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Original Research Article

Outcome of early laparoscopic cholecystectomy versus delayed laparoscopic cholecystectomy for patients with acute cholecystitis

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ABSTRACT

Background: This prospective randomized study was undertaken to to assess the outcomes of early versus delayed cholecystectomy for patient's acute cholecystitis.
Methods: 70 patients with acute cholecystitis were prospectively randomized to either an early laparoscopic cholecystectomy (n=35) or a delayed laparoscopic cholecystectomy group (n=35). The mean operative time, conversion rate, total hospital stay, intra-operative and post-operative complications, average hospital cost were evaluated between the two groups.
Results: A total of 70 patients were enrolled, 35 patients in each group. There was no significant difference in the conversion rates (early, 8.57% vs delayed, 5.71%) and postoperative complications (early, 25% vs delayed, 20%). At the cost of an increased operating time (early, 81 minutes vs delayed, 78 minutes) and blood loss (early, 180.33ml vs delayed, 108.00 ml), early laparoscopic cholecytectomy significantly shortened the total hospital stay (early, 1.5 days vs. delayed, 7.95 days) and average hospital cost (early 9240 INR vs delayed, 12251 INR).
Conclusions: The safety and efficacy of early and delayed laparoscopic cholecystectomy for acute cholecystitis were comparable in terms of morality, morbidity and conversion rate. However early laparoscopic cholecystectomy allows significantly shorter total hospital stay and reduction in days away from work at the cost of longer operating time and blood loss and offers definitive treatment at initial admission. Moreover it avoids repeated admissions for recurrent symptoms has both medical as well as socioeconomic benefits and should be the preferred approach for patients managed by surgeons with adequate experience in laparoscopic cholecystectomy.

Keywords: Acute chholecystitis, Delayed laparoscopic cholecystectomy, Early laparoscopic cholecystectomy

INTRODUCTION

Acute cholecystitis is inflammation of gall bladder, usually associated with cholelithiasis, with a high incidence in our environment. Laparoscopic cholecystectomy (LC) has been the procedure of choice for symptomatic gall bladder disease.[1] Laparoscopic cholecystectomy can be done as early laparoscopic cholecystectomy (ELC) or delayed laparoscopic cholecystectomy (DLC) after conservative treatment. However, the definition of "early" varies amongst the guidelines,the British Society of Gastroenterology recommend cholecystectomy within the same hospital admission or up to 2 weeks after discharge.[2] The American Gastroenterological Association guidelines suggest that cholecystectomy should be performed as soon as possible and in no case beyond 2-4 weeks after discharge, whereas the American College of

Gastroenterology recommends cholecystectomy within index admission.[3,4]

The first studies that assessed ELC as a treatment for acute cholecystitis date back to the 1950s.[5-7] In western world early laparoscopic cholecystectomy for acute cholecystitis started gaining popularity in 1980s but after carefully examining the results studies all over world the Japanese Society of Hepato-Biliary-Pancreatic Surgery in "The updated Tokyo Guidelines announced in 2013" cautiously suggested that early laparoscopic cholecystectomy is the first-line treatment in patients with mild acute cholecystitis, whereas in patients with moderate acute cholecystitis, delayed/elective laparoscopic cholecystectomy after initial medical treatment with antimicrobial agents is the first-line treatment.[8] Despite these guidelines and literatures, cholecystectomy during the same admission is not commonly practiced. The majority of specialists perform an interval cholecystectomy due to uncertainty regarding the efficacy and safety of an early cholecystectomy. However, only minority of surgeons is performing early laparoscopic cholecystectomy.[8-10] As this procedure demands a huge experience in laparoscopic cholecystectomy, till now, the exact timing and potential benefits of early laparoscopic removal of gall bladder have not been clearly established and continue to be controversial.[11] Although literature favors early laparoscopic cholecystectomy, most evidence comes from prospective studies specifically designed to prove this particular aspect, which probably does not reflect the worldwide clinical practice.[12,13]

The objective of the present study was to to to assess the outcomes of early versus delayed cholecystectomy for patient's acute cholecystitis.

