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Original Research Article

An evaluation of early and delayed laparoscopic cholecystectomy for acute cholecystitis

M. Zaid Imbisat*, S. A. A. Rizvi, Imad Ali

Department of Surgery, Jawaharlal Nehru Medical College and Hospital, AMU, Aligarh, Uttar Pradesh, India

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***Correspondence:**
Dr. M. Zaid Imbisat,
E-mail: zaidimbisat09@gmail.com

ABSTRACT

Background: Acute cholecystitis is one of the hepatopancreatobiliary emergencies. With more and more experience in the laparoscopic cholecystectomy studies are being carried out evaluating the effectiveness and feasibility of early laparoscopic cholecystectomy in acute cholecystitis.
Methods: Fifty patients presenting with acute cholecystitis were included in this study and randomized using chit in the box method into two groups- early group and delayed group.
Results: Mean duration of surgery in the early group is 42.28±5.99 mins and in the delayed group is 39.12±5.55 mins (p=0.06). Gallbladder perforation was reported in 4 patients (16%) in early group and in 2 patients (8%) in delayed group (p=0.67). Gall stone spillage was reported in 3 patients (12%) in early group and in 2 patients (8%) in delayed group (p=1.00). At 6th hr mean VAS (visual analogue scale) score in the early group was 4.0±0.41 and in the delayed group it was 3.6±0.58 (p=0.01). At 12th hr mean VAS score in the early group was 3.4±0.51 and in the delayed group it was 3.3±0.48 (p=0.39). Mean duration of postoperative stay was 2.24±0.60 days in early group and in the delayed group it was 2.08±0.57 days (p=0.34).
Conclusions: It has been found that early laparoscopic cholecystectomy is safe and feasible in the setting of acute cholecystitis with added advantage of shorter total hospital stay.

Keywords: Acute cholecystitis, Early surgery, Delayed surgery, Complications, Clinical outcomes

INTRODUCTION

Acute cholecystitis is one of the hepatopancreatobiliary emergencies and needs expert treatment. Once the diagnosis of acute cholecystitis is established the disease warrants prompt treatment. Intravenous fluids, antibiotics and proper analgesia form the first line of management of acute cholecystitis but cholecystectomy is the definitive treatment. However the timing of cholecystectomy has been a matter of debate since beginning. There have been two schools of thought- first who suggested cholecystectomy in the index admission and second who were in the favour of initial conservative management and cholecystectomy in another admission. Acute inflammation obscuring the view of Calot's triangle is thought to be associated with bile duct injury and conversion into open procedure.[1,2] There are also concerns regarding higher morbidity rates associated with an emergency procedure.[3-6] But if surgery is delayed it increases the risk of further gallstone-related complications.[7,8] Moreover surgery done in the index admission may reduce total length of hospital stay. With more and more experience in the laparoscopic cholecystectomy and due to known benefits of laparoscopic procedures studies are being carried out evaluating the effectiveness and feasibility of early laparoscopic cholecystectomy in acute cholecystitis.

The present study was done with the objective to compare clinical outcomes of early and delayed laparoscopic cholecystectomy in the management of acute cholecystitis.

METHODS

This prospective study an evaluation of early and delayed laparoscopic cholecystectomy for acute cholecystitis is a Hospital based randomized study conducted in J N Medical College and Hospital, AMU, Aligarh between December 2016 to December 2018.

Fifty patients of acute cholecystitis were included in this study. All the patients presenting with acute cholecystitis in casualty of J N Medical College and Hospital, AMU, Aligarh giving consent were included. Patients with ASA IV and V, empyema gallbladder and jaundice were excluded. All the fifty patients giving consent to be participating in the study were randomized using chit in the box method into two groups- early group and delayed group.

In the early group laparoscopic cholecystectomy was done within 72 hrs of admission and in the delayed group patients were initially managed conservatively to be discharged after symptomatic improvement and laparoscopic cholecystectomy was done after 6-10 weeks in another admission.

