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Original Research Article

A comparative study of interval cholecystectomy and early cholecystectomy in acute cholecystitis

Gursimranjit Singh*, Rana Ranjit Singh, Darpan Bansal

Department of Surgery, SGRD Institute of Medical Sciences and Research, Vallah, Sri Amritsar, Punjab, India

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***Correspondence:**
Dr. Gursimranjit Singh,
E-mail: gursimranjitt@gmail.com

ABSTRACT

Background: In the whole world including India, the incidence of acute cholecystitis is increasing day by day. Gall stones are the most common cause of acute cholecystitis in 90-95% of the cases. The management of acute cholecystitis was conservative earlier but now there are studies recommending early surgery as the treatment of choice.
Methods: Our study was conducted on 60 patients divided into two groups of 30 each to compare the results of early surgery with the delayed surgery.
Results: The overall post-operative complication rate was same in both the groups but there was significant difference in the total hospital stay and total cost of the therapy in both the groups. The average total hospital stay in early group was 6.50±4.44 days and in delayed group was 10.80±5.55 days without including the number of days in non-operating admission.
Conclusions: So, early cholecystectomy was found to be more economical with less total hospital stay and less total cost of the therapy than interval cholecystectomy in acute cholecystitis.

Keywords: Acute cholecystitis, Early cholecystectomy, Interval cholecystectomy

INTRODUCTION

Cholecystectomy is the definitive treatment for patients with acute cholecystitis. Early cholecystectomy performed within 2 to 3 days of presentation is preferred over interval or delayed cholecystectomy that is performed 6 to 10 weeks after initial medical therapy. About 20% of patients fail initial medical therapy and require surgery during the initial admission or before the end of the planned cooling-off period.[1] Laparoscopic cholecystectomy is the gold standard for the treatment of the gallstones. There are studies recommending early surgery as the treatment of chice and Ganey et al support this approach with their remarkably low mortality of 0.5%.[2] However, Alinder et al, made the comment that "most surgeons still look on an early cholecystectomy as hazardous operation and it is still mostly performed only if the patient's condition is deteriorating during the first 24 to 48 hours after admission".[3] Majority of surgeons still prefer to manage acute cholecystitis by conservative management with intravenous fluids and analgesia, usually in conjunction with antibiotics. Elective cholecystectomy is carried out after a period of 4 to 6 weeks when acute attack has settled down. Since most surgeons prefer to delay surgery during the acute phase, this study was conducted with an intension to study the results of early surgery compared with delayed surgery and find optimum treatment for acute cholecystitis.

METHODS

This study was a prospective study and was carried out in the department of surgery, SGRD Institute of Medical Sciences and Research, Sri Amritsar from June 2017 to 2019.

All patients presenting with features suggestive of acute cholecystitis in surgical OPD and emergency of SGRD Institute of Medical Sciences and Research, SRI Amritsar and also few waiting patients of proven gallbladder stones for whom an elective cholecystectomy was done were included in the study series.

The total number of patients admitted with the features of acute cholecystitis were 60. Thirty cases of acute cholecystitis underwent early definitive cholecystectomy in the same admission. The remaining 30 cases were managed on a conservative regime and discharged thereafter to be readmitted for elective cholecystectomy after 4-6 weeks. Total number of cases of acute cholecystitis were divided into two groups Group I and Group II by odd-even method of randomization alternatively as per their primary surgical OPD presentation sequence in which early laparoscopic cholecystectomy and delayed/interval laparoscopic cholecystectomy was done respectively.

Immediate cholecystectomy was performed in Group I patients while interval cholecystectomy after initial conservative management was performed in Group II patients. In this study, Group II (delayed group) were investigated afresh for the subsequent operative intervention.

Inclusion criteria

Patients will be admitted to the study based on clinical, laboratory and radiological evidence of acute calculous cholecystitis. The diagnosis will be based on the presence of two of the following four features: abdominal pain characteristic of acute cholecystitis, positive Murphy's sign, total leucocyte count >10,000/ul, and ultra-sonographic evidence of acute calculous cholecystitis. Admission in our unit between June 2017 and 2019. Initial surgical management planned for cholecystectomy whether in immediate or interval cholecystectomy.

Exclusion criteria

Patients with ultra-sonographic findings of common bile duct calculi/pancreatitis/gall bladder perforation/gall bladder gangrene/gall bladder abscess. Patients with other associated abdominal pathology, patients with any previous abdominal surgery, septic shock, pregnancy/breast-feeding mothers, patients with any significant systemic disease.

All patients were subjected to detailed history including, chief complaints, history of present and past illness, personal history, family history, treatment and drug history. Then detailed physical examination like general survey, abdominal examination, other systemic examinations were carried out.

The selected patients underwent some baseline investigations like routine blood examination which includes estimations of hemoglobin, total leucocyte count, differential leucocyte count, ESR, RBS, urea, and creatinine. Most patients with uncomplicated acute cholecystitis had leucocytosis. Liver function tests including total serum bilirubin, liver enzymes, total protein. Coagulation profile including prothrombin time. Chest X-ray postero-anterior view and electrocardiogram were done as a part of preanesthetic workup of the patient. Straight X-ray of abdomen to rule out other acute abdominal conditions.

