

Intra-Operative Difficulties During Laparoscopic Cholecystectomy In Cases Of Empyema Gallbladder

¹Patel Kartavya, ²Ramendranath Talukdar, ³Rahul Kadam, ⁴Abu Nasar,
⁵Kothari Jairaj, ⁶Rudrax Bhatt

¹(Post-graduate, Department of Surgery, SGT Hospital, Gurugram, Haryana, India)

²(Professor, Department of Surgery, SGT Hospital, Gurugram, Haryana, India)

³(Assistant Professor, Department of Surgery, SGT Hospital, Gurugram, Haryana, India)

⁴(Assistant Professor, Department of Surgery, SGT Hospital, Gurugram, Haryana, India)

⁵(Post-graduate, Department of Surgery, SGT Hospital, Gurugram, Haryana, India)

⁶(Post-graduate, Department of Surgery, SGT Hospital, Gurugram, Haryana, India)

Corresponding Author: Dr Kothari Jairaj

ABSTRACT

Objective: To study the clinical profile of Empyema Gall Bladder and to assess the difficulties during laparoscopic cholecystectomy in such cases. This prospective experimental clinical study covers 30 cases of empyema of the gall bladder, which were admitted in the Department of General Surgery at SGT Medical College, Hospital and Research Institute, Budhera, Gurugram, Haryana, India during the period from August 2020 to January 2023. All the Cases were planned for elective laparoscopic cholecystectomy.

Results: In our study of 30 patients ranging from age group of 20 years to 70 years, maximum incidence were between 30-50 years. The male female ratio being 1:2(10 males:20 females). All the cases were attempted laparoscopically out of which 28 (93.33%) were successfully completed while only 2 cases (6.66%) cases were converted to open due to dense adhesions at calot's triangle. Intra-operative difficulties included dense gall bladder adhesion to liver bed in 21 cases (70.00%), difficulty in grasping gall bladder in 18 cases (60%), dense adhesions in 18 cases (60.00%), friable gall bladder wall in 13 cases (43.33%), increased bleeding from liver bed in 9 cases (30.00%), spillage of bile/pus in 6 cases (20.00%), frozen calot's triangle in 2 cases (6.66%), were noted. Data were collected by using proforma and were analysed by using SPSS version 21.

Conclusion: Empyema of the gall bladder is more often encountered in males and the elderly. The clinical picture is indistinguishable from other forms of acute cholecystitis and a preoperative diagnosis is difficult. As there are no specific diagnostic criteria on ultrasound, thickened oedematous wall of gall bladder, impacted calculi at gall bladder neck or cystic duct and pericholecystic adhesions can be considered as diagnostic criteria. An aggressive policy of early broad-spectrum antibiotics introduction and cholecystectomy is the criterion standard of treatment. A higher conversion rate is expected for patients with empyema. However, in our study the conversion rate was 6.66% which is comparable to other studies and it depends on the technical experience of the surgeon and surgical knowhow plays a key role in the overall outcome. We can conclude from our study that laparoscopic cholecystectomy is a safe procedure and pretty much feasible in the hands of experienced surgeons.

Keywords: Empyema, Gall bladder, Laparoscopic Cholecystectomy.

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I. INTRODUCTION

Over the last few decades, laparoscopic cholecystectomy (LC) has become gold standard for symptomatic gallstone disease. It has revolutionized gallbladder surgery and has gained widespread acceptance among medical professionals and general public. The procedure has dramatically changed the acceptance of minimal invasive surgery. Its popularity lies in advantages it has over open procedures, including decreased post-operative analgesic requirement, shorter recovery period and hospital stay, low incidence of post-operative infection and incision hernia, and cosmetic satisfaction.¹ Gallstone disease is one of the most encountered medical problems among adults and gall bladder lithiasis is one of the commonest diagnoses requiring intervention.²

Empyema of the gall bladder received extensive attention in the early twentieth century, but has since been seldom discussed. Until 1982, only one paper in the English medical literature dealt with the subject and described it as the forgotten disease.³ In mucocele, mostly gall bladder is palpable but it can be missed by the

ultrasonologist and identified during cholecystectomy. Rupture of the gall bladder can occur, leading to peritonitis.⁴ Patterns of presentation in empyema of the gall bladder may vary widely with some presenting acutely with features of sepsis, a tender palpable Gallbladder and leucocytosis while in others the course may be quite insidious and chronic due to widespread use of antibiotics or may be the immunosuppressed nature of the patient and may exhibit few signs and symptoms.

