



PREDICTIVE FACTORS IN SUCCESSFUL COMPLETION OF LAPAROSCOPIC CHOLECYSTECTOMY IN ACUTE CHOLECYSTITIS.

General Surgery

Zubair Rashid	Asst. Professor, Subharti Medical College, Meerut, U.P.
Abid Akbar Sofi*	DNB Fellow (ex), Department of General Surgery, Moolchand Medcity, Lajpat Nagar, Delhi(110024) *Corresponding Author
Muktesh Sharma	Senior Consultant, Department of General Surgery, Moolchand Medcity, Lajpat Nagar, Delhi(110024)

ABSTRACT

Background: Laparoscopic Cholecystectomy in acute Cholecystitis is the established treatment of choice for the management of acute Cholecystitis. The conversion rate and morbidity is higher in Laparoscopic Cholecystectomy done in acute Cholecystitis.

Aims and Objectives: To identify certain preoperative criteria for the selection of patients in acute Cholecystitis that can undergo laparoscopic Cholecystectomy, so that there is decrease in the conversion rate to open procedure and decrease in the complications.

Methods: A Prospective interventional study was conducted in the Department of General Surgery, Moolchand Medcity, New Delhi, on 50 patients with acute Cholecystitis from September 2009 to September 2010. Data was analyzed using standard statistical software SPSS. Chi-square test was used for statistical analysis of qualitative data.

Results: There were 4 males and 46 female patients with a mean age of 37.74 years (range 18 to 65 years). There was no significant variation in intraoperative severity (IOS) pattern of acute Cholecystitis across the various age groups ($p=0.532$). Males had significantly higher IOS grades of acute Cholecystitis as ($p=0.000$). Among patients with varying IOS of acute Cholecystitis, there was significant difference in mean values of duration of symptoms before surgery ($p=0.006$), TLC at admission (adm.) ($p=0.037$) and at 24 hours of adm. ($p=0.016$) and serum AMS at adm. ($p=0.005$). The difference in mean serum ALP at adm. ($p=0.0171$), at 24 hours of adm. ($p=0.137$) and at 48 hours of adm. ($p=0.151$), and mean values of TLC ($p=0.052$) at 48 hours of adm. were insignificant across the various IOS grades of acute cholecystitis. There was no significant variation in histopathological severity (HPS) pattern of acute cholecystitis across the various age groups ($p=0.826$). Males had significantly higher HPS grades of acute Cholecystitis compared to females ($p=0.042$). Among patients with varying HPS of acute cholecystitis, there was no significant difference in mean duration of symptoms before surgery ($p=0.065$). The difference in mean values of TLC at adm. ($p=0.001$), at 24 hours of adm. ($p=0.001$) and 48 hours of adm. ($p=0.003$); serum ALP at adm. ($p=0.001$), at 24 hours of adm. ($p=0.001$) and at 48 hours of adm. ($p=0.022$) was very significant across the various HPS grades of acute cholecystitis. The IOS ($p=0.035$) and HPS ($p=0.032$) of acute cholecystitis was significantly less with successful early lap Chole than with failed procedure. There was no significant difference in success versus failure rates of early Lap Chole across the age distribution of the patients ($p=0.153$); mean values of duration of symptoms before surgery ($p=0.971$); TLC at adm. ($p=0.422$), at 24 hours of adm. ($p=0.990$) and at 48 hours of adm. ($p=0.478$); serum ALP at adm. ($p=0.113$), at 24 hours of adm. ($p=0.135$) and at 48 hours of adm. ($p=0.238$). Male patients had significantly higher failure rate of early Lap Chole ($p=0.022$). Patients with failed early Lap Chole had a significantly longer mean duration of surgery ($p=0.032$) and postoperative hospital stay ($p=0.028$) than those undergoing a successful procedure.

Conclusion: Acute Cholecystitis is much more common in females. Severity of inflammation (intraoperative/ histopathological) in acute Cholecystitis is associated with higher failure/conversion rate of early laparoscopic Cholecystectomy because of dense pericholecystic adhesions, and has longer duration of surgery and postoperative hospital stay. This has a positive relation with male sex and TLC (IOS and TLC at 48 hrs of adm., however had insignificant relation in our study), while as no relation with age (at least up to 65 years) and mean duration of symptoms before surgery (if surgery is done within 1.5-4 days of onset of symptoms).

