COMPARISON OF EARLY VS LATELAPROSCOPIC CHOLECYSTECTOMY IN TERM OF HOSPITAL STAY

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ABSTRACT

Background: Laparoscopic Cholecystectomy (LC), though less invasive, is still heralded by a variety of complications of which gall bladder (GB) perforation with free leakage of bile and stones into the peritoneal cavity is becoming increasingly common which occurs during grasping, dissection off the liver bed/during extraction. Elective LC has become the gold standard for treatment of symptomatic gallstones. However, in the early days, acute cholecystitis was a contraindication of laparoscopic cholecystectomy, and patients with acute cholecystitis were managed conservatively and discharged for re-admission in order to have elective surgery performed for the definitive treatment. With the increased experience in laparoscopy, surgeons started to attempt early laparoscopic cholecystectomy for acute cholecystitis[9]. However, early LC is still performed by only a minority of surgeons.

Objective: To compare the mean hospital stay between earlywith late laparoscopic cholecystectomy for acute cholecystitis.

Materials and Methods: This study was conducted in the in the Department of Surgery, Hayatabad Medical Complex, Peshawar From 22-01-2016 to 30-01-2017. Through a randomized controlled trial Study Design, a total of 72 patients with undergoing laparoscopic cholecystectomy were included in the study and randomly allocated in two groups. Patients in one group were subjected to early LC while other group to late LC. The hospital stay was recorded in number of days between admission and discharge.

Results: The mean age of the whole study sample was 34.5 $\pm$ 9.3 years. The mean age of patients in patients in early LC group was 33.4 $\pm$ 7.9 years while mean age of patients in late LC group was 35.6 $\pm$ 10.6 years. (P 0.335). In early LC group we had 41.7% males and 58.3% females while in late LC group we had 30.6% males and 69.4% females. (P 0.326). The mean hospital stay in early LC group was 4.8 $\pm$ 1.4 days while that of late LC group was 9.2 $\pm$ 1.6 days ($p < 0.001$)

Conclusion: The hospital stay is less among patients subjected to early LC compared to late LC. Further randomized controlled trials are suggested which should take into account the complications of both the strategies and on a bigger sample size before recommending any of the above surgical strategy for laparoscopic cholecystectomy.

Key Words: Laparoscopic cholecystectomy, cholecystitis, hospital stay

INTRODUCTION

Gallstone disease accounts for the most common biliary tract disease throughout the world figuring to almost 12% of the population in United States and 18.5% in the Europe[1]. Majority of patients harboring gallstones though asymptomatic still carry a risk of developing complications (1-2%)[2]. Laparoscopic cholecystectomy (LC), regarded the gold standard, being a very common modality of treatment is undergoing rapid improvement with the advent of newer technologies[3,4].

LC, though less invasive, is still heralded by a variety of complications of which gall bladder (GB) perforation with free leakage of bile and stones into the peritoneal cavity is becoming increasingly common which occurs during grasping, dissection off the liver bed/during extraction[5,6]. The incidence of GB perforation is almost 6-40% out of which 13-32% patients present with late complicationssuch as the infected bile and spilled gallstones leading to intra-abdominal and subcutaneous abscesses, fistulas, liver abscess and bowel obstruction, etc[7].

Elective LC has become the gold standard for treatment of symptomatic gallstones[8]. However, in the early days, acute cholecystitis was a contraindication of laparoscopic cholecystectomy, and patients with acute cholecystitis were managed conservatively and discharged for re-admission in order to have elective surgery performed for the definitive treatment[9]. Then, randomized controlled trials and meta-analyses had shown the benefits of early surgery (within the acute admission period, which is 24 to 72 hours) compared with delayed cholecystectomy with respect to hospital stay and costs, with no significant difference in morbidity and mortality[9-11].

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With the increased experience in laparoscopy, surgeons started to attempt early laparoscopic cholecystectomy for acute cholecystitis[9]. However, early LC is still performed by only a minority of surgeons[12-14]. Furthermore, the exact timing, potential benefits, and cost-effectiveness of LC in the treatment of acutely inflammed gallbladder have not been clearly established and continue to be controversial[15].