So, we conducted a study that find out the difficulties faced by surgeons intra-operatively while performing laparoscopic cholecystectomy in case of Empyema Gallbladder.

II. MATERIAL AND METHODS

This is a prospective experimental clinical study conducted at department of surgery SGT Medical College, Hospital and Research Institute, Budhera, Gurugram, Haryana, India during the period from August 2020 to January 2023.

During the study period, of all the patients who underwent laparoscopic cholecystectomy, total 30 patients who had findings of empyema gall bladder were included in the study who were diagnosed on the basis of clinical, laboratory and ultrasonographic findings.

While patients with history of abdominal surgery, immunocompromised, patients less than 18 years and more than 70 years of age or with co morbidities like cardiac disease, severe asthma, liver disease and renal compromised patients, malignancies and past history of radiotherapy were not considered for laparoscopy.

Laparoscopic cholecystectomy was done using standard four ports. Pus aspiration was done using suction cannula if difficulties like grasping was encountered. In case of gall bladder perforation, spilled stones and pus was retrieved and thorough peritoneal lavage with normal saline was done, tube drain was placed at hepatorenal pouch. Patient's data including demographic data, co morbidities, operative time, peri-operative difficulties, postoperative complications and conversion to open cholecystectomy were recorded. Data were entered, coded and analysed in IBM SPSS Statistics software. Descriptive statistics were produced in the form of percentage, frequency and mean \pm SD.

III. RESULTS

Of all the patients who underwent laparoscopic cholecystectomy during study duration, 30 patients who had findings of empyema gall bladder were included in the study. Age range was 20-70 years with mean age of 51.12 ± 10 years. Out of 30 patients, 10 patients were males, and 20 patients were females makes ratio of 1:2. Common clinical findings were acute right upper abdominal pain in 23 (76.66%) patients, tenderness RHC in 21 (70.00%), Lab investigations revealed leucocytosis in 19 (63.33%) patients with TLC $>10000/\text{cumm}$. positive Murphy's sign in 9 (30.00%), tachycardia in 9 (30.00%), fever in 5 (16.66%), whereas, Co-existing hypertension and diabetes mellitus were present in 3 cases (10.00%) and 2 cases (6.66%) respectively. In 28 (93.33%) patients' laparoscopic cholecystectomy was successfully completed while in 2 cases (6.66%) laparoscopic cholecystectomy was converted to open procedure. Major reason for conversion to open was dense adhesions at calot's triangle anatomy in both the cases.

There are no characteristic features suggestive of empyema gall bladder on Ultrasonography. However, the features such as distended GB with thickened oedematous wall $> 6\text{mm}$ with intraluminal sludge or calculi in 27 cases (90.00 %), impacted calculi in GB neck or cystic duct in 20 cases (66.66%) and some amount of pericholecystic omental adhesions and fluid collections in 9 cases (30%) were present in our study. These are the few findings which were persistent in all our cases which turned out to be Empyema intra-operative and could be considered as diagnostic features.

Mean operating time was 84 min with range of 60-150 mins. Intra-operative difficulties included gall bladder adhesion to liver bed in 21 cases (70.00%), dense adhesions in 18 cases (60.00%), difficulty in grasping gall bladder in 18 cases (60%), friable gall bladder wall in 13 cases (43.33%) increased bleeding from liver bed in 9 cases (30.00%), spillage of bile/pus in 6 cases (20.00%), frozen calot's triangle in 2 cases (6.66%), while bleeding from cystic artery in 1 (3.12%) patient were noted.

Complications occurred in total 9 cases (30.00%) patients, which includes bile spillage in 4 cases (13.33%), spillage of gall stones in 3 cases (10.00%), which were retrieved and thorough peritoneal lavage with normal saline was done and tube drain was placed at hepatorenal pouch. also wound site infection in 2 (6.66%) patients at umbilical port site were seen that was eventually recovered with daily aseptic dressing weighing 3-5 days. However, no common bile duct injuries and bile leak were dealt with in any of our cases out of 30 patients. There was no mortality. Mean hospital stay was 3.56 ± 0.95 days with average of 3-5 days.

