(7.3%) cases had overnight stay while in CLC group 15(36.6%) cases had overnight stay, the frequency of overnight stay was statistically lower in the FFLC as compared to CLC group, p-value < 0.05.

Conclusion: Through the findings of this study it is concluded that FFLC reduced surgery time and also frequency of overnight stay and resulted in better patient outcomes. So, this technique shall be adopted in the clinical practice in routine for cases of elective laparoscopic cholecystectomy.

Keywords: Gallstones, Laparoscopic cholecystectomy, Fundus First dissection,

INTRODUCTION

Laparoscopic Cholecystectomy is gold standard for the management of gallstones. It is equally safe and has the added benefits of smaller incisions, cosmesis, less post-operative pain, early discharge, early return to work and less chances of hernia formation in the long term[1,2,3]. In the conventional approach (CLC) the dissection is being carried out at the Calot's triangle and then once the critical view of safety is being established the cystic duct and artery are clipped and then the rest of the gallbladder is dissected off the liver bed using monopolar diathermy. Monopolar diathermy is known to produce a lot of heat and can cause damage to surrounding structures as well[4,5,6,7]. During dissection perforation can occur that can cause bile spillage along with stone spillage as well that can cause field contamination and can lead to localized collections and can significantly prolong the operative time as well[3]. Those cases that have a difficult dissection and there are chances of bile duct injury were most of times been converted to open to prevent the bile duct injury. In such difficult cases FFLC (Fundus first laparoscopic cholecystectomy) can aid in lesser conversions to open procedures and can aid to safely complete the procedure laparoscopically[8,9]. When there is a difficult exposure of the structures at the Calot's triangle and the cystic duct cannot be identified the FFLC approach can be particularly helpful[10]. This approach has shown to have less intra operative time and early discharge, It has also shown to produce less discomfort for the patient in terms of pain, nausea and vomiting , thus indirectly resulting in early discharge of the patient[1,6]. Multiple studies both prospective and retrospective have been done in the literature to compare various aspects of FFLC to traditional LC[1,6,11,12]. On these lines the FFLC is being advocated and practiced at various centers worldwide.

One of the studies concluded that mean duration of surgery in conventional LC group was 60.8±16.8 and in FFLC group was 46±13.7 minutes, p-value was< 0.01. The frequency of overnight hospital stay was reported as 8/33 (24.24%) and 2/40(5%) cases in conventional LC and FFLC group respectively, p-value was < 0.05[12].

The rationale of this study is to compare fundus-first dissection versus conventional dissection in laparoscopic cholecystectomy. As no local study is available and in international data there is difference of opinion that which method is superior over the other we have conducted this study at our institution. Through this study if we find lesser duration of surgery and hospital stay then in future, we can alter our practice and can adopt FFLC procedure. This study can help us to reduce hospital burden by reducing hospital stay, bed occupancy and also surgery time.

MATERIALS AND METHODS

This is a Randomized control trial conducted at surgical unit services Hospital Lahore. The duration of study was from June 2018 to December 2018**.** A total of 82 cases were studied divided in two groups (41 in each group).

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These cases are estimated using frequency of overnight hospital as 24.24% in conventional and 5% in fundus first group[12]. We used 80% power of test, 95% confidence level and 5% margin of error. It was Non-probability, consecutive sampling.

Inclusion criteria: Patients with Ages b/w 20 - 60 years from both gender who were diagnosed to have gallstones on ultrasound abdomen and already scheduled for elective laparoscopic cholecystectomy with ASA grade I and II on preoperative assessment. An informed consent was taken from all the patient included in study.

Exclusion criteria: Patients with CBD stones with acute cholecystitis (on USG)**,** with history of previous abdominal surgery, with suspicion of gall bladder malignancy based on ultrasound & CT findings and pregnant females

Data collection technique: After approval from the hospital ethical committee a minimum of 82 patients fulfilling the inclusion criteria were recruited from the out-patient department of SIMS / Services Hospital, Lahore. After taking an informed consent and taking a detailed history, their demographic data details were recorded in the hospital data base and hard copy record was maintained as well. Moreover, the pre op labs and ultra sound were also kept in record.