KEYWORDS

Acute Cholecystitis, TLC (Total leukocyte count), Alkaline Phosphatase (ALP), Amylase (AMS), Laparoscopic Cholecystectomy (Lap Chole), intraoperative severity (IOS), Histopathological severity (HPS), Admission (adm.)

Introduction: Acute cholecystitis is a very common ailment treated surgically all over the world. The laparoscopic approach was initially considered as a relative contraindication or unsafe in acute cholecystitis, because of inflammatory tissue which makes dissection & accessibility difficult, thus increasing the hazard of serious complications like injury to common bile duct as well as the conversion rate¹. Laparoscopic cholecystectomy has become now the gold standard for treatment of symptomatic gall stones presenting with acute/sub acute/chronic cholecystitis². It has been concluded by several investigators that the laparoscopic cholecystectomy performed within the Golden Window period of within 72 hours of onset of symptoms is a safe, feasible & valid alternative to open cholecystectomy in a patient with acute cholecystitis, with shorter hospital stay, less operating time & many more benefits. The speculation of a worse outcome of attempting laparoscopic cholecystectomy for acute cholecystitis beyond 72 hours is experience rather than evidence-based. It has been found by various investigators that apart from short operating time, treating patients with delayed cholecystectomy did not offer any additional benefits over those undergoing successful completion of early cholecystectomy³. However conversion to open cholecystectomy can occur in 35% of patients of acute cholecystitis which diminishes potential medical, cosmetic & economic advantages of the minimally invasive procedure.⁴ It has been realized that only a small number of patients with acute cholecystitis are managed surgically within this "gold

window" of 72 hours from the onset of symptoms. If the remaining majority of patients with acute cholecystitis are managed conservatively with interval cholecystectomy to follow, then an increased total hospitalization and subsequently the increased cost can be expected. Furthermore, the subgroup of patients who do not respond to conservative treatment as well as those who relapse while awaiting interval cholecystectomy should be considered. A converted cholecystectomy takes more operating room time than a typical open cholecystectomy, involves extra costs for equipments and patient has the longer post-operative hospital stay. Thus a combined cholecystectomy combines the worst of both the procedures.⁵

Thus it became imperative to define certain preoperative criteria for patients selection in order to decrease the conversion rate and complication in acute cholecystitis patients undergoing laparoscopic cholecystectomy.

MATERIALS AND METHODS: A prospective interventional study was conducted between September 2009-September 2010 in the department of surgery, Moolchand Medcity, New Delhi. Fifty patients of acute cholecystitis satisfying the case definition and not having any of the exclusion criteria were included in the study. All cases were operated within 5 days of onset of symptoms. Acute Cholecystitis was defined if patient had clinically Acute Right upper abdomen tenderness, Temperature at presentation >37.5 C and/or WBC count

>10,000. Presence of gall stones in thickened and edematous gall bladder, Positive Murphy's sign and pericholecystic fluid collection on USG and Histopathology-confirming acute Cholecystitis were also included in the definition. Patients with Choledocholithiasis (as on USG), Jaundice, Cholangitis, and those with co-morbid conditions (e.g. uncontrolled hypertension, diabetes mellitus, Hepatic or renal disease, previous surgeries) were excluded from the study. Female patients with Pregnancy, perimenopausal females with history of missed periods and all those patients who refused to participate in the study were also excluded from the study. All admitted patients were kept NPO and started on medical therapy. Intravenous antibiotics were continued post operatively till patient was allowed orally, as early as tolerated after 6 hours.

OPERATIVE TECHNIQUE:

Laparoscopic cholecystectomy was performed by an experienced lap surgeon (having done more than 1500 elective laparoscopic Cholecystectomy). Standard four port technique was used for laparoscopic cholecystectomy. Dissection with electrocautery was done where required. Closed suction drains were inserted through the subcostal port into sub hepatic space only when deemed necessary by operating surgeon. Conversion to open was done when deemed necessary by the operating surgeon. Intra operative severity of acute cholecystitis was graded as described by Palanivelu⁶⁷.

