LAPAROSCOPIC CHOLECYSTECTOMY IN ACUTE GALL BLADDER

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ABSTRACT

Objective: *To look for the feasibility and results of laparoscopic cholecystectomy in acutely inflamed gall bladder, gangrenous cholecystitis and empyema gall bladder.*

Methodology: *It was a prospective observational case series. As an institutional policy early laparoscopic cholecystectomy was performed in all the patients with diagnosis of acute cholecystitis. The incidence of gangrenous cholecystitis and empyema gall bladder was noted and laparoscopic intervention was preferred in all these patients. The demographic profile, clinical records, operative details, complications and follow up details were prospectively gathered on a performa.*

Results*: Early laparoscopic cholecystectomy was performed in 142 patients. 103 patients had simple acute cholecystitis, 13 patients had empyema gall bladder and 26 patients had gangrenous cholecystitis. The incidence of comorbids such as diabetes mellitus, hypertension and ischemic heart diseases was 28.1%, 61.5 and 80.75 in patients with simple acute cholecystitis, empyema gall bladder and gangrenous cholecystitis respectively. Male gender was predominating in patients with complicated cholecystitis. The open conversion rate was 3.88% in simple acute cholecystitis, 15.38% in empyema gall bladder and gangrenous cholecystitis combined. There were 2 major complications in patients with simple acute cholecystitis and 2 major complications in patients with gangrenous cholecystitis. There was one mortality in a patient with simple acute cholecystitis.*

Conclusion: *Laparoscopic cholecystectomy is a safe and effective option in acute gall bladder. Based on our experience we recommend an early laparoscopic gall bladder removal, provided expertise & gadgets are available.*

Key Words*: Laparoscopy, Gangrenous, Cholecystitis, Empyema, Gall bladder.*

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INRODUCTION

Gallstone disease remains one of the most common medical problems leading to surgical intervention. Acute cholecystitis frequently leads to hospitalization and a significant burden on health system. About 20% of adults above the age of 40 years and 30% of those over 70 have biliary calculi. During the reproductive years, the female-to-male ratio is about 4:1, with the sex discrepancy narrowing in the older population to near equality. A study of the natural history of cholelithiasis demonstrates that approximately 35% of patients initially diagnosed with having, but not treated for, gallstones later developed complications or recurrent symptoms leading to cholecystectomy[1].

Empyema and gangrene of gall bladder are potentially fatal complications of the acute cholecystitis characterized by friable walls and the presence of pus within the lumen of the gall bladder[2,3]. These are produced by suppuration superimposed on acute cholecystitis. The clinical presentation is often difficult to distinguish from acute cholecystitis[2,4]. Features suggesting diagnosis and seriousness of this condition are few[1,2,5].

Empyema of the gall bladder is more often encountered in males and the elderly[2] so percutaneous gallbladder drainage has often been recommended as a safe and effective procedure for

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the initial management of in such patients with the better outcome since these patients are more sick and older[6]. The scientific trials support an early cholecystectomy in such patienst[5]. During the last two decades, the general principles of gallstone management have not notably altered. The treatment of choice still remains cholecystectomy[1].

However the gadget supported minimally invasive cholecystectomy has dramatically changed the outlook of patients with symptomatic gallstone disease. Initially due to the lack of experience & trials, empyema gallbladder used to be considered as a contraindication for laparoscopic cholecystectomy (LC) because of fear of life-threatening complications due to obscured local anatomy and extensive adhesions[3]. With the evolution of laparoscopic cholecystectomy, there has been a global re-education and retraining program of surgeons. The surgeons of today are more experienced in laparoscopic dissection[1,7]. But these two conditions are still considered the commonest reasons for the conversion[2,8]. Despite various encouraging reports, some consider the role of laparoscopic surgery in such acute conditions still under evaluation[3], but various recent trials and studies so far support early laparoscopic cholecystectomy in patients with acute cholecystitis[2]. Laparoscopic cholecystectomy (LC) is more likely to be successful when performed not later than 72 hours of the onset of symptoms[1].

The aim of our study was to determine the feasibility and results of laparoscopic cholecystectomy in acutely inflamed gall bladder, gangrenous cholecystitis and empyema gall bladder.

METHODOLOGY

This study was performed at the laparoscopic surgery unit of Fauji Foundation Hospital, Rawalpindi. It is a prospective observational study. The study duration was two and half years i.e., March 2005 to October 2007.