Table 1: Clinical and Laboratory Findings in 30 patients of Empyema Gall bladder

Sr.no	CLINICAL & LABORATORY FINDINGS	RESULTS
1	Male: Female ratio	1:2 (10 males and 20 females)
2	Right upper abdominal pain	23 cases (76.66%)
3	Tenderness in Right Hypochondrium	21 cases (70.00%)
4	Leucocytosis	19 cases (63.33%)
5	Positive Murphy's sign	9 cases (30.00%)
6	Tachycardia	9 cases (30.00%)
7	Fever	5 cases (16.66%)
8	Hypertension	3 cases (10.00%)
9	Diabetes Mellitus	2 cases (6.66%)

Table 2: Intra-operative Difficulties

Sr.no	INTRA-OPERATIVE DIFFICULTIES	RESULTS
1	Gall bladder adhesion to liver bed	21 cases (70.00%)
2	Dense adhesions	18 cases (60.00%)
3	Difficulty in grasping gall bladder	18 cases (60.00%)
4	Friable gall bladder wall	13 cases (43.33%)
5	Increased bleeding from liver bed	9 cases (30.00%)
6	Spillage of bile/pus	6 cases (20.00%)
7	Frozen calot's triangle	2 cases (6.66%)

Table 3: Operative details

Sr.no	OPERATIVE DETAILS	NUMBER OF CASES
1	Total cases of empyema gall bladder	30 cases
2	Successful laparoscopic cholecystectomy	28 cases (93.33%)
3	Laparoscopic to Open conversion cholecystectomy	2 cases (6.66%)
4	Mean operating time	84 minutes

Table 4: Complication

Sr.no	Complication	Number of cases
1.	Bile spillage	4 cases (13.33%)
2.	Spillage of gallstones	3cases (10.00%)
2.	SSI	2 cases (6.66%)
3.	CBD injury	Nil
4.	Bile leak	Nil

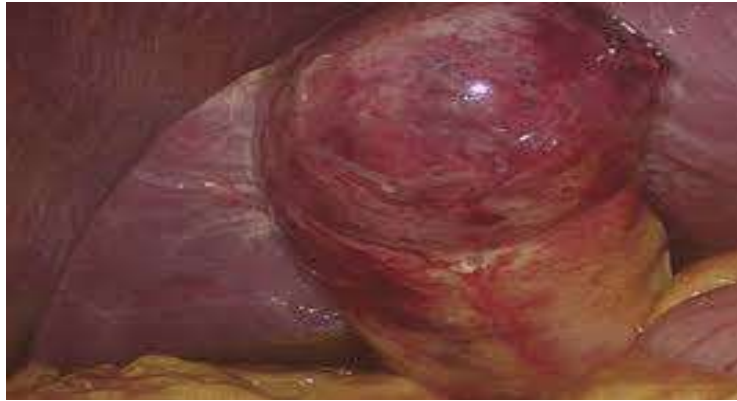


Figure 1: Tense Gallbladder



Figure 2: Acutely inflamed Gall Bladder with adhesions



Figure 3: Post-operatively Resected Gall Bladder with Pus

IV. DISCUSSION

Since the time of the Egyptians gall bladder disease has been a major cause of concern worldwide. Empyema comes from the Greek word 'Empyein' meaning producing (suppuration). Empyema of Gall Bladder is a severe form of acute Cholecystitis may it be calculous or acalculous. Acute cholecystitis in the presence of bacteria-containing bile may progress to suppurative infection in which the gallbladder fills with purulent material, a condition referred to as empyema of the gallbladder.