RESULTS:

There were 4 males and 46 female patients with a mean age of 37. 74 years (range 18 to 65 years). There was no significant variation in intraoperative severity pattern of acute Cholecystitis across the various age groups ($p=0.532$). Males had significantly higher intraoperative severity grades of acute Cholecystitis as compared to females ($p=0.000$). Among patients with varying intraoperative severity of acute Cholecystitis, there was significant difference in mean values of duration of symptoms before surgery ($p=0.006$), total leucocyte count at admission ($p=0.037$) and at 24 hours of admission ($p=0.016$) and serum amylase at admission ($p=0.005$). The difference in mean serum alkaline phosphatase at admission ($p=0.0171$), at 24 hours of admission ($p=0.137$) and at 48 hours of admission ($p=0.151$) was insignificant across the various intraoperative severity grades of acute cholecystitis. Among patients with varying intraoperative severity of acute cholecystitis, there was no significant difference in mean values of total leucocyte count ($p=0.052$) at 48 hours of admission. The intraoperative severity of acute cholecystitis was significantly less in patients with successful early laparoscopic cholecystectomy than in those with failed procedure ($p=0.035$).

There was no significant variation in histopathological severity pattern of acute cholecystitis across the various age groups ($p=0.826$). Males had significantly higher histopathological severity grades of acute Cholecystitis compared to females ($p=0.042$). Among patients with varying histopathological severity of acute cholecystitis, there was no significant difference in mean duration of symptoms before surgery ($p=0.065$). The difference in mean values of total leucocyte count at admission ($p=0.001$), at 24 hours of admission ($p=0.001$) and 48 hours of admission ($p=0.003$); serum alkaline phosphatase at admission ($p=0.001$), at 24 hours of admission ($p=0.001$) and at 48 hours of admission ($p=0.022$) was very significant across the various histopathological severity grades of acute cholecystitis. The histopathological severity of acute cholecystitis was significantly less in patients with successful laparoscopic cholecystectomy than in those with a failed procedure ($p=0.032$).

There was no significant difference in success versus failure rates of early laparoscopic Cholecystectomy across the age distribution of the patients ($p=0.153$); mean values of duration of symptoms before surgery ($p=0.971$); Total leucocyte count at admission ($p=0.422$), at 24 hours of admission ($p=0.990$) and at 48 hours of admission ($p=0.478$); serum alkaline phosphatase at admission ($p=0.113$), at 24 hours of admission ($p=0.135$) and at 48 hours of admission ($p=0.238$). Male patients had significantly higher failure rate of early laparoscopic Cholecystectomy as compared to female patients ($p=0.022$).

Patients of acute cholecystitis undergoing a failed early laparoscopic cholecystectomy had a significantly longer mean duration of surgery ($p=0.032$) and postoperative hospital stay ($p=0.028$) than those undergoing a successful procedure.

DISCUSSION:

Early laparoscopic Cholecystectomy has become the treatment of

choice in acute Cholecystitis. However the rate of conversion to open operation in laparoscopic Cholecystectomy for acute Cholecystitis is 15-25 % (5 times) compared to the conversion rate for chronic Cholecystitis. The study has been designed to identify predictive factors for successful laparoscopic Cholecystectomy for acute Cholecystitis. The failure rate of laparoscopic procedure in this study was 20% (as 10 out of 50 patients failed to undergo laparoscopic completion of early Cholecystectomy). Acute Cholecystitis was found to be much more common in females than in males, which is in agreement with the literature. There was no significant relationship of age with intraoperative and histopathological severity of acute Cholecystitis. This is in contrast with the studies by Eldar et al⁸ and Schaefer et al⁷. The observed disparity may be due to younger age of patients in the present study. The mean age of patients in the present study was 37. 74 years and there was no patient with age 65 years. In Schaefer's series mean age was 61. 4 years with age range of 23-95 years.

Male sex significantly predicted the conversion of early laparoscopic cholecystectomy and was also found to be associated with significantly higher intraoperative and histopathological severity grades of acute Cholecystitis. This is in agreement with the study conducted by Eldar et al⁸ and Schaefer et al⁷. Mean duration of symptoms before surgery was not found to have any significant bearing on success/failure of early laparoscopic cholecystectomy and histopathological severity of acute Cholecystitis which is in contrast to the study conducted by Rattner et al¹⁰, Bickel et al¹¹ and Schaefer et al⁷. The disparity between present observation and the literature may be because all the patients in the study were operated within 1.5-4 days of symptoms. Total leucocyte count was found to significantly predict intraoperative severity of acute cholecystitis and successful lap completion of early cholecystectomy. Rattner et al found degree of leucocytosis to be significantly associated with severity of inflammation and failure of lap procedure. Similar observation was also made by Eldar et al⁸ and Schaefer et al⁷.