In both the groups we recorded and compared different intraoperative complications (vessel /cystic artery injury, bile duct injury, gall bladder perforation, gall stone spillage, any other organ injury), requirement of any modification of technique (use of any additional port, enlargement of epigastric port, conversion to open procedure), total duration of surgery (from skin incision to the application of the last stitch), postoperative pain assessment (using visual analogue scale), duration of postoperative hospital stay, total duration of hospital stay and postoperative complications (wound infection, wound seroma, wound hematoma, wound dehiscence, intra-abdominal abscess, bile leak and any other organ injury)

Statistical analysis

All the data were compiled on Microsoft Office Excel 2007 ®. The data was subjected to statistical analysis by the help of SPSS 20® software. Statistical comparison was performed using unpaired "t" test, chi square test and fisher's exact test. Statistical significance was accepted when p value was less than 0.05.

RESULTS

In our study mean age in early group with standard deviation was 42.28±12.98 years and in the delayed group it was 43.08±13.62 years.

On applying unpaired t test p value comes to be 0.83 which is statistically not significant. Out of 25 patients in early group, 16 patients were female (64%) and in the delayed group out of 25 patients 19 patients (76%) were female. In the early group 9 patients (36%) were male and in the delayed group 6 patients were males (24%). On applying chi square test p value is 0.86 which is statistically not significant.

Mean duration of surgery in the early group is 42.28±5.99 mins and in the delayed group this duration is 39.12±5.55 mins. Thus the mean duration of surgery is more in the early group as compared to the delayed group. But on applying unpaired t test p value comes to be 0.06 which is statistically not significant.

Table 1: Mean operating time in both groups.

Operating time (min)	Early group	Delayed group	P value
	42.28±5.99	39.12±5.55	0.06

Gallbladder perforation was reported in 4 patients (16%) in early group and in 2 patients (8%) in delayed group. (p=0.67). Gall stone spillage was reported in 3 patients (12%) in early group and in 2 patients (8%) in delayed group (p=1.00). Bile duct injury, major vessel injury or any other injury was not reported in either of the groups.

Table 2: Intra operative complications in both groups.

Intraoperative complications	No. of patients in early group	No. of patients in delayed group
	N (%)	N (%)
Major vessel injury	0 (0.00)	0 (0.00)
Bile duct injury	0 (0.00)	0 (0.00)
GB perforation	4 (16.00)	2 (8.00)
Gall stone spillage	3 (12.00)	2 (8.00)
Any other injury	0 (0.00)	0 (0.00)

At 6th hr mean VAS (visual analogue scale) score in the early group was 4.0±0.41 and in the delayed group it was 3.6±0.58. On applying unpaired t test p value came out to be 0.01 which is statistically significant. At 12th hr mean VAS score in the early group was 3.4±0.51 and in the delayed group it was 3.3±0.48. On applying unpaired t test p value came out to be 0.39 which is statistically not significant.

Thus at 6th hr patients in the early group were in significantly more pain but at 12th hr pain difference in the two groups were statistically not significant.

In the early group mean duration of postoperative stay was 2.24±0.60 days and in the delayed group it was 2.08±0.57 days. So mean postoperative stay was higher in early group as compared to delayed group.

On applying unpaired t test p value comes out to be 0.34 which makes the difference in the postoperative stay between these two groups statistically insignificant.

Table 3: Mean duration of postoperative stay in both groups.

Post-operative stay	Early group	Delayed group	P value
	2.24±0.60	2.08±0.57	0.34

In the early group mean total hospital stay was 4.24±0.60 days (which included both index admission and second admission for operation) and in the delayed group it was 7.07±0.57 days. On applying unpaired t test p value comes out to be <0.0001 which is statistically significant. Thus in the early group patients were having significantly shorter duration of total hospital stay.

In 6 patients (24%) in the early group there was a need of enlargement of epigastric port and in 2 patients (8%) in the delayed group it was needed. On applying fisher`s exact test p value came out to be 0.25 which is statistically not significant.

Table 4: Modification of operative technique in both groups.

Modification of operative technique	Early group	Delayed group	P value
Additional port	0	0	-
Enlargement of epigastric port	6	2	0.25
Conversion to open procedure	0	0	-

Table 5: Post-operative complication in both groups.

