

## OUTCOMES OF LAPAROSCOPIC CHOLECYSTECTOMY IN ACUTE CHOLECYSTITIS

Shafqat Rehman, Muhammad Afzal\*, Muhammad Qasim Butt\*\*

Combined Military Hospital Kohat/National University of Medical Sciences (NUMS) Pakistan, \*Combined Military Hospital Lahore/National University of Medical Sciences (NUMS) Pakistan, \*\*Combined Military Hospital Multan/National University of Medical Sciences (NUMS) Pakistan

### ABSTRACT

**Objective:** To study the morbidity and mortality of early laparoscopic cholecystectomy in acute cholecystitis by comparing its results with laparoscopic cholecystectomy in chronic cholecystitis and simple cholelithiasis.

**Study Design:** Quasi-experimental study.

**Place and Duration of Study:** Pakistan Naval Ship (PNS) Shifa Hospital Karachi and Combined Military Hospital (CMH) Lahore Pakistan, from Nov 2009 to Jan 2013.

**Material and Methods:** Total 398 patients with symptomatic gall stone disease were included in the study after exclusion of patients with upper abdominal surgery, perforated gallbladder with abscess formation, cardiopulmonary disease, equipment failure and those with choledocholithiasis. Cholecystectomy was performed using a three port technique in most of the cases. On the basis of per-operative findings regarding degree of inflammation of gallbladder, all patients were divided into three groups irrespective of duration of symptoms i.e. acute cholecystitis group, chronic cholecystitis group and no inflammation group. The collected data included age, sex, diagnosis, history of previous surgery, co-morbidities, conversion to open surgery and its reasons, operative time, post-operative hospital stay and complications. Statistical comparison was performed using the chi square test. Statistical significance with value of  $p$  was less than 0.05 was considered significant.

**Result:** Out of 398 patients, 31.2% had acute cholecystitis, 10.1% had chronic cholecystitis and 58.8% had no inflammation of gall bladder. Complication rates and conversion rates were higher in chronic cholecystitis group as compared to acute cholecystitis group and no inflammation group. Similarly, mean hospital stay was also highest in chronic cholecystitis group.

**Conclusion:** Early laparoscopic cholecystectomy was found safe in acute cholecystitis in expert hands and should be performed in all cases of acute cholecystitis rather than delayed interval cholecystectomy.

**Keywords:** Acute cholecystitis, Complications, Laparoscopic cholecystectomy.

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### INTRODUCTION

Laparoscopic cholecystectomy (LC) is considered "the gold standard" for the management of symptomatic gallstone disease<sup>1,2</sup>. Before the advent of laparoscopic surgery early open cholecystectomy within 2-3 days was recommended as a treatment for acute cholecystitis rather than initial non-operative treatment with subsequent elective cholecystectomy after 6 to 8 weeks. Studies had documented benefit of early surgery in terms of total hospital stay<sup>3-5</sup>.

With greater experience in LC, surgeons

have attempted cholecystectomy laparoscopically in patients with a diagnosis of acute cholecystitis<sup>6-9</sup>. However, surgery in acute cholecystitis was generally recommended within 72 hours and not after that. The speculation of a worse outcome, when attempting LC for acute cholecystitis during the urgent admission beyond this very early phase, is experience rather than evidence-based. Most of the hospitals in Pakistan don't have a policy of early LC in acute cholecystitis. This may be partly because of the fact that most emergency surgeons are not experts in laparoscopic technique and partly because of the higher conversion rate (5 to 30%) in acute cholecystitis.

In this study, we decided to study the outcomes of LC in patients with diagnosis of

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**Correspondence:** Dr Shafqat Rehman, Surgical Specialist CMH Kohat Pakistan (Email: [shafqat2004@yahoo.com](mailto:shafqat2004@yahoo.com))  
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cholecystitis (both acute and chronic) irrespective of timing of surgery within or after 72 hours of onset of symptoms.