In our study, the patient was subjected to USG. USG examination included liver, gallbladder, pancreas and common bile duct to confirm the diagnosis of acute cholecystitis. Ultrasonographic signs of acute cholecystitis include distension of gallbladder, pericholecystic fluid collection, oedematous gall bladder, sludge or stones in gallbladder, omental adhesion and ultrasonographic Murphy's sign.

Operative principles

First the general condition of patient was made stable by fluid, electrolytes correction, IV antibiotics and other supportive measures like antiemetics. Then the patient was subjected to pre anaesthetic work up. The cases presented with features of acute cholecystitis were subjected to early cholecystectomy in the next available elective optional list. In cases of early cholecystectomy all the patients were subjected to laparoscopic cholecystectomy but had to be converted to open cholecystectomy in two cases due to technical difficulties like gall bladder wall thickening, omentum adherence at the gall bladder, tight adhesion in the calot's triangle and empyema formation. In cases of early cholecystectomy with lap to open conversion cholecystectomy abdominal drainage kit (ADK) drain no. 28 was placed and in cases of laparoscopic cholecystectomy ADK drain no. 20 was placed. All operations were done within the same hospital admission in the early surgery group.

In other group elective cholecystectomy after 4-6 weeks of acute attack, managed conservatively in the first hospital admission. The bile collected from gallbladder was sent for culture sensitivity. The specimen of gallbladder was sent for histopathological examination.

Post-operative managements

All patients were managed post operatively by antibiotics, intravenous fluid for 24-48 hours and analgesic. Post-operative complications, total duration of hospitalization needed and cost-effectiveness of individual procedures were taken into account.

Follow up

All patients were keenly followed up in surgical OPD. Though some patients had irregular follow up but majority are seen after 2 weeks, 6 weeks, then 6 months.

Analysis of data

Data was analysed by using paired 't' test and chi square test. The p value was determined finally to evaluate the levels of significance. The p value of >0.05 was considered non significant; p value of 0.01 to 0.05 was considered significant. The results were then analysed and compared to previous studies. SPSS-23 version of software was used, released 2013, Armonk, NY: IBM Corp.

RESULTS

The mean age in Group I is 43.36±14.73 and Group II is 48.23±14.48 and the data is statistically not significant (p>0.05) as depicted in Table 1. From the below observations female predominance is present in both the groups and the data is not statistically significant (p>0.05) as depicted in (Table 2).

Table 1: Age wise distribution of patients undergoing early and elective cholecystectomy.

Age group (years)	Group-I		Group-II	
	N	%	N	%
20-30	6	20.00	7	23.33
31-40	6	20.00	4	13.33
41-50	7	23.33	3	10.00
51-60	6	20.00	11	36.67
>60	5	16.67	5	16.67
Total	30	100.00	30	100.00
Mean age	43.36±14.73		48.23±14.48	
P value	0.623			

Table 2: Sex incidence in patients undergoing early and elective cholecystectomy.

Gender	Group-I		Group-II	
	N	%	N	%
Female	24	80.00	23	76.67
Male	6	20.00	7	23.33
Total	30	100.00	30	100.00

X^2=0.098; df: 1; p value=0.754.

Laparoscopic cholecystectomy was done in all the 30 cases of Group I but in 02 cases it had to be converted to open cholecystectomy due to tight adhesion in the Calot's triangle and empyema formation in one case and gall bladder (GB) wall thickening, omentum adherence to GB and empyema formation in the other.

In Group-II, laparoscopic cholecystectomy was done in all the 30 cases but in 05 cases it had to be converted to open cholecystectomy due to GB wall thickening, omentum adherence, mucocoele formation in two cases, empyema formation in one case, Intrahepatic gall bladder in one case and cholecysto duodenal fistula in one case for which open cholecystectomy along with Graham's patch repair was done. (as depicted in Table 3). The data mentioned in Table 3 is statistically not significant (p>0.05).

Table 3: Details of different operative procedures.

Type of operation	Group-I		Group-II	
	N	%	N	%
Lap cholecystectomy	28	93.3	25	83.3
Lap to open conversion	02	6.66	05	16.6
Total	30	100	30	100

X^2=1.460; df: 1; p value=0.228.

In early surgery group, we had 02 patients with wound infection. 5 patients had mild to moderate biliary drainage via the peritoneal drain.

In delayed surgery group, we had 04 patients with wound infection. 08 patients had mild to moderate biliary drainage via the peritoneal drain, mild biliary drainage being <200 ml and moderate bile drainage >200 ml. All these patients with mild to moderate biliary drainage were subjected to MRCP where no leak from the cystic duct and the duct of Luschka was seen. Therefore, these patients were managed conservatively. The data as mentioned in (Table 4) is statistically not significant (p>0.05).

Table 4: Post-operative complications in both groups.