Post-operative complications	Early group	Delayed group
Wound infection	3	1
Wound dehisence	0	0
Wound hematoma	0	0
Wound seroma	1	1
Intra-abdominal abscess	0	0
Bile leak	0	0
Other organ complication	0	0

Wound infection was noted in 3 patients (12%) in early group and in 1 patient (4%) in delayed group. Wound seroma was noted in 1 patient (4%) in each group. None of the patients developed wound dehisence in any group. None of the patients developed wound hematoma in any group. Intra-abdominal abscess and bile leak were not found in any of the patients in any group. No other post-operative complication was noted in any patient in any group (Table 3). On application of Fisher's exact test p value comes out to be 0.67 which is statistically not significant.

DISCUSSION

In this study we have evaluated early and delayed laparoscopic cholecystectomy in acute cholecystitis and compared it with the previous studies done.

Yadav et al in their comparative study reported the mean age of 42.68±14.18 yrs in the early group and 40.26±11.62 yrs in the delayed group.[9] Nile et al reported mean age of 38.7±11.4 yrs in early group and 40±11.4 yrs in delayed group with p value of 0.45.[10] Al-Qahtani et al reported mean age of 42.2±10.2 yrs in the early group and mean age of 44.1±8.2 yrs in delayed group with p value of 0.3076.[11] Their findings were comparable to our study. Al-Qahtani et al reported 26.2% males and 73.8% females in their early group and in their delayed group there were 30.4% males and 69.6% females(p=0.586).[11] Ozkardeş et al in their study reported 33.3% male patients and 66.7% female patients in early group.[12] In the delayed group they reported 43.3% male patients and 56.7% female patients (p>0.05). Thus in their study also they reported insignificant sex distribution between the early and delayed group and the values are not statistically significant. Kolla et al in their study reported mean operating time 104 min (range, 40–210 min) in the early group and 93 min (range, 35–200 min) in delayed group.[13] The difference in operation time was not statistically significant (p=0.433). Lau et al in their meta-analysis reported no significant difference in the length of operation (p=0.732).[14] Jamil et al also reported insignificant difference in average operation time in early and delayed groups (40-210 min in early and 35-200 min in delayed group) with p value 0.433.[15] Ozkardeş et al reported mean operation time 67.00±28.515 min in early group and 71.33±24.066 min in delayed group with p value 0.202 which is statistically insignificant.[12] Thus similar to our study they also reported insignificant difference in the operating time in early and delayed group. Agrawal et al in their study reported the differences in the intraoperative gallbladder perforation to be statistically insignificant between their early and delayed laparoscopic cholecystectomy group.[16] Thus similar to their study in our study also gallbladder perforation between the early and delayed groups was found to be insignificant. Jamil et al in their study reported spillage of gallstones in 3.77% patients in the early group and in no patient in the delayed group and reported intra-operative complications between early and delayed groups insignificant (p=0.007).[15] Malik et al in their study reported spillage of stones in 8% patients of their early group and 4% patients of their delayed group and reported it to be statistically significant.[17] Yadav et al compared intra operative complications between early and delayed groups and reported intraoperative complications in 40% of the cases in early group and 20% of the cases in delayed group and found it to be statistically insignificant (p=0.122).[9] Agrawal et al reported the differences in the intraoperative complications (bile leak, perforation) to be statistically insignificant (p=0.353) between early and delayed laparoscopic cholecystectomy group.[16] Thus similar to

their study in our study also overall intra-operative complications are insignificant between the two groups. Dar et al compared postoperative pain scores and reported it to be significant at 1 hr (p=0.003) and 12 hrs (p=0.001) between their early and delayed groups.[18] However they also reported pain scores at 24hrs (p=0.133) and 48 hrs (p=0.409) insignificant. Flowers et al performed a study of laparoscopic cholecystectomy in acute cholecystitis on 15 patients and reported average duration of stay after laparoscopic cholecystectomy to be 2.7 days.[19] Nile et al in their study of early and delayed laparoscopic cholecystectomy compared postoperative hospital stay between these two groups and reported mean postoperative stay of 1 day in both the groups and reported it to be insignificant (p=0.34).[10] Verma et al in their study compared postoperative hospital stay in the early group (1.67days) and delayed group (1.47 days) and reported insignificant difference in the postoperative stay between these two groups (p=0.379).[20] Minutolo et al in their study compared length of postoperative stay in the early and delayed group and reported it to be 4.3 days in early group and 3.8 days in delayed group (p=0.437).[21] Thus similar to their study in our study also duration of post-operative hospital stay between the two groups was statistically insignificant. Kolla et al in their study reported that in 5% of patients of both early and delayed groups required enlargement of epigastric port (p=0.321).[13] Agrawal et al in their study reported requirement of epigastric port enlargement in 8% of the patients of both early and delayed group (p=0.999).[16]