In one study, morbidity rate was significantly lower in group early LC than in group late LC: 11.8% versus 34.4%. Conversion rate to open surgery and mortality did not differ significantly between groups.Mean length of hospital stay was 5.4 $\pm$ 4.6 in the early LC compared to 10.03 $\pm$ 7.1 in the late LC group ($p < 0.001$)[16]. In another study, mean length of hospital stay was 2.34 $\pm$ 0.718 in the early LC compared to 3.93 + 1.230in the late LC group ($p < 0.001$)[17].

Acute Cholecystitis is not uncommon in our population and the best modality of treatment is LC for these patients. Cost benefit analysis of both early and late LC should be done in order to draw consensus on one common approach in the treatment of acute cholecystitis but controversies still exist. The current study is designed to compare the mean hospital stay between early and late LC and if in our study the mean hospital stay with early LC is found to be either equal to or less than late LC, then early LC will be recommended as a routine approach in the treatment of acute cholecystitis.

OBJECTIVE

To compare the mean hospital stay between earlywith late laparoscopic cholecystectomy for acute cholecystitis.

OPERATIONAL DEFINITIONS

AcuteCholecystitis: It will be diagnosed on the basis of all of the following features i.e. history of sudden onset of pain (> 3 on VAS) in the righthypochondrium of less than 3 days duration, tenderness in the right hypochondrium (on clinical examination) and ultrasound showing thick fibrosed wall of gall bladder.

Hospital Stay: It will be calculated from the time of admission till the discharge of the patient and will be calculated in days.

HYPOTHESIS

Mean hospital stayin early LC is less than late LC.

MATERIALS AND METHODS

T his Randomized Controlled Trial. Study has been conducted at Surgical unit, Hayatabad Medical Complex, Peshawar.

From 22-01-2016 to 30-01-2017. Study duration is one year after the date of approval of ethical committee. Sample size was keeping 36 in each group keeping mean length of hospital stay 5.4 $\pm$ 4.6 in the early LC compared to 10.03 $\pm$ 7.1 in the late LC group[16], 95% confidence interval and 90% power of the test.

Sampling Technique used are Consecutive (Non Probability Sampling)

All patients presenting with acute cholecystitis. Of Age group above 18 years.

Of Either gender were included while .

1. Any patient with choledocholithiasis (US detected)
2. Empyema gall bladder (ultrasound)
3. History of previous upper abdominal surgery.

The above mentioned conditions act as independent risk factors for gall bladder perforations and if included may act as confounders to introduce bias in the study results.

The study was conducted after approval from hospitals ethical and research committee. All patients meeting the inclusion criteria i.e. patient with diagnosed by the criteria as mentioned in operational definitions and meeting ASA class 1 and 2 was included in the study through OPD and was admitted in the surgical department for further evaluation. The purpose and benefits of the study was explained to the patients and they was assured of the research purpose and a written informed consent was obtained.

Complete history, general physical and relevant anesthesia fitness examination was done. All patients was randomly allocated in two groups by lottery method. Patients win group A wassubjected to early LC (i.e. LC was done within 72 hours of diagnosis) while patients in group B was subjected to late LC (i.e. patients was sent home on antibiotics, analgesics and LC was done after complete resolution of abdominal pain).

The induction of anesthesia was done in all patients undergoing laparoscopic cholecystectomy using Midazolam 7.5mg 1 hour before surgery, induction was done by using propofol 2mg/kg body weight, atracurium 0.5mg/kg body weight and tramadol 1mg/kg body weight. All the laparoscopic cholecystectomies was conducted by single experienced laparoscopic surgeon fellow of CPSP and all the patients was monitored throughout surgery as per anesthesia protocols. All LCs was performed using conventional four ports umbilicalport, port below xiphoid, and two ports below right costal margin.Pneumoperitoneum at pressure 12 mmHg was used.

A co researcher was appointed to record time from the time of admission till the discharge of the patient.

All the above mentioned information including name, age, gender and address was recorded in a predesigned proforma. Strict exclusion criteria was

followed to control confounders and bias in the study results.