Complications	Group-I	Group-II	P value
Wound infection	2	4	0.741
Biliary leaks	5	8	0.884
Stricture	0	0	Nil
Re-op due to haemorrhage/bile leakage	0	0	Nil
Injury of CBD	0	0	Nil
Injury of the duodenum	0	0	Nil
Pulmonary oedema	0	0	Nil
Pulmonary embolus	0	0	Nil
Lung complication	0	0	Nil

Table 5: Mean hospital stays in different groups (in days).

Hospital stay	Group-I		Group-II	
	N	%	N	%
1-5	21	70.00	07	23.33
6-10	03	10.00	10	33.33
11-15	04	13.33	07	23.33
16-20	02	6.66	06	20.00
Total	30	100.00	30	100.00
Mean	6.50±4.45		10.80±5.55	
P value	0.0016			

Table 6: Total cost of therapy (in rupees).

Variables	Group-I (n=30)	Group-II (n=30)
File and admission charges	1200.00±0.00	1200.00±0.00
Bed charges	3250.00±2186.13	5400.00±2730.69
Staff charges (medical/paramedical)	2275.00±1530.29	3780.00±1911.48
Operation theatre charges	10000.00±0.00	10000.00±0.00
Drug charges (preoperative/intraoperative/postoperative)	7110.00±1392.44	9384.00±1547.33
Total cost of therapy	23835.00±4767.51	29764.00±5474.60

P value=0.001.

In ES group, the average total hospital stay and total cost of therapy in our series is 6.50±4.44 days and 23835.00±4767.51 rupees respectively and in delayed group, the same being 10.80±5.55 days without including the number of days in non-operating admission and total cost of therapy being 29764.00±5474.60 rupees. The data as mentioned in (Table 5 and 6) is statistically significant (p<0.05).

DISCUSSION

Sokhi et al conducted a study where they found the complication rate in early and delayed group as 30% and 27% respectively.[4] Jarvinen et al found the complication rate in early and delayed group as 13.8% and 17.3% respectively.[5] Bhaumik et al found the complication rate in early and delayed group as 39% and 33.3% respectively.[6] In a study of Norrby et al found the complication rate in early and delayed group as 14.9% and 15.2% respectively.[7] In our study we found the complication rate in early and delayed group as 23.3% and 40% respectively. The overall post-operative complication rate is almost equal in both the groups in our study with the p value of >0.05 which is statistically not significant. The previous data supports the data of our study.

Norrby et al demonstrated that the average time spent in hospital during non- operative stay was 7.2 days.[7] In their studies, the mean post-operative stay was exactly the same (6.6 days) but the difference was found in the total hospital stay, being 6.4 days shorter in the ES group. They had total hospital stay in ES group of 9.1 days and that of DS group was 15.5 days. In another study by Addison et al, found that the number of days between operation and discharge to be approximately the same (elective 12.8, early 13.6).[8] This agrees with the work of other who claim that there is no increase in the number of days from operation to discharge in the early group compared with the delayed group and the former therefore is more cost- effective. In comparison to above studies, our study showed that the total hospital stay in early group was 6.50±4.44 days and in elective group was 10.80±5.55 days which is statistically significant with p value of <0.05. The longer stay of elective group in our study might be attributed to the intraoperative difficult fibrotic adhesions at the Calot's triangle leading to high incidence of biliary leak in this group as more time was required to manage this. In our study, there were 8 biliary leaks in Group II and 5 in Group I which was statistically non significant (p>0.05). The patient treated by early surgery had also the advantage of not paying the double bed charges and medicinal cost like antibiotic as in case of delayed group due to previous hospital admission. The total cost of therapy in early group is 23835.00±4767.51 and in delayed group is 29764.00±5474.60 which was statistically significant (p<0.05). Therefore, the former group in our study was more cost effective as the total cost of therapy was reduced due to less total hospital stay. The previous data supports our present study.

According to Arther et al, there was no mortality in either group.[9] This compares favourably with the mortality of 19 percent reported by Houghton et al.[10] Wright et al showed mortality rate in only 4 % of the cases.[11] They concluded that in acute cholecystitis, urgent or early cholecystectomy is a very safe procedure in patients under 70 years of age. Even for patients over 70 years, traditional conservative management may prove fatal and despite cardiorespiratory disease, obesity and other associated diseases of the aged, early cholecystectomy is recommended despite high mortality. In our present study of early and elective cholecystectomy, there was no mortality.

CONCLUSION

The definitive treatment of acute cholecystitis is cholecystectomy. According to some, patients should be treated non-operatively, allowing resolution of the acute inflammation followed by elective cholecystectomy approximately within 4-6 weeks later. Others claimed that operation should be done as soon as diagnosis is made.

So far as the cost of total treatment and hospital stay is concerned, the patients treated by early surgery had less total hospital stay and less total cost of treatment as compared to the delayed group. They also had the benefit of not paying double bed charges or medicinal costs like antibiotics. Moreover, there was less wastage of working days in comparison to delayed surgery, as many patients could not be admitted in due time for planned surgery and they had to come to out patients department many times before admission. So early surgery is found to be more economical than delayed surgery in acute cholecystitis if the diagnosis could be confirmed in proper time.

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