All the patients admitted through the out patient clinics and emergency room with the diagnoses of acute cholecystitis and subsequent laparoscopic cholecystectomies were included in the study. Patients with elective admission for laparoscopic cholecystectomy, patients in sepsis who had pre-operative percutaneous drainage for the empyema gall bladder, patients with suspected choledocholithiasis and those having suspicion of growth in the gallbladder were excluded from this study.

Diagnosis of acute cholecystitis was made on clinical, laboratory and ultrasound criteria. The diagnosis of gangrenous gall bladder was made on operative gross appearance of gall bladder and histopathology. Diagnosis of Empyema gall bladder was made on ultrasound evidence of distended thick walled gall bladder with a stone impacted at the neck of gall bladder and white blood count of 15000/dl and presence of pus in gall bladder during operation.

As a policy of our unit all the patients with diagnoses of acute cholecystitis underwent early laparoscopic cholecystectomy within three days of admission.

An informed consent was taken from all the patients before surgery. All patients were managed by a team of experienced laparoscopic surgeons in a uniform manner according to a management based algorithm. Our operating room had trained team of theater staff with two laparoscopes and a broad range of laparoscopic hand instruments.

The demographic profile, clinical records, operative data, complications, postoperative recovery and follow up was recorded prospectively for every patient. Our patients had three routine follow up visits in outpatient clinics and we had maximum follow up of two years.

Patients who developed complications were managed with a multidisciplinary approach.

The data was analysed using statistical package for social sciences (SPSS version 10). Continuous variables were expressed as mean ± SD while categorical variables were presented as frequencies and percentages. Chi square test was used to compare the categorical variables. A P value of $\leqslant$ 0.05 was considered significant.

RESULTS

The study comprised of 142 patients who underwent laparoscopic cholecystectomy in the presence of acute gallbladder. There were 23 male patients compared to 119 female patients. The mean age was 54.48 ± 7.07 years. The mean operative time was 45.90 ± 15.18 minutes, while the mean hospital stay was 5.19 ± 1.73 days. The patients were further classified into three groups. Gangrenous gall bladder (n = 26), empyema gall bladder (n = 13), and finally those with simple acute cholecystitis (n = 103). A comparison of the three groups showed that the mean operative time was significantly longer in empyema gallbladder patients ($P \leqslant 0.001$). Similarly the mean hospital stay was also significantly prolonged in patients with empyema gallbladder ($P \leqslant 0.001$).

Outcome of patients with Gangrenous gall bladder.

This group had 26 patients and diagnosis

of gangrenous cholecystitis was confirmed on histopathology in all of them. Ten patients were male and 16 were female. Average age was 59.03 ± 8.52 years, with an age range of 27 to 83 years. Twenty one of these patients had significant comorbids while 5 of them did not have any other significant disease (Table 1 and 2). Laparoscopic intervention was converted to open cholecystectomy in 4 patients. Reason of conversion was difficult anatomy at calot's triangle in two patients, one patient had bleeding from the gall bladder bed and there was instrument failure in one patient. Out of 21 patients who were managed with laparoscope, two patients developed abdominal collections later on. Both of these patients were successfully managed by ultrasound guided percutaneous aspiration of collection. One patient had post-operative minor wound infection. Pre-operative diagnosis of gangrenous cholecystitis was correct in only seven (33.33%) patients. Eighteen of these patients had WBC count of more the 20,000 cell/ ml. The mean operative time was 49.07 ± 12.58 minutes, with a time range of 38 minute to 107 minutes. The mean hospital stay was 5.07 ± 2.33 days, with a range of 3 to 16 days.

Outcome of patients with Empyema Gall bladder.

There were 13 patients in this group, 5 were male and 8 were female. Mean age was 57.07 ± 12.05 years, with range of 23 to 69 years. Eight patients (61.5%) had significant comorbids (Table 1 and 2). Laparoscopic intervention was converted to open in two patients. Reason of conversion was difficult anatomy at calot's triangle in one patient and avulsion of cystic duct from the common bile duct in one patient. Both of these patients had smooth postoperative recovery. There was no mortality or major morbidity in this group. Only one patient had minor wound infection. Preoperative ultrasound diagnosis was correct in all the patients and all of these patients had WBC count of more than 15000/dl. Mean Operative time was longest in this group with an average of 78.00 ± 17.06 minute and a range of 47 minutes to 127 minutes. The laparoscopic procedure was technically challenging in these patients. The gall bladder was aspirated early in the procedure in all the cases, four patients required an extra port insertion, in two patients partial cholecystectomy was performed and drains were placed in all the patients postoperatively. Hospital stay was between 4 to 9 days with an average of 6.07 ± 1.32 days.