METHODS

This study was conducted from March 2014 to February 2017 and included 70 patients. Ethical clearance was granted by our college ethical committee. The study participants need to be scheduled for an early or delayed cholecystectomy. Random assignment was performed by drawing a sealed, unlabeled, unordered envelope from a container by an independent party immediately after informed consent was obtained. All patients who are 18 years or above, who presented to our outpatient department or in emergency department with features of acute cholecystitis and given consent to participate in the this study were included. The diagnosis of acute cholecystitis was made according to the Tokyo 2013 criteria, with local (Murphy's sign or right upper quadrant pain) and systemic (fever or elevated C-reactive protein/white blood cell) signs of inflammation and confirmed by ultrasound.[14] The abdominal ultrasound was performed by trained radiologists. Characteristics findings of acute cholecystitis were thickening of the gallbladder wall and pericholecystic fluid or radiological murphy's sign, associated with biliary stone. Patients that were excluded from the study are Gall stone induced pancreatitis, choledocholithasis, suspected concomitant acute cholangitis, severe preexisting medical co-morbidity, contraindicated to laparoscopic cholecystectomy, pregnancy; previous upper abdominal surgery, patients who refuse to participate in the study.

The paricipatients were divided in to two groups, Group A (early laparoscopic cholecystectomy) and Group B (delayed laparoscopic cholecystectomy). Thirty five patients with acute cholecystitis were admitted and treated conservatively with fasting, intravenous fluids, antibiotics and analgesics till the symptoms subsided. Hospital stay and treatment cost during this period was noticed and patients were discharged and were advised to follow up. These patients constituted group B and were subjected to elective laparoscopic cholecystectomy after 6-8 weeks interval. Other 35 patients with acute cholecystitis underwent laparoscopic cholecystectomy within 72 hours of onset of symptoms and they constituted group A.

All patients are operated by single experienced laparoscopic surgeon. All patients are subjected to standard four port laparoscopic cholecystectomy, oral intake tarted as soon as patients tolerated and discharged accordingly and are advised to follow up in OPD at 1 week, 6 weeks and 6 months. The demographic profile, clinical presentation, Intra-operative complications, post-operative complication, operative time, total hospital stay, and cost were noted and subjected to statistical analysis. Hospital costs included all costs during primary hospitalizations, readmissions in the DLC group. Cost data were obtained from the hospital accounting database and available for each patient. Mean hospital stay and cost was calculated using the total number of patients in each group as denominator.

Statistical analysis

All data was analyzed by software SPSS version 19 "P" value <0.05 was considered, statistically significant.

RESULTS

This prospective study was conducted from March 2014 to February 2017. Total 70 Patients with features of acute cholecystitis were admitted from OPD and Emergency department. The mean age were comparable in both groups, In group A mean age was 44.1 years and in group B mean age was 43.4 years which was statistically insignificant (p=0.12). Body mass index was 26.2 in group A and 25.6 in group B and was statistically insignificant (p=0.59).

All patients presented with pain at right subcostal region and tenderness at right sub costal region. Murphy's sign was present in 15 patients in group A and 17 patients in group B and was statistically insignificant (p=1). Fever was present in 16 patients in group A and 17 patients in

group B (p=1) and TLC >10,000/ cu mm in 15 patients in early group and 17 patients in delayed group which was statistically insignificant (p=0.79).

USG done in all patients and Radiological Murphy's sign was present in 14 in Group A and 17 in group B and was statistically insignificant p=0.47. Wall thickness >4 mm was present in all patients in both the groups (p=1). Peri-cholecystic fluid was present in 12 patients in early group and 13 in delayed group (p=1). In group A single stone was present in 15 patients and multiple stones in 20 patients while in Group B single stone was present in 12 patients and multiple in 23 patients. There was no statistical difference between two groups (p>0.05).

Table 1: Demographic data of patients.