METHODS

Patients scheduled for elective laparoscopic cholecystectomy were randomized to two groups via lottery methods, either FFLC group or conventional LC group. All procedures were done by a single surgeon. In FFLC group after insertion of the standard 4 ports, the gallbladder was retracted at the fundus and dissected from the liver fossa to create a space to insert the liver retractor. With the retractor in position, the gallbladder was then easily dissected off the liver bed by using ultrasonic harmonic shear till it hangs at the junction of the cystic duct with the CBD. Utmost care was taken not to damage portal structures in the retrograde dissection. At this stage, the gallbladder was divided between metal clips. In certain situations in very severely inflamed cases vicryl endo loop or intra corporeal Prolene suture was used to secure the cystic duct. In Conventional Laparoscopic Cholecystectomy (CLC) group the gallbladder was dissected at Calot's triangle to divide the cystic duct and artery between clips. The organ was then dissected off the liver bed. The outcome of the study were measured in terms of mean operative time (It was measured in minutes and from skin incision to skin closure) and overnight hospital stay (It was labeled if patients need analgesia to control the pain (on VAS > 3), if patients need medication to control nausea and vomiting). Data was entered and analyzed using SPSS 22. Mean and standard deviation was calculated for quantitative variables e.g. age and surgery time. Categorical data like gender and overnight hospital stay was presented as per frequency(%). Independent sample t-test was applied to compare surgery time in both groups. Chi-square test was applied to compare frequency of overnight stay. P-value ≤ 0.05 was considered as significant. Data was stratified for age, gender, BMI and ASA status. Post stratified independent sample t-test and Chi-square test was applied by taking p-value ≤ 0.05 as significant.

RESULTS

The mean age of patients in FFLC group was 39.17 ± 10.43 years and in CLC group was 40.22±13.11 years. In FFLC group there were 17(41.5%) male and 24(58.5%) female cases and in CLC group there were 17(41.5%) male and 24(58.5%) female cases. Mean duration of surgery in FFLC group was 46.44±6.71 minutes and in CLC group the mean duration of surgery was 57.61±13.31 minutes. The mean duration of surgery in FFLC group was statistically lower as compared to CLC, group, p-value< 0.001. In FFLC group 3(7.3%) cases had overnight stay while in CLC group 15(36.6%) cases had overnight stay, the frequency of overnight stay was statistically lower as compared to CLC group, p-value < 0.05. When data was stratified for age, gender, BMI and ASA status, the mean duration of surgery was statistically less in FFLC group as compared to CLC group, p-value <0.05. Moreover, frequency of overnight stay was also statistically less in FFLC group when compared to CLC group regardless of age, gender, BMI and ASA status, p-value < 0.05.

Table-1: Descriptive statistics of age (years)

Age (yrs)	Mean	S.D	Minimum	Maximum
FFLC	39.17	10.43	20.00	60.00
CLC	40.22	13.11	21.00	60.00
Total	39.70	11.78	20.00	60.00

Table-2: Descriptive statistics of Duration of surgery

	Mean	S.D	Minimum	Maximum
FFLC	46.44	6.71	36.00	58.00
CLC	57.61	13.31	36.00	80.00
Total	52.02	11.89	36.00	80.00

t-test = -4.798, P-value = <0.001 (Highly Significant)

Table-3: Comparison of overnight stay in both study groups

Overnight stay	Study groups		Total
	FFLC	CLC	
Yes	3(7.3%)	15(36.6%)	18(22%)
No	38(92.7%)	26(63.4%)	64(78%)
Total	41(100%)	41(100%)	82(100%)

Chi-square = 10.250, P-value = 0.001 (Significant)