## PATIENTS AND METHODS

This quasi-experimental study was carried out at surgical department, Pakistan Naval Ship (PNS) Shifa Karachi and Combined Military Hospital (CMH) Lahore over a period of three years from November 2009 to January 2013. Patient selection for LC was based upon clinical diagnosis, findings of ultrasound examination, laboratory investigations and anaesthetist's assessment. All patients with symptomatic gallstones and acalculous cholecystitis were included. Patients with upper abdominal surgery, mass in right hypochondrium, perforated gallbladder with abscess formation, cardiopulmonary disease, equipment failure and those with choledocholithiasis were excluded from the study. Total 398 patients were included in study through non-probability convenience sampling. Cholecystectomy was performed using a three port technique in 97.5% cases and fourth port was used in 2.5% cases where dissection was very difficult with three ports. On the basis of per-operative findings regarding degree of inflammation of gallbladder, all patients were divided into three groups irrespective of duration of symptoms. In acute cholecystitis group three types were seen: acute inflammation with pericholecystic oedema (oedematous cholecystitis), mucus noted on gallbladder aspiration (mucocele), or pus on gallbladder aspiration (empyema). Chronic cholecystitis was defined as a thickened gallbladder wall with evidence of fibrosis in the anatomical plane between the gallbladder and the liver. The gallbladder was categorized as "not inflamed" when neither of the features of acute or chronic inflammation were present. Out of 398 patients 31.2% (n=124) had acute cholecystitis, 10.1% (n=40) had chronic cholecystitis and 58.8% (n=234) had no inflammation of gall bladder. Out of 58.8% patients with acute cholecystitis, 23.4% (n=93) had acute calculous cholecystitis and 7.3% (n=29) had empyema gall bladder. There was one case

(0.3%) each of acute acalculous cholecystitis and mucocele gallbladder.

Data had been collected on personal computer. The collected data included age, sex, diagnosis, history of previous surgery, comorbidities, conversion to open surgery and its reasons, operative time, post-operative hospital stay and complications. The duration of operation was taken from the time of the initial skin incision to the time of skin closure. The postoperative stay was taken as the number of nights the patient stayed in the hospital after the procedure. Follow up was done on 5th, 10th and 30th day. All the patients were asked to report to the author's OPD in case of any late complications after 30th day of operation.

Data had been analysed using SPSS version 13. Descriptive statistics were used to describe the variables. Statistical comparison was performed using One-way ANOVA test for normal variables and Kruskal Wallis test for non-normal variables. Statistical significance was accepted when the value of  $p < 0.05$ .

## RESULTS

Mean age of patients in acute inflammation group was  $46.36 \pm 13.47$  years,  $44.10 \pm 12.28$  years in chronic inflammation group and  $43.08 \pm 13.14$  years in no inflammation group. There was statistically no difference in the age of three groups with  $p = 0.082$ .

Male to female ratio was 1:3.9 in acute cholecystitis group while it was 1:5.6 and 1:6.3 in chronic cholecystitis and no inflammation group respectively. Statistically there was no significant difference between the sex ratio of three population groups. (Acute versus chronic inflammation group  $p = 0.318$ , Chronic versus no inflammation group  $p = 0.492$  and acute versus no inflammation group  $p = 0.076$ ).

Mean operation time was higher in acute cholecystitis group ( $48.40 \pm 20.73$  min) as compared to chronic cholecystitis group ( $36.37 \pm 9.8$  min), and no inflammation group ( $34.23 \pm 11.26$  min). The difference was statically

significant with  $p$  value  $<0.001$  mean hospital stay was highest in chronic cholecystitis group ie  $1.35 \pm 1.0$  days versus  $1.314 \pm 0.546$  days in acute cholecystitis group and  $1.15 \pm 0.81$  days in no inflammation group ( $p=0.001$ ).