Variable	Early laparoscopic cholecystectomy (Group A)	Delayed laparocopic cholecystectomy (GroupB)	P value
Age mean	44.1	43.4	0.12
Sex M/F	15/35	15/35	0.12
Body mass index (kg/m^2)	26.2	25.6	0.59
Clinical presentation			
Pain at right sub costal region	35	35	1
Tenderness at right sub costal region	35	35	1
Murphy's sign	15	17	0.8
Fever	16	17	1
TLC >10,000/cu mm	15	17	0.79
USG findings			
Radiological murphy's sign	14	17	0.47
Wall thickness >4 mm	35	35	1
Peri- cholecystic fluid	12	13	1
Single stone	15	12	0.59
Multiple stones	20	23	0.59

Table 2: Peri-operative and post-operative data of patients.

Variable	Early laparoscopic cholecystectomy (Group A)	Delayed laparoscopic cholecystectomy (Group B)	P value
Mean operative time (minutes)	81 (60-104))	78 (61-108)	0.91
Conversion to open	3	2	1
Gall bladder perforation	6	5	1
Drain required	22	20	0.414
Post-operative hospital stay (days)	1.5	1.3	0.23
Total hospital stay (days)	1.5	7.95	0.000
Complications			
Bleeding	4	3	1
Bile leak	1	0	1
Bile duct injury	0	0	-
Intra-abdominal collection	0	1	1
Fever	3	2	1
Port site infection	1	1	1
Average hospital cost (INR)	9240	12251	0.018

Table 2 showing peri-operative and post-operative data of both the groups. The mean operative time in group A was 81 (60 - 104) minutes as compared to group B 78 (61 - 108) minutes and was statistically insignificant (p=0.91). In Group A, 3 patients are converted to open cholecystectomy, because of inflammatory adhesions and edematous gall bladder and in one patient had CBD stone discovered Intra-operatively while in delayed group 2 patients are converted to open cholecystectomy, in one patient, because of dense adhesions and also clots triangle anatomy was not well defined and in one patient there was CBD stone discovered intra-operatively and also dense adhesions. It was statistically insignificant (p=1). During surgery gall bladder perforation occurs in 6 VS 5 Patients in Group A and B respectively (p=1). Drain required post-operatively in 22 patients in group A and 20 patients in Group B (p=1). Post-operative stay was less in group B 1.3 days as compared to group A 1.5 days

and was statistically insignificant (p=0.23). Total hospital stay was7.95 days in group B as compared to Group A 1.5 days and was statistically significant (p<0.05). There occur recurrent admissions in 5 patients because of biliary colic and 20 patients admitted once in hospital before electively cholecystectomy and one patient develop biliary pancreatitis, treated by Intravenous fluids and antibiotics. The post-operative complications such as bile leak, bile duct injury, intra-abdominal collection, post-operative fever and port site infection was statistically insignificant between two groups. Bleeding was more in early Laparoscopic cholecystectomy as compared to delayed laparoscopic cholecystectomy. The average blood loss was in group A was 180.33 ml and in group B was 108.00 ml, which was statistically significant (p<0.05). The average hospital cost in group A was 9240 INR and in group B was 12251 INR which was statistically significant p<0.018.

DISCUSSION

Laparoscopy has become now the cherished art of practice of surgery across the globe. Laparoscopic cholecystectomy has become affordable, beneficial and practicable by majority of surgeons. Our new generation of surgeons has taken this art to the newer horizons. The timing of cholecystectomy in patients with acute cholecystitis has been a contentious issue for a long time. It is an established practice that patients admitted for acute cholecystits have their cholecystectomy delayed until local complications have resolved, typically after some 6 weeks.[15] As the experience and confidence of surgeons in laparoscopic cholecystectomy rose up, several clinical trials, though samples were small in size, proved that early laparoscopic cholecystectomy in acute cholecystitis is feasible, safe, cheaper and requires shorter hospitalization.[16-19] However, laparoscopic cholecystectomy for acute cholecystitis has not become routine, because the timing and approach to the surgical management in patients with acute cholecystitis is still a matter of controversy.[20] High conversion rates have been reported by different studies, ranging from 6% to 35% for early laparoscopic cholecystectomy for acute cholecystitis.[21-23] The higher conversion rate obviates the advantages of an early laparoscopic cholecystectomy. In our study, the demographic data between two groups was comparable and was statistically insignificant (Table 1).