Similar to their study in our study also the rate of enlargement of epigastric ports was insignificant between the two groups. Kolla et al in their randomized study reported the need of fifth port in 10% of the patients in their early group and was not required in any patient of the delayed group but they reported this difference to be insignificant (p=0.456).[13] Agrawal et al in their study reported the use of additional port in 4% of the patients in the early group and none of the patients in the delayed group (p=0.999).[16] However in their study there was a need of additional port during the procedure in the early group but this need was statistically insignificant. Flowers et al reported conversion in 5 patients out of their 15 patients operated for acute cholecystitis.[19] Lau et al performed a meta-analysis of four clinical trials of early and delayed laparoscopic cholecystectomy in acute cholecystitis and reported no significant difference in the conversion rate (p=0.19).[14] Verma et al reported conversion in 3 patients in their early group of 30 patients and in 2 patients in their delayed group of 30 patients and reported it to be insignificant (p=0.780).[20] Malik et al in their study reported conversion to open procedure in 16% of patients in the early group and in4% of the patients in the interval group (p>0.05) and was statistically not significant.[17] Minutolo et al in their study reported conversion rate in early group to be 34.3% and in their delayed group to be 20.3%, but the difference was not statistically significant (p=0.223).[21] Ozkardes et al in their study reported conversion rate of 13.3% in early group and no conversion in delayed group and found it to be statistically insignificant (p=0.112).[12] Agrawal et al in their study reported that conversion rate in their early group was 16% and in their delayed group it was 8% which they reported to be insignificant (p=0.667).[16] Kolla et al in their study reported wound infection in 20% of their early group and in 15% of patients in their delayed group.[13] Gomes et al compared early laparoscopic cholecystectomy (done within 72 hrs) and late laparoscopic cholecystectomy (done after 72 hrs in their study) and reported no wound infection.[22] Malik et al in their study reported wound infection in 24% of their early patients and in 20% of their delayed patients and reported it to be insignificant.[17] Jamil et al reported 3.77% wound infection rate in early group and 4% in delayed group.[15] They also reported that 1.88% of their early patients developed seroma and hematoma as compared to none in the delayed group. However on applying the statistical test they reported it to be insignificant. Thus similar to their studies in our study also wound infection between the two groups was found to be insignificant.

In our study intra-abdominal abscess and bile leak were not found in any of the patients in any group. No other post-operative complication was noted in any patient in any group. Kolla et al in their study reported post-operative bile leak in 5% of their early patients and no such event in their delayed group.[13] However they reported the incidence of post-operative complications insignificant between the two groups (p=0.456). Gomes et al also reported no bile duct injury or any other systemic complication in any of their early or delayed group.[22] Jamil et al in their study also compared post-operative complications in the early and delayed groups.[15] Post-operative bile leak in their early group was 2.5% as compared to none in the delayed group. However they reported post-operative complications between the two groups to be insignificant (p=0.07). We found early laparoscopic cholecystectomy safe and feasible in the setting of acute cholecystitis with added advantage of shorter total hospital stay. Total duration of hospital stay was significantly shorter in the early group. It may be due to the fact that in the early group surgery was done in the index admission. We conclude that early laparoscopic cholecystectomy is a safe procedure to be done in acute cholecystitis.

CONCLUSION

It has been found that early laparoscopic cholecystectomy is safe and feasible in the setting of acute cholecystitis with added advantage of shorter total hospital stay.

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