

# Laparoscopic Cholecystectomy in Complicated Gallstone Disease

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## ABSTRACT

**OBJECTIVE:** To assess the role of laparoscopic cholecystectomy (LC) in gallstone disease with its complicated problems.

**DESIGN:** Prospective observational study.

**SETTING:** Surgical Department of Liaquat University of Medical & Health Sciences, Jamshoro and Private Hospitals of Hyderabad, Sindh-Pakistan; from May 2001 to April 2005.

**METHODS:** The patients were categorized as cases of complicated gallstone disease on the basis of clinical assessment, investigations especially ultrasound abdomen and operative findings noted during laparoscopic cholecystectomy. All patients were explained for advantages and disadvantages of early LC with their difficult disease problem and willing taken for study. Sampling strategy was convenient. The patients with uncomplicated gallstones, obstructive jaundice, acute pancreatitis and carcinoma of gall bladder were excluded from this series.

**RESULTS:** 120 out of 400 patients presented with one of the known complication of cholelithiasis such as chronic cholecystitis 50%, acute cholecystitis 12.5%, empyema 18.33%, mucocele 10% and fibrosed gall bladder in 9.17% of cases as assessed on clinical examination, ultrasound and laparoscopic findings. Majority (75%) of cases were having adhesions around gall bladder and 25% without adhesions. Problems encountered during LC were difficult separation of tight adhesions around gallbladder (50.0%), grasping and holding of thick walled and distended gallbladder (41.67%), dissection and identification of structures in Calot's triangle (29.17%), haemorrhage from main cystic artery and gall bladder bed 20.83% and delivery of large and thick wall gallbladder in 25% of cases. Intra operative complications seen during procedure were haemorrhage in 20.83% cases, perforation of gallbladder by instrumentation in 12.5% and avulsion of cystic duct in 1.67% of cases. Two patients (1.67%) were converted to open cholecystectomy due to bleeding. Postoperatively 12.5% of patients developed biliary leak, out of which 3 cases (2.5%) were due to actual common bile duct injury, 2.5% of cases developed port-site sepsis as main postoperative complications. Cases with bile duct injury were re-explored and managed accordingly. Hospital stay varied from 2-7 days but majority of patients were discharged (70.83%), within 2-3 days, no mortality was seen in this series.

**CONCLUSION:** Laparoscopic cholecystectomy like uncomplicated biliary stone disease is equally effective procedure for complicated cholelithiasis. Its applicability is almost 95% in experienced hands.

**KEY WORDS:** Gall stones. Complications. Laparoscopic cholecystectomy. Operative problems. Conversion rate.

## INTRODUCTION

Gall stones are the most common biliary pathology<sup>1</sup>. It affects 12% of population in United States<sup>2</sup> and 18.5% of people in Europe<sup>3</sup>. Majority of the subjects (more than 85%) are asymptomatic<sup>1</sup>. However, the annual risk of developing complicated gallstone disease is 1-2% in asymptomatic carriers<sup>4</sup>. Chronic cholecystitis is the most common form of symptomatic gall bladder disease<sup>5</sup>, where as acute cholecystitis develops in upto 10% of cases possibly due to cystic duct obstruction<sup>6</sup>.

Complications of cholelithiasis responsible for difficult laparoscopic cholecystectomy (LC) are acute cholecystitis, acute biliary pancreatitis, acute cholangitis<sup>7</sup>, choledochal gallstones, vesicular (gallbladder) adhesions, cholecystoduodenal or colonic fistula<sup>8</sup>. However chronic cholecystitis associated with fibrosed gall bladder or adhesions with surrounding structures also presents difficulty during LC. Most of the cholecystectomies are done in people with uncomplicated biliary colic, the commonest presentation of gallstones<sup>9</sup> and LC has been advocated as first option for