The data was analyzed with SPSS version 17. Frequency and percentages was computed for categorical variables such as gender while numerical variables such as age and hospital staywas presented with Mean ± SD. T test was used to compare the mean hospital stay between the two groups. $P \leq 0.05$ was considered significant. All results was presented in the form of tables and graphs.

RESULTS

The study was conducted on patients subjected to laparoscopic cholecystectomy (LC). The sample size was 72 patients. i.e. 36 patients randomly allocated in two groups by lottery methods. One group was subjected to early LC while the other to late LC.

The mean age of the whole study sample was 34.5 ± 9.3 years. The mean age of patients in patients in early LC group was 33.4 ± 7.9 years while mean age of patients in late LC group was 35.6 ± 10.6 years. The difference was statistically insignificant with a p value 0.335 of after applying independent sample T test. (Table 1)

We distributed the patients with regards to different age group i.e. patients with age from up to 30 years, patients with age form > 30 to 40 years and patients with age > 40 to 50 years. We compared the age groups of patients with regards to their treatment groups. Details of the age groups for both treatment arms are elaborated in table 2.

In our study, we had 41.7% male in early LC group and 30.6% in late LC group. The proportion of females was 58.3% in early LC and 69.4% in late LC group. The difference was statistically not significant after applying chi square test with a p value of 0.326 (Table 3)

The mean hospital stay in early LC group was 4.8 ± 1.4 days while that of late LC group was 9.2 ± 1.6 days. The difference was statistically significant after applying independent sample T test with a p value of < 0.001. (Table 4).

The subsequent tables explain the age and gender wise stratification of hospital stay in both groups.

DISCUSSION

Laparoscopic cholecystectomy is considered the gold standard treatment for benign gallbladder disease. It is characterized by a short hospital stay and an early return to regular activity[16-18] [136-138]. Strategies to handle the different intraabdominal surgical pathologies with a laparoscopic approach offer a significant benefit compared with the conventional technique[16-17] [136, 137].

As laparoscopic surgeries are gaining popularity, different modalities of postoperative pain management are being used. Apart from the parenteral route of analgesic use, intraperitoneal instillation of local anaesthetics and opioids are gaining popularity for better pain relief[19][139].

Laparoscopic cholecystectomy has improved surgical outcome in terms of reduced pain and convalescence compared to conventional cholecystectomy[136, 137]. However, the postoperative pain is considerable. Pain management with multiple analgesic and opioids has been reported with variable success[16,17,19][136, 137, 139].

The pain in the conventional cholecystectomy is a parietal pain. In laparoscopic cholecystectomy, pain is derived from multiple situations: incision pain (somatic), deep intraabdominal pain (visceral), and shoulder pain (visceral pain due to phrenic nerve irritation)[20,21,22][140-142].

The technique of laparoscopic cholecystectomy which was difficult to learn in its evolving phase, had led the surgeons to put conditions like acute cholecystitis into contraindications while performing laparoscopic cholecystectomy in the past. But as the technique flourished, surgeons started performing laparoscopic cholecystectomy in acute phase of cholecystitis.[143, 144]Timing of when to perform laparoscopic cholecystectomy in acute cholecystitis has been a recent focus of attention in international publications. It is proclaimed that cholecystectomy can be performed safely in acute phase when done within 03 days of start of symptoms whereas it is difficult to perform it in second week as the inflammatory process leads to adhesions and makes the dissection very difficult.[145]

Definition of early laparoscopic cholecystectomy is still unsettled.[146] A few authors have placed patients who are operated within 72 hours duration of start of symptoms as early cholecystectomy whereas others have performed laparoscopic cholecystectomy within 01 week of start of symptoms and labeled it as early laparoscopic cholecystectomy[147]. Tzovaras G et al conducted performed laparoscopic surgeries for acute cholecystitis as early as start of symptoms. They divided the patients into three groups according to the timing of surgery: (1) within the first 3 days, (2) between 4 and 7 days and (3) beyond 7 days from the onset of symptoms. The conversion rate for the whole cohort of patients was 4.6%. There was no significant difference in the conversion rate between the three groups.[146]A study conducted in Japan by Uchiyama Ket al, advocated early laparoscopic cholecystectomy within 72 hours of onset of symptoms to decrease conversion rates from laparoscopic to open surgery.[148]. Sher Mohammad et al, from Chandka Medical College, Pakistan reported 6% conversion rate in 100 consecutive patients of acute cholecystitis[149]. Laparoscopic cholecystectomy can be safely performed irrespective of time elapsed from start of symptoms. Although conversion rate is high when surgery is performed after 3 days but even then there is no statistical significance of conversion rate between the various groups divided on basis of timings[150-152].