Complication rate was much high in chronic cholecystitis group ie 12.5% ( $n=5$ ) versus 3.2% ( $n=4$ ) in acute cholecystitis group ( $p=0.02$ ) and 3.4% ( $n=8$ ) in no inflammation group ( $p=0.01$ ). There is statically no significant difference between morbidity of acute cholecystitis group and no inflammation group ( $p=0.22$ ).

Conversion rate was highest in chronic cholecystitis group ie. 12.5% ( $n=5$ ) versus 2.4% ( $n=3$ ) in acute cholecystitis group. ( $p=0.022$ ) and 1.3% ( $n=3$ ) in no inflammation group ( $p=0.02$ ). There is statically no significant difference between conversion rates of acute cholecystitis group and no inflammation group ( $p=0.345$ ). Different complications / reasons of conversion in each group along with their management are shown in table.

complications but the difference was not statically significant. Our study however, has shown statically significant advantage of cholecystectomy in early acute stage as compared to chronic stage in terms of morbidity, hospital stay and conversion rates. Similar results are also shown in several other studies<sup>11,12</sup>. Although most of these studies have recommended surgery in first 48 hours after the onset of symptoms, however in our study most of the laparo-scopic cholecystectomies performed in acute cholecystitis group were after 48 hours but within 7 days of onset of symptoms. This delay was not deliberate as most of these patients presented late in tertiary care hospital after being treated by general practitioners for other causes of upper abdominal pain. In our view, this delay was responsible for relatively higher mean operative time in acute cholecystitis group as compared to chronic cholecystitis. This was because of the fact that in most of these cases, persistent inflammation resulted in a distended and friable gallbladder with difficult handling so additional time was required for aspiration of gallbladder.

**Table: Complications in each group along with their management.**

| Groups          | Number of conversions | Complications   | Treatment  |
|-----------------|-----------------------|---|--|
| Acute           | 03                    | Sub hepatic Abscess (1)<br>Cystic artery bleeding (1)<br>Bile leak from cystic duct stump (1)<br>Umbilical site infection (1) | Laparotomy + Drainage<br>Conversion + Ligation<br>Laparotomy + Ligation of stump<br>Drainage + Antibiotics |
| Chronic         | 05                    | Bile Leak (4)<br>Common Hepatic Duct injury (1)   | Laparotomy<br>Laparotomy + Repair + T tube placement   |
| No inflammation | 03                    | Cystic artery bleeding (3)<br>Gallstone Pancreatitis(1)<br>Port site infection (3)<br>Port site Hernia (1)                    | Conversion<br>ERCP + Sphinterotomy<br>Drainage + Antibiotics<br>Repair                                     |

## DISCUSSION

Dr Lo and associates, for the first time performed randomized controlled trials of early versus delayed laparoscopic cholecystectomy for acute cholecystitis at the University of Hong Kong<sup>10</sup> in 1998. Although this study demonstrated better results with early intervention in terms of hospital stay and

Similarly more time was taken for irrigation of gall bladder fossa and placement of drains in acute and infected cases.

We have observed that there are several disadvantages of deferring surgery in patients of acute cholecystitis. First of all, deferring surgery in acute cholecystitis results in formation of dense adhesions with development of chronic

cholecystitis. These adhesions and chronic inflammation makes laparoscopic cholecystectomy technically more demanding because of obscure anatomy and bleeding. Secondly, it is hard to predict at presentation that in which patient the acute episode will resolve by conservative treatment without gangrene and perforation of gall bladder. Thirdly, delaying cholecystectomy for 6 to 8 weeks may require readmissions for recurrent attacks which increase the overall cost of treatment for the patient. Dr Lo and his colleagues mentioned that approximately 20% of the patient in delayed cholecystectomy group required urgent operations and another 18% require readmissions for symptom control<sup>13</sup>.

This study has also demonstrated that there is statically no significant difference between acute cholecystitis and no inflammation group in terms of morbidity, hospital stay and conversion rates.

## CONCLUSION

Early LC is safe in acute cholecystitis in expert hands and should be performed in all cases of acute cholecystitis rather than delayed interval cholecystectomy.

## CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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