treatment of uncomplicated symptomatic gallstone disease and about 70-80% of all cholecystectomies are now done laparoscopically.<sup>10,11,12</sup> But it has not been widely accepted for management of more complicated gall bladder disease<sup>13,14</sup>. However it is safe and superior procedure in these patients when performed by experienced surgeon<sup>8</sup>. Currently available evidence recommend early LC for acute cholecystitis<sup>15</sup> or any other complicated problem related to gallstones on the basis that early surgery does not increase operative morbidity or mortality<sup>16,17</sup>. Nevertheless strategy of early cholecystectomy has not been widely adopted in different countries<sup>18,19</sup> and indications and contraindications very widely between providers<sup>20</sup>. LC may be rendered difficult in complicated gallstone disease due to various problems encountered during surgery such as difficulty in assessing the peritoneal cavity, creating pneumoperitoneum, grasping and dissecting the gall bladder, separation of adhesions, identifying anatomy in Calot's triangle or extracting the excised gallbladder<sup>21</sup>. However its applicability is beyond any doubt in complicated gallstone disease<sup>22</sup>, because of substantially less postoperative pain, short hospital stay and early return to work as compared to open cholecystectomy<sup>23</sup>.

## PATIENTS AND METHODS

This study was conducted at Surgical Department of Liaquat University of Medical and Health Sciences Jamshoro and private hospitals of Hyderabad, Sindh-Pakistan during May 2001 to April 2005. It comprised of 120 cases of complicated gallstone disease from a total number of 400 patients of cholelithiasis undergone for LC. The patients were evaluated by clinical assessment on basis of history and clinical examination and biodata recorded on a prepared proforma. The relevant base line investigations along with hepatitis B and C profile were carried out in all patients and diagnosis confirmed on ultrasound examination. Sampling strategy was convenient and all patients were explained for study and verbal consent taken. Those patients diagnosed preoperatively as cases of complicated gallstones or as cases of difficult LC on operative finding were included in the study. In this study difficult gallstone disease was considered when evaluation of patients from clinical assessment, ultrasound findings and operative findings revealed the conditions such as acute cholecystitis, chronic cholecystitis with fibrosed thick walled gallbladder or tight adhesions, to surrounding structures, acute pancreatitis, mucocele or empyema of gallbladder with impacted stone in Hartmann's pouch and difficult anat-

omy in Calot's triangle due to fibrosis. All cases of difficult gallstone disease were operated by experienced surgeons and the difficulties encountered during surgery were dealt with according to situation. In case of distended gall bladder the contents were aspirated by spinal needle (No. 16), adhesions separated by blunt dissection with sucker nozzle or coagulation diathermy or hormonal scalpel (HS), dissection started from posterior aspect of gall bladder neck (a safe area) to make window from behind in Calot's triangle or even dissection started from fundus or body of gall bladder, rather than neck (fundus first method), clamping of cystic duct and artery near to neck of gall bladder and away from common bile duct. The patients with uncomplicated gall stone disease, obstructive jaundice, acute pancreatitis and carcinoma of gall bladder were excluded from this series. The data analysis was done by SPSS 10.0 version. The patients were followed up for duration of one year in order to see any late complication.

## RESULTS

Out of 120 cases of complicated cholelithiasis, 62.5% were females and 37.5% males with female to male ratio of 1.67:1. Most of the patients presented during 3<sup>rd</sup> to 5<sup>th</sup> decade of life (83.71%) having highest incidence in 5<sup>th</sup> decade (41.66%) with mean age of presentation 42.5 years. Clinically patients presented with upper abdominal pain either in right hypochondrium (51.67%) or right hypochondrium and epigastrium (29.17%) or epigastrium (19.17%) as main clinical symptoms along with positive Murphy's sign in 58.33% of cases, tenderness in right hypochondrium in 12.5% and palpable gall bladder in 15.0% of cases (**Table I**). The clinical parameters were further supported by ultrasound examination which revealed multiple stones in 69.71%, thick walled gallbladder in 41.67% and adhesions in 35% of cases as main findings (**Table II**). Laparoscopic cholecystectomy further confirmed the preoperative findings in form of adhesions of gall bladder with omentum and other surrounding structures in 75% of patients, chronic cholecystitis in 50%, acute cholecystitis in 12.5%, empyema in 18.33%, mucocele in 10%, and fibrosed gall bladder in 9.17% of cases (**Table III**). Same table also shows different problems encountered during surgery. Intraoperative complications seen during surgery were bleeding (20.83%), perforation of gall bladder (12.5%), avulsion of cystic artery (3.33%) and cystic duct (1.67%) (**Table IV**). Two patients (1.67%) with uncontrollable bleeding due to avulsion of cystic artery were

converted to open procedure giving rise to 1.67% conversion rate. Postoperative complications enlisted in (Table IV), revealed biliary leak as major complicated problem in 12.5% of cases which was due to difficult dissection of gall bladder from its bed leading to damage of minute biliary channels. Therefore, it was stopped in majority of cases except 3 patients (2.5%) who were due to actual common bile duct injury. They

were re-explored and managed accordingly. Operative time utilized was 30-60 minutes in 58.38%, 60-90, minutes in 33.33% and 90-120 minutes in 8.33% of cases. Hospital stay varied from 2-7 days except those who were either converted to open cholecystectomy (1.67%) or re-explored (2.5%) but majority of the patients (70.83%) were discharged within 2-3 days (Table V). No mortality was seen in this series.