The mean operative time in early laparoscopic cholecystectomy was 81 (60-104) minutes which was slightly higher than delayed laparoscopic cholecystectomy 78 (61-108) minutes, because obscure anatomy, distended, edematous and friable gall bladder which perforate during surgery due to which our operative time increase. But this slight increase in operative time in early laparoscopic cholecystectomy benefits patients in terms cost and hospital stay. In our study 3 patients converted to open cholecystectomy in early group and 2 patients in delayed group, the difference was statistically insignificant, the reasons for conversion in early group were obscured calots triangle anatomy, oedematous, friable gall bladder and in one patient CBD stone and in delayed group the reason for conversion were dense fibrous adhesions, distorted calots triangle anatomy and also CBD Stone in one patient, which are noticed during surgery. In our study conversion rate was low as compared with 13% to 15 % conversion rate reported by literature.[24] Because of flexible attiude towards conversion, no CBD, gastrointestinal tract, liver injury were noted in both the groups.

It was recommended that during early laparoscopic cholecystectomy, several technical points should be kept in mind for good exposure of clots triangle, decompression of gall bladder for holding and retraction of gall bladder, dissection at clots triangle should be done by blunt instruments or by irrigation cannula (hydro-dissection) to avoid injuries. In our study decompression of gall bladder was done in both groups. A sub-hepatic drain was placed in 22 patients in early laparoscopic cholecystectomy and 20 patients in delayed laparoscopic cholecystectomy, because spillage of bile and stones during sugergy. Perforated gallbladder and spilled out stones were taken out using retrieval bag. The average blood loss was more in the early group than in the delayed group; however, no patient required blood transfusion. The difference could be attributed to more vascularity around gallbladder and Calot's triangle in acute phase. Average hospital stay in early group was 1.5 days and delayed group 1.3 days which was statistically insignificant. The total duration of hospital stay in early laparoscopic cholecystectomy was 1.5 days while in delayed laparoscopic cholecystectomy was 7.95 days which was statistically significant. This include admission at the time of acute cholcystits and readmissions. In our study, In delayed group there occur recurrent admissions(4 times) in 5 patients because of pain and 20 patients admitted twice in hospital before electively cholecystectomy and one patient develop biliary pancreatitis and were treated by Intravenous fluids and antibiotics. No patient requires ICU admission. In delayed group, during waiting interval of 6-8 weeks patients also develops mental stress. Different studies conducted till date offer significantly lower hospital in early laparoscopic cholecystectomy. The study conducted by Banz et al shows a difference in hospital stay of 2 days between two groups while study conducted by Linden VD showed difference of 10 days between two groups.[25,26]

The peri-operative and post-operative complications such as bleeding, bile leak, bile duct injuries, intra-abdominal abscess, fever and port site infection were comparable in both groups and there was no significant difference between two groups (Table 2).[27,28] The average cost in early laparoscopic cholecystectomy was 9240 INR and in delayed laparoscopic cholecystectomy was 12251 INR. The difference in the cost was statistically significant. The cost includes multiple admissions and antibiotics. There is also loss of work during the hospital admission

in delayed group, which is more as compared to early laparoscopic cholecystectomy. Moreover, the total duration of antibiotic therapy and length of stay, as well as costs were significantly reduced by an ELC.[24] In today's world, people are very much shorter of two things i.e. time and money, both these are more in delayed cholecystectomy.

CONCLUSION

Early laparoscopic cholecystectomy in acute cholecystitis is, safe, costs less due to fewer stays in ICU, fewer readmissions and requires shorter hospital stay. It is comparable to delayed laparoscopic cholecystectomy in terms of mortality, morbidity, and conversion rate. It also causes reduction in days away from the work, reduces recurrent biliary events and prevents readmission as cholecystectomy is performed within the index admission. So early cholecystectomy has both medical and social-economic advantages and should be the preferred approach for patients. It should be performed by a surgeon who is expert in laparoscopy .The delayed cholecystectomy should be performed in patients in which acute pancreatitis, choledocholithiasis, or cholangits can't be ruled out and those with unacceptable anesthetic risk at the time of diagnosis.

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