Table No 1: Descriptive Statistics of Age in Both Groups (n = 36 each)

	Treatment Groups	n	Mean	Std. Deviation	P value
Age of the Patient	Early LC	36	33.4944	7.92345	0.335
	Late LC	36	35.6417	10.65609	

Table No 2: Age Groups (n = 36 each)

		Treatment Groups		P value
		Early LC	Late LC	
Age Groups	up to 30 years	14	11	0.755
		38.9%	30.6%	
	> 30 to 40 years	12	14	
		33.3%	38.9%	
	> 40 to 50 years	10	11	
		27.8%	30.6%	
Total		36	36	
		100.0%	100.0%	

Table No: 3: Gender Wise Distribution of Patients in Both Groups (n=36 in each group)

		Treatment Groups		P value
		Early LC	Late LC	
Gender of the patient	Male	15	11	0.326
		41.7%	30.6%	
	Female	21	25	
		58.3%	69.4%	
Total		36	36	
		100.0%	100.0%	

Table no. 4: Comparison of Hospital Stay Between Both Treatment Groups (n = 36 in each group)

	Treatment Groups	n	Mean	Std. Deviation	P value
Hospital Stay	Early LC	36	4.8333	1.40408	< 0.001
	Late LC	36	9.2500	1.69664	

Table no. 5: Age Groups Wise Stratification of Mean Hospital Stay Between Both Groups

Age Groups	Group	Mean (SD) pain scores	P Value
Up to 30 years	Early LC	4.5 (0.5)	< 0.001
	Late LC	9 (0.8)	
>30 to 40 years	Early LC	5 (1.7)	< 0.001
	Late LC	9.7 (2.1)	
>40 to 50 years	Early LC	5.1 (1.8)	< 0.001
	Late LC	8.8 (1.6)	

Table No. 6: Gender Wise Stratification of Mean Hospital Stay Between Both Groups

Gender	Group	Mean (SD) pain scores	P Value
Male	Early LC	4.7 (1.6)	< 0.001
	Late LC	9.1 (1.2)	
Female	Early LC	4.9 (1.2)	< 0.001
	Late LC	9.2 (1.8)	

In a recent retrospective analysis of the optimal timing of emergencycholecystectomy in 4113 patients in Switzerland, immediatesurgery was found to have statistically significant advantages in conversion/reoperation rates, postoperative complications, and length ofpostoperative hospital stay compared with delayed cholecystectomy1 to 6 days after hospital admission[153]. In a meta review, twotrials[154, 155] reported the mean(s.d.) hospital stay and two[156, 157]provided amedian value.The total hospital stay was shorter in the early groupthan in the delayed group by 4 days (mean difference−4·12(95 per cent c.i. −5·22 to −3·03); P < 0·001). Themedian hospital stay reported in two trials was shorter in the early group than in the delayed group by 3 days[157] and 5 days[156]. Excluding these trials did not alter the mean difference in the total hospital stay (−4·16 (95 per cent c.i. −5·45 to −2·86); P < 0·001).