**TABLE I:  
CLINICAL PRESENTATION OF PATIENTS**

Symptoms	Number of Patients	Percentage	Clinical Signs	Number of Patients	Percentage
Pain in RHC	62	51.67	Tenderness + Rigidity in RHC.	15	12.5
Pain in RHC + Epigastrium	35	29.17	Tenderness + Rigidity in Epigastrium	10	8.33
Pain in Epigastrium	23	19.17	Murphy's Sign (Positive)	70	58.33
Fullness in upper abdomen	30	25.0	Palpable gall bladder	18	15.00
Nausea and vomiting	24	20.0	No Finding	17	14.16
Fever	15	12.5	-	-	-

RHC = Right Hypochondrium

**TABLE II:  
ULTRASOUND FINDINGS**

Finding	Number of Patients	Percentage
Single stone	37	30.8
Multiple stones	83	69.17
Impacted stones at the neck	20	16.66
Thick-wall gall bladder	50	41.67
Empyema	17	14.16
Mucocele	9	7.5
Contracted gall bladder	10	8.33
Adhesions around gall bladder	42	35.0
Cirrhosis of liver	10	8.33

**TABLE III:  
OPERATIVE FINDINGS AND PROBLEMS ENCOUNTERED DURING SURGERY**

Operative Finding	Number of Patients	Percentage	Difficulties encountered during surgery	Number of Patients	Percentage
Adhesions	90	75.0	Difficulty in grasping the gall bladder	50	41.67
Chronic cholecystitis	60	50.0	Separation of adhesions	60	50.00
Acute cholecystitis	15	12.5	Dissection in Calots triangle	35	29.17
Empyema	22	18.33	Dissection in gall bladder bed	22	18.33
Mucocele	12	10.0	Bleeding	25	20.83
Contracted gall bladder	11	9.17	Extraction of gall bladder	30	25.0
Thick wall gall bladder	70	58.33	-	-	-
Cirrhosis of Liver	19	15.8	-	-	-

**TABLE IV:  
FREQUENCY OF COMPLICATIONS**

Operative Complication	Number of Patients	Percentage
Haemorrhage (from gall bladder bed + cystic artery)	25	20.83%
Gall bladder perforation with spillage of stones.	15	12.5%
Avulsion of cystic duct	2	1.67%
Avulsion of cystic artery	4	3.33%
Surgical emphysema from port site	3	2.5%
Conversion rate	2	1.67%
<b>Postoperative Complications</b>		
Haemorrhage	10	8.33%
Biliary leak	15	12.5%
Chest infection	12	10.0%
Port site wound sepsis	4	3.33%
Nausea and vomiting	22	18.33%
Bile duct injuries	3	2.5%
Re-exploration	2	2.5%
Port site hernia	2	1.67%

**TABLE V:  
HOSPITAL STAY**

Duration of Stay	Number of Patients	Percentage
2 days	60	50.0%
3 days	25	20.83%
4 days	15	12.5%
5 days	15	12.5%
> 7 days	5	4.17%

*Mean Hospital Stay = 3.2 days*

## DISCUSSION

After the introduction of LC in 1991, its widespread use has completely revolutionized the management of cholelithiasis either simple or complicated and advantages of LC are undoubtable in comparison to open cholecystectomy<sup>24</sup> and it has got economic advantages over open surgery<sup>25</sup>. However still most cholecystectomies are done for uncomplicated gallstone disease but its applicability is equally good for complicated cholelithiasis<sup>20</sup>, in experienced hands with some technical changes in procedure such as dissection by fundus first method, ligation of short and wide cystic duct with transfixing suture instead of clipping, decompression of distended and stone filled gall bladder and in more difficult cases dissection and excision of