Outcome of simple acute cholecystitis

There were 103 patients in this group. Eight patients were male and 95 were female. Mean age of patients was 53.00 ± 5.10 years, with an age range of 15 to 72 years. Only 28.15% had any significant comorbids (Table 1 and 2). Four patients had conversion to open procedure. Reason of conversion was difficult anatomy at calot's triangle in two, cholecystodudenal fistula in one case and bleeding from the right hepatic artery in one case. There were 4 minor and 2 major complications in this group. Four patients had post operative wound infections, one patient had postoperative collection and one patient had postoperative bleeding from the gall bladder bed leading to open re-exploration eight hours after

Table 1: Clinical details of patients with early Laparoscopic Cholecystectomy

Diagnosis	Simple acute cholecystitis	Empyema gall bladder	Gangrenous cholecystitis
No of Patients	103	13	26
Mean Age	53.00± 5.10 years	57.07±12.05 years	59.03 ± 8.52 years
Age Range	15 to 72 years	23 to 69 years	27 to 83 years
Male/female ratio	8 : 95	5 :8	10 : 16
Comorbids (Diabetes Mellitus, Hypertension, Ischemic Heart Disease)	29 (28.15%)	8 (61.5%)	21 (80.76%)
Mean Operative time Range	41.04 ± 9.38 minutes 27 to 113 minute	78.00±17.06minutes 47 to 127 minutes	49.07±12.58minutes 38 to 107 minute
Mean Hospital stay Range	5.08 ± 1.61 days 2 to 19 days	6.07 ± 1.32days 4 to 9 days	5.07 ± 2.33 days 3 to 16 days
Follow up	2 weeks to 2 years	2 weeks to 2 years	2 weeks to 2 years

*The mean operative time and mean hospital stay were significantly longer in empyema gallbladder patients ($P \leq 0.001$)

Table 2: Outcome of patients with early laparoscopic surgery for Acute Cholecystitis, Empyema Gall Bladder and Gangrenous cholecystitis

Diagnosis	Simple acute cholecystitis	Empyema gall bladder	Gangrenous cholecystitis
No of Patients	103	13	26
Mortality	1	0	0
Major complications	2	0	2
Minor complications	4	1	1
Conversion rate	4 (3.88%)	2 (15.38%)	4 (15.38%)

surgery followed by a smooth recovery. There was one mortality in this group. This was an elderly female patient with diabetes and hypertension. Her procedure was converted to open cholecystectomy very early during the laparoscopy due to difficult anatomy. She had stable immediate postoperative recovery but later on she developed Myocardial infarction in ICU and expired three days after surgery. The average operative time was 41.04 ± 9.38 minutes, with range of 27 minute to 112 minute. The average hospital stay was 5.08 ± 1.61 days, with a range of 2 to 19 days.

DISCUSSION

Although there was an initial criticism but the in recent years laparoscopic cholecystectomy (LC) has replaced open cholecystectomy as a management of choice for the non complicated symptomatic gall bladder[9,10]. Early experience with laparoscopic intervention of the acute cholecystitis raised some cautions in literature with reports of higher complication and conversion rates. Now after twenty years of the first laparoscopic cholecystectomy the indications of laparoscopic cholecystectomy have evolved to favor its use for simple as well as complicated acute cholecystitis. Many centers across the world advocate early LC for acute cholecystitis within first 3-4 days of admission[1,11,12].

Recently LC has become a preferred and acceptable choice even in the most difficult situations associated with complicated gallbladders. Experience of laparoscopic cholecystectomy for acute cholecystitis in our series is comparable to the experience reported earlier in the literature. The incidence of gangrenous cholecystitis was 18.1% and empyema gall bladder was 9.1% amongst the patients diagnosed to have acute cholecystitis. We had correct pre-operative diagnosis of gangrenous cholecystitis in only 7 (33.33%) patients. While the literature also suggests that gangrenous cholecystitis is difficult to identify leading to potential misdiagnoses in most of these patients. It is inferred that male, elderly patients with high WBC count and patients with comorbids are at high risk of having gangrenous cholecystitis[13,14].