Empyema of gallbladder is a deadly complication of cholelithiasis. It usually has signs and symptoms of acute cholecystitis. Clinical findings of fever, tachycardia, and tenderness are usually present, but in our cases these were absent. It usually presents at 51.12 years of age. Which was similar in our study ranging from 20-70 years with mean age of 48.25 ± 10 years. The Triangle of Calot's is usually distorted and expertise should be available to operate these cases.⁵

Although LC has proven to be a safe and feasible option for empyema gallbladder, still many surgeons are reluctant to treat these cases laparoscopically and its role is still under evaluation. Patient with empyema require urgent intervention in the form of cholecystectomy or percutaneous drainage. It depends upon the

severity of disease and time of presentation. Usually, patients with empyema who presented early without gangrenous changes or perforation can be safely intervened with LC.⁶

Performing emergency cholecystectomy on an inflamed and oedematous gallbladder with surrounding tissue oedema and adhesion is generally known to be fraught with danger of bleeding and iatrogenic injuries to structures in the triangle of Calot given the regularity and notoriety of the anatomical anomalies and variations of the extrahepatic ducts and vessels.⁷

A significantly high and wide range of conversion rates (12.5 to 83%) was reported for empyema patients.⁸⁻¹⁰ Cox et al¹¹ reported a conversion rate of 83% suggested that empyema once diagnosed should be converted without much ado. However Elder et al¹⁰ reported a much more encouraging conversion rate of around 12.5 % while Malik et al¹² reported a 19.4% conversion rate. While in our study conversion rate was noted to be around 6.66% which is significantly low compared to other studies.

Throtonetal had recorded raised Total WBC count in 90 % cases¹³ and LFT abnormalities though none of the LFT findings were specific. Such results were even detected by Chow WC et al in 51% cases. We in our study found raised Total WBC count i.e> 10000 cells/cumm in 19 (63.66%) patients. In our study, we used ultrasonography findings along with clinical judgement and laboratory values to close in on our preoperative diagnosis. Though no specific USG feature is diagnostic of Empyema GB, the features such as distended GB with thickened oedematous wall > 6mm with intraluminal sludge or calculi (90%), impacted calculi in GB neck or cystic duct (66.66%) and some amount of pericholecystic omental adhesions and fluid collections (30%) are definitely suggestive.

In case of thickened wall, the gallbladder was punctured, and the suction cannula directly introduced into gall bladder to aspirate pus as was proposed by Tseng et al¹⁴. At times the suction cannula was also used to dissect the dense adhesions in the area of Calot's triangle using continuous pressurized irrigation technique. Injury to any of the adjacent structures can be prevented by proper visualization. The use of diathermy must be very judicious and limited.

DrPrakash et al in their study done in 69 patients of empyema gall bladder shows "the overall rate of postoperative complications was 28.9% which ranges from minor port wound infection to bile leak and abdominal collection. There was no mortality in our series. Thus, our study did not present us with any such life-threatening complication which would dissuade the laparoscopic approach towards Empyema GB, though Surgeons should always keep in mind the possibilities while approaching such cases".¹⁵ while in our study also showed similar results of overall complications, which were seen in 9 cases (30.00%) that includes bile spillage, spillage of gallstones and surgical site infection (umbilical port site).

If empyema of the gallbladder is treated promptly, the outcomes are good. However, individuals with advanced age, those who are immunocompromised or have diabetes, usually tend to have worse outcomes compared to healthy people.

With advancement in technology and growing experience of passionate surgeons, number of Laparoscopic cholecystectomies being carried out successfully in case of empyematous cholecystitis are increasing in number which were considered contraindicated by pioneers of Laparoscopic cholecystectomy because of their threatening peri-operative complications, surgical technical difficulties and higher conversion rates. In literature many case series; non randomized trials have documented the safety and feasibility of LC.

V. CONCLUSION

Empyema of the gall bladder is more often encountered in males and the elderly. The clinical picture is indistinguishable from other forms of acute cholecystitis and a preoperative diagnosis is difficult. As there are no specific diagnostic criteria on ultrasound, thickened oedematous wall of gall bladder, impacted calculi at gall bladder neck or cystic duct and pericholecystic adhesions can be considered as diagnostic criteria.

An introduction of broad spectrum antibiotics and cholecystectomy is the criterion standard of treatment. A higher conversion rate is expected for patients with empyema. However, in our study the conversion rate was 6.66% which is comparable to other studies and it depends on the technical experience of the surgeon and surgical knowhow plays a key role in the overall outcome. We can conclude from our study that laparoscopic cholecystectomy is a safe procedure and pretty much feasible in the hands of experienced surgeons.

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