Other authors have advocated a more aggressive approachtowards early cholecystectomy.In a retrospective study, Taylor and Wong compared theapproach of 2 surgeons. The first surgeondelayed surgery until normalization of amylase and complete resolutionof abdominal tenderness, whereas the second surgeon proceededwith LC as soon as the amylase was decreasing and theabdominal pain was improving. There were no differences in thecomplication rates which were 10% and 11%, respectively (P _0.12). However, early cholecystectomy was associated with a significantlyshorter hospital stay, 3.5 days as compared with 4.7 daysin the delayed surgery group (P _ 0.01)[158]. This approach wasverified by Rosing et al who instituted a practice of early cholecystectomy(within 48 hours) in a prospective study of 43 patients. Themedian length of hospital stay was 4 days, as compared with a 7-dayhospital stay in a retrospective group of 177 patients treated withdelayed cholecystectomy, before implementation of this policy. Complication rates were 4.8% (early cholecystectomy group) and4.5% (delayed cholecystectomy group) (P _ 0.7)[159].

The post operative hospital stay is comparable to laparoscopic cholecystectomy where the hospital stay was 2 days and work disability was 5–6 days but the complication rate is higher with laparoscopic cholecystectomy.[160, 161]

In the past, the optimal timing for laparoscopic cholecystectomy for patients with acute cholecystitis had generally been considered to be 6 to 8 eight weeks after the acute phase to allow for resolution of the acute inflammation of the gallbladder[13]. However, several clinical trials—albeit mostly small and retrospective studies—proved that early laparoscopic cholecystectomy is safe and shortens hospital stay, with morbidity and mortality similar to those of elective delayed cholecystectomy[162-165]. In a retrospective analysis of 100 patients, Ohta et al[165] compared 4 timing groups of laparoscopic cholecystectomy (≤72 hours, 4–14 days, 3–6 weeks, and >6 weeks after onset of symptoms) and found that the best timing for laparoscopic cholecystectomy for acute cholecystitis is within 72 hours, which provides the shortest total hospital stay versus operations performed later. Faloret al[13] performed early laparoscopic cholecystectomy (within 48 hours of admission) in 117 of 303 patients with mild gallstone pancreatitis; for the rest of the patients, operation was delayed until the normalization of laboratory values. They suggested that early laparoscopic cholecystectomy is safe, resulting in shortened hospital stay and decreased use of endoscopic retrograde cholangiopancreatography without increased morbidity and mortality. Chang et al[163] reported that although early laparoscopic cholecystectomy is associated with a higher rate of wound infections compared with delayed intervention, it shortens the length of hospital stay and reduces the risk of repeat cholecystitis. In a randomized, controlled trial including 75 patients, early laparoscopic cholecystectomy (<24 hours) was found to decrease the morbidity during the waiting period for elective laparoscopic cholecystectomy, the rate of conversion to open cholecystectomy, operating time, and hospital stay[166]. In a recent survey evaluating surgical approaches for acute gallbladder disease between 1989 and 2006 in Sweden, total hospital stay was found to be shorter for patients who had emergency cholecystectomy at first admission compared with patients with elective cholecystectomy[12]. Similar to the above clinical studies, we found that hospitalization duration was significantly shorter with early laparoscopic cholecystectomy compared with delayed laparoscopic cholecystectomy.

In addition to the clinical studies, the meta-analyses of randomized clinical trials in the literature demonstrated that early laparoscopic cholecystectomy (24–72 hours of onset) provides benefit over delayed laparoscopic cholecystectomy (6–12 weeks later) in terms of total hospital stay, with conflicting results on conversion rates and postoperative complications[5, 44, 167,

[168]. Siddiqui et al[44] analyzed 4 clinical studies containing 375 patients and found shorter hospital stay and longer operation time in early laparoscopic cholecystectomy, but they found no significant difference in conversion rates between early and delayed laparoscopic cholecystectomy. In a best-evidence topic that analyzed 92 papers (meta-analyses, randomized control trials, prospective controlled study, and retrospective cohort studies), it was concluded that early laparoscopic cholecystectomy for acute cholecystitis is advantageous in terms of the length of hospital stay without increases in morbidity or mortality[168]. Although the operating time in early laparoscopic cholecystectomy can be longer, the incidence of serious complications was found to be comparable to the delayed laparoscopic cholecystectomy.

CONCLUSION

The hospital stay is less among patients subjected to early LC compared to late LC. Further randomized controlled trials are suggested which should take into account the complications of both the strategies and on a bigger sample size before recommending any of the above surgical strategy for laparoscopic cholecystectomy.

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