Conversion rate (4%) was quite low compared to the previous reported literature. The low conversion rate may be due to better case selection, presence of experienced surgeons in all the cases and belief that a careful laparoscopic dissection will lead to better anatomical identification and surgical outcome. Different forms of cholecystitis carry various conversion and complication rates in selected cases. Eldar S et al in their case series have identified that the patients over 65 years of age, with a history of billiary disease, a non-palpable gallbladder, WBC count over 13,000/cc, and acute gangrenous cholecystitis were independently associated with a high LC conversion rate. They have also mentioned that male patients, finding large bile stones, serum bilirubin over 0.8 mg/dl, and WBC count over 13,000/cc were independently associated with a high complication rate following laparoscopic surgery with or without conversion [15].

We had four major complications in this series and all of these patients were managed successfully with a multidisciplinary team approach. There was only one mortality which was not directly related to the modality of surgery. The difficulties that we encountered in dissection in the area of Calot's triangle are more or less the same as mentioned by other similar studies[3,15]. Habib et al[16] reported that preoperative factors did not predict conversion in patients undergoing laparoscopic cholecystectomy for presumed acute cholecystitis who were found to have gangrenous cholecystitis. Duration of surgery was not significantly prolonged and the out come in terms of morbidity and hospital stay was significantly better in patients in whom laparoscopic cholecystectomy was successful[16,17]. Similarly Hunt et al[18] reported safety of laparoscopic intervention for the gangrenous cholecystitis with a low conversion rate (8.7%) contrary to Eldar's[15] experience from Israel who reported conversion rate of 49% for gangrenous cholecystitis and 28.5 % for empyema gall bladder. History of recurrent acute cholecystitis and an undue delay in the

surgery are usually the main contributing factors for conversion[3]. The conversion rate can be significantly reduced by patience, clear display and identification of the anatomy of Calot's triangle before cutting or applying clips. The dissection should proceed with extreme caution and gentle separation of the adhesion should be done. The surrounding viscera should be identified and gently pushed down to avoid injury. The use of diathermy should be minimal and so be the threshold for conversion[3].

We routinely decompressed the distended gallbladder before proceeding to Calot's triangle to facilitate dissection. Malik A with his Colleagues[3] and Tseng *et al*[19] have also favored this procedure to make surgery safe and easier. Another way of handling such life threatening situations is to perform subtotal cholecystectomy after removal of all the stones to ensure safety of patient's life instead of continuing dissection in the frozen Calot's triangle with totally obscured anatomy[20]. The rate of major complications is not significant in current study so as to preclude the laparoscopic approach in this condition but there should always be a word of caution while operating on such difficult conditions.

There is always a risk of common bile duct (CBD) injury if the operating surgeon is impatient and anatomy of the field is not clearly displayed before clipping and cutting. Undue use of diathermy is also a major factor in causing CBD injury and should be avoided in the area of Calot's triangle. We did not have even a single case of damage to the common bile duct.

Now more and more laparoscopic surgeons are persuaded to perform LC in acute cholecystitis as suggested by Hunter[21] "Get it while its Hot". While in the medical literature, several reports of large case series[22,23], and nonrandomized studies[24,25], have been published, documenting the emergency use of LC for acute cholecystitis. In these studies, LC was proven to be a feasible and safe treatment for acute cholecystitis. Like our series the hospital mortality rate was less than 1% and the bile duct injury rate was also around 1%. Furthermore, the postoperative hospital stay and the length of sick leave required by the patients after LC were also significantly shorter[26]. There was also a lower postoperative complication rate. The overall benefits conferred by the use of LC could lead to a reduced cost of treatment, as a result of a shorter hospital stay, rehabilitation, and sick leave needed by these patients[27]. Apart from a wide variation in the use of LC for acute cholecystitis, the conversion rate of LC also varies considerably depending upon the different factors. Some report the conversion rate of as high as 50% or even greater, some authors report the conversion rates of less than 20%[28].

CONCLUSION

Our study showed that among the acute gallbladder diseases, empyema gallbladder not only prolongs the operative time but also affects the mean hospital stay. Based on our experience we recommend an early laparoscopic gall bladder removal provided expertise & gadgets are available.

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None Declared

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CONTRIBUTORS

RM conceived the idea and planned the study. S, ZUDA, KM, BAK & FK did the data collection and analyzed the study. All the authors contributed significantly to the research that resulted in the submitted manuscript.