body and fundus with drain in gall bladder bed<sup>26</sup>. Incidence of gallstones rises with age, so that between 50 and 65 years of age about 20% of women and 5% of men are affected by disease<sup>5</sup>. In present study the disease was mainly found in patients between 30-50 years of age affecting 62.5% of females and 37.5% of males with female to male ratio of 1.67:1. Spectrum of gallstone disease include biliary colic in 56%, acute cholecystitis in 36%, acute pancreatitis in 4%, cholecholethiasis in 0.3%, gall bladder cancer in 0.3% and cholangitis in 0.2% of cases<sup>27</sup> and those patients who present as complicated gallstone disease usually (58%) had prior warning colics<sup>4</sup>. In this series 51.67% of patients presented with biliary colic, 12.5% with acute cholecystitis, 29.17% with combined symptoms of biliary colic and gastritis, 19.17% with symptoms of gastritis and 15% as palpable gall bladder due to mucocele or empyema, however, cases of common bile duct stones, pancreatitis and malignancy were already excluded from study. Clinical and ultrasonic factors can help to predict difficult LC and likelihood of conversion to open surgery<sup>19</sup> and four ultrasonic parameters are important for assessment of difficult LC namely gallbladder wall thickness, contracted gall bladder, impaction of gallstones at neck and common bile duct stones<sup>28</sup>. In present study, the factors for difficult LC found were gall bladder wall thickness in 41.67%, contracted gall bladder in 8.33%, distended gall bladder (empyema and mucocele) in 21.67%, impacted gallstones at the neck in 16.66%, and adhesions around gall bladder in 35% of cases. Gall bladder wall thickness is related to the inflammation or fibrosis that follows previous attacks of cholecystitis<sup>29</sup>. The variables for difficult LC include age, gender, operative pathology and accidents, duration of surgery, rate of conversion to open procedure, length of hospital stay and postoperative complications<sup>8</sup>. In this study, patients of all age groups were found with complicated disease but majority was seen in 4<sup>th</sup> and 5<sup>th</sup> decades while male patients had more operative difficulties as compared to females. Surgical findings for difficult or easy LC are considered with five operative parameters namely total time taken for surgery, time taken to dissect gall bladder bed, spillage of stones, tear of gall bladder during dissection and conversion to open procedure<sup>28</sup>. In this series, the operative factors for the difficult LC were difficulty in grasping the gall bladder (41.67%), separation of adhesions (50%), dissection in Calot's triangle (29.17%), bleeding (20.83%), perforation and spillage of contents (12.5%), difficult extraction of thick walled distended gall bladder (25.0%) and cirrhosis of liver (15.8%). The conversion rate to open procedure was seen in 1.67% of cases whereas re-exploration was carried out in 2.5% of patients due to common bile duct injury.

The intraoperative complications which demand repeated operation are bleeding in 0.5% and CBD injuries in 11%<sup>22</sup> and 1% of cases<sup>30</sup>, which shows lower incidence than present study. Conversion to open cholecystectomy is required in 2-15% of patients as assessed by Alponat A et al<sup>31</sup>, Sanabria JR et al<sup>32</sup> and 5-26% of cases as seen by Papi C, et al<sup>15</sup> which is quite higher than our study. Also male gender has been recognized as a risk factor for increased conversion rate but in present study two (1.67%) male patients with uncontrollable bleeding were converted to open cholecystectomy. The main postoperative complications for difficult LC were bleeding and biliary leakage with common bile duct injury which were responsible for re-exploration to open procedure. These complications are responsible for morbidity and prolonged hospital stay but lesser than open cholecystectomy<sup>33</sup>. Majority of our patients was discharged within 2-3 days time (70-83%) but only 5 cases (4.17%) who were converted to open remained for more than one week with mean hospital stay of 3.2 days. However the mean hospital stay given by Spetz CL<sup>34</sup> is 2.7 days which is lower than our study.

## CONCLUSION

Laparoscopic cholecystectomy is equally safe and ideal procedure for complicated gallstone disease in hands of experienced laparoscopic surgeon. Duration of surgery is not significantly prolonged and outcome in terms of hospital stay and morbidity is similar to that of uncomplicated gall stone surgery. The procedure is applicable in more than 95% of cases with conversion rate of 1.67% in the current study.

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