DISCUSSION

Cholelithiasis is one of the most prevalent surgical issue worldwide and confers a significant impact on the health-related budgets. Gallstones have at least three different types. Cholesterol stones, Pigment stones and Brown stones. Each have different etiology but it is often overlapped. The incidence of gallstones is worldwide more in the females. The prevalence of cholelithiasis is gradually rising possibly due to change in diet patterns, longer survival and other related factors[13]. Cholelithiasis has a significant impact on the western health care systems, It is expected that the prevalence of gallstone disease is between 10 – 20% in the west[14,15]. The management of cholelithiasis costs around $6 billion in the US and is currently superseded only by reflux disease in terms of cost of management[16]. In Pakistan the incidence of cholelithiasis was found to be 9.03% (95% CI, 8.6 - 9.4), Females are 3.3 times more prone to develop cholelithiasis

as compared to males[17]. Samra et al. reported that out of 400 cholecystectomies, 320 (80 %) had gallstones[18]. Bilal et al. reported the prevalence of 10.2% for gallstones in the study population[19].

Laparoscopic cholecystectomy is been practiced as standard of care for a few decades now and its safety has been well established. As the time has evolved there were various modifications in the technique of laparoscopic cholecystectomy. Complications have gradually gone down by better learning programs and better understanding of the procedure. As discussed above there are two main approaches of laparoscopic cholecystectomy, FFLC approach and CLC approach. Cengiz et al[20] conducted a randomized control trial of CLC with electrocautery *versus* harmonic FFLC in the patients undergoing laparoscopic cholecystectomy. Thirty- seven (37) patients undergoing laparoscopic cholecystectomy were randomized to CLC and Forty-three (43) to FFLC with ultrasonic shears. FFLC was associated with a shorter duration of operation (mean 46 *vs* 61 min), less overnight hospital stays (two *vs* eight), less pain scores 4 and 24 h after procedure, less nausea at 2, 4 and 24 h, and shorter period of leave from work (mean 5·5 *vs* 9·3 days) compared with conventional laparoscopic cholecystectomy by monopolar cautery[20]. Tuveri et al[21] conducted a study to ascertain the limits and potential advantages of FFLC. The FLC was performed in 29 cases (1.5%) and was successful in 23 patients (80%). The median operating time was 65 minutes (range, 40–170). In 6 patients (20%), FFLC was eventually converted. Intraoperative Florocholangiography (IOFC) was performed in 17 cases (74%). Minor complications occurred in 6 patients (20%). No CBD injuries were encountered. There was no mortality[21].

Matilla et al[22] conducted a randomized control trail comparing Fundus first dissection with harmonic shear and Calot's triangle dissection first in the other group with monopolar cautery. Median operative time was similar in the both study arms (45 vs 45 min, p=0.95). Same-day discharge was possible in 77 patients (87%) in the fundus first group and in 69 patients (87%) in the Calot's triangle approach group, p=0.98. Intraoperative gallbladder perforations, mean intraoperative bleeding, postoperative pain and post-operative nausea and vomiting at 1, 2 and 4th (p=0.78) did not differ significantly between the study arms[22].

In our study the mean duration of surgery in FFLC group was 46.44±6.71 minutes and in CLC group the mean duration of surgery was 57.61±13.31 minutes. The mean duration of surgery in FFLC group was statistically lower as compared to conventional group, p-value < 0.001. In FFLC group 3(7.3%) cases had overnight stay while in CLC group 15(36.6%) cases had over night stay, the frequency of overnight stay was statistically lower as compared to CLC group, p-value <0.05. A study reported that median duration of operation in CLC group was 60.8±16.8 and in FFLC group was 46±13.7 minutes, p-value < 0.01. The frequency of overnight hospital stay was reported as 8/33 (24.24%) and 2/40 (5%) cases in CLC and FFLC group respectively, p-value <0.05[12]. These findings are consistent with current study.

CONCLUSION

Through the findings of this study it is concluded that fundus first group reduced surgery time and also frequency of overnight stay. So, in future clinical effectiveness of fundus first must be adopted when planned for laparoscopic cholecystectomy in terms of operative time and overnight hospital stay.

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