Serial serum AP levels were found to be highly predictive of histopathological severity of acute cholecystitis. However, none of the serum alkaline phosphatase levels showed any significant association with success/failure of laparoscopic procedure or with intraoperative severity of acute cholecystitis. Degree of alkaline phosphatase elevation was found to be significant predictor of laparoscopic cholecystectomy by Rattner et al¹⁰. However, other investigators in the literature have not reproduced this observation of Rattner et al and thus disparity with present findings is unexplainable.

Degree of intraoperative and histopathological severity of acute cholecystitis had good association with conversion rate of early laparoscopic Cholecystectomy, as also reported earlier by Eldar et al⁸, Schaefer et al⁷, Rattner et al¹⁰ and Bickel et al¹¹.

Patients of acute cholecystitis with failed / converted early laparoscopic procedure have significantly longer duration of surgery and postoperative hospital stay than those undergoing a successful laparoscopic cholecystectomy. These findings are consistent with those of several studies in the literature.

Conclusion: Acute Cholecystitis is much more common in females. Severity of inflammation (i.e., a high grade of intraoperative/histopathological severity) in acute Cholecystitis is associated with higher failure/conversion rates of early laparoscopic Cholecystectomy because of dense pericholecystic adhesions. Age, at least up to 65 years and Mean duration of symptoms before surgery (if surgery done within 1.5-4 days of onset of symptoms) does not affect the success of laparoscopic Cholecystectomy. However, intraoperative severity of acute Cholecystitis is found to increase with increasing duration of symptoms, but has no relation with age (at least up to 65 years). Male patients have significantly higher intraoperative and histopathological severity grades of acute Cholecystitis and are at significantly higher risk of failure of early laparoscopic Cholecystectomy. TLC was found to be strong predictor of intraoperative and histopathological severity of acute Cholecystitis. Patients converted to open Cholecystectomy had longer duration of surgery and subsequent longer postoperative hospital stay.

REFERENCES

1. Cushman A, Dubois F, Mouiel J. The European experience with Laparoscopic Cholecystectomy. Am J Surg. 1991;161:385-8.
2. Soper NJ, Stockmann PT, DL, Ashley SW. Laparoscopic cholecystectomy. The gold

- standard. Arch Surg. 1992;127:917-21.
3. Zucker KA, Flowers JL, Bailey RW. Laparoscopic management of Acute Cholecystitis. Am J Surg. 1993;165:508-14.
 4. Mitchell A, Morris PJ. Trend in management of Acute Cholecystitis. BMJ. 1982;28:427-30.
 5. Lo CM, Fan ST, Lui CL, Lai EC, Wong J. Early decision for conversion of laparoscopic to open cholecystectomy for treatment of Acute Cholecystitis. Am J Surg. 1997;173:513-7.
 6. Palanivelu C. CIGES Atlas of lap surgery. 2nd ed. New Delhi; Jaypee Brothers; 2003;53:1071-7.
 7. Palanivelu C. Textbook of lap surgery. 1st ed. Coimbatore. Gem Digestive Diseases Foundation; 2002. p. 147.
 8. Eldar S, Sabo E, Nash M, Abrahamson J, Matter I. Laparoscopic cholecystectomy for acute cholecystitis Prospective trial. World J Surg. June 1997;21(5):540-5.
 9. Schafer M, Krahenbuhl L, Buchler MW. Predictive factors for the type of surgery in acute cholecystitis. Amer J of Surg. 2001;182:291-7.
 10. Rattner DW, Feguson C, Warshaw AL. Factors associated with successful laparoscopic cholecystectomy for acute cholecystitis. Ann Surg 1993;217(3):233-6.
 11. Bickel A, Rappaport A, Kanievski V. Lap management of acute cholecystitis. Surg Endosc. 1996;10:1045-9.