

STUDY OF GALLBLADDER PERFORATION DURING LAPAROSCOPIC CHOLECYSTECTOMY AT A TERTIARY HOSPITAL

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Abstract

Background: Laparoscopic cholecystectomy has led to the emergence of different problems such as intraoperative iatrogenic gall bladder perforation (IGBP) with the spillage of bile & stones, a higher incidence of biliary tract injuries and port site problems. Present study was aimed to review the factors leading to GB perforation and clinical outcomes associated with it. **Materials and Methods:** Present study was prospective, observational study, conducted patients > 18 years age, either gender, undergoing laparoscopic cholecystectomy for cholelithiasis, operated at our institute. The patients were classified into two groups based on the presence of GP at the time of the operation (Perforation or No perforation groups). **Result:** During study period incidence of gallbladder perforation during laparoscopic cholecystectomy was 7.74 %). Experience of the surgeon, degree of difficulty, duration of post-operative ileus, incidence port site infections were comparable among perforation & non-perforation group & difference was not significant statistically. Variables such as duration of surgery, drain use, duration of post-operative pain, duration of hospital stay were more in perforation group as compared to non-perforation group & difference was statistically significant. **Conclusion:** The early postoperative outcomes such as duration of surgery, drain use, duration of post-operative pain, duration of hospital stay were more common in perforation group.

INTRODUCTION

Laparoscopic cholecystectomy is now the method of choice to treat symptomatic gallstones. Laparoscopic cholecystectomy has significant advantages such as less postoperative pain compared to open surgery, shorter recovery time and shorter hospital stay, better cosmetic results, and has fewer postoperative infective complications compared with open surgery due to the use of smaller incision and presence of less tissue damage.^[1,2]

Laparoscopic cholecystectomy has led to the emergence of different problems such as a higher incidence of biliary tract injuries, intraoperative iatrogenic gall bladder perforation (IGBP) with the spillage of bile & stones and port site problems.^[3,4] Gallstones can be spilled during an open cholecystectomy, but these stones are eliminated usually through direct removal, copious irrigation and mopping with laparotomy sponges. In laparoscopic procedures, these techniques are more

difficult or unavailable and so stones can disappear from view and can become "lost".

The gallstone left in the peritoneal cavity acts as the source of infection, while the bile spillage may lead to chemical peritonitis and may cause localized or systemic infection, inflammation, fibrosis, adhesion, small bowel obstruction, septicemia, and intra-abdominal abscess.^[5] Present study was aimed to review the factors leading to GB perforation and clinical outcomes associated with it.

MATERIALS AND METHODS

Present study was prospective, observational study, conducted in department of general surgery, at Raichur Institute of Medical Sciences, Raichur, India. Study duration was of 2 years 9 months (July 2019 and March 2022). Study was approved by institutional ethical committee.

All patients > 18 years age, either gender, undergoing laparoscopic cholecystectomy for cholelithiasis,

operated at our institute were considered for present study. We excluded patients required conversion to open surgery, immunocompromised patients, patients on immunosuppressive therapy, those having preoperative fever and associated choledocholithiasis.

All patients of cholelithiasis were primarily examined in the outpatient department and admitted in surgery ward. Patient's demographic details, detailed clinical history (onset of pain, duration, progression, associated fever, vomiting and jaundice), family history, personal history, drug intake, previous surgical history etc. were obtained. All patients underwent physical examination, laboratory/radiological investigations. Fitness obtained for laparoscopic cholecystectomy.

The patients were classified into two groups based on the presence of GP at the time of the operation (Perforation or No perforation groups).

Intra-operative degree of difficulty was calculated according to Cuschieri's scale,^[6]

Grade	Description
1	Easy cholecystectomy without any further problems.
2	Presence of light pericholecystitis or adhesions or fatty tissue masking the cystic pedicle or mucocele
3	Severely difficult cholecystectomies in patients with gangrenous cholecystitis; shrunken fibrotic gallbladder; intense pericholecystitis; subhepatic abscesses; or advanced hepatic diseases, such as cirrhosis or portal hypertension
4	Requires conversion to open surgery

The timing of perforation was noted as follows

- during traction of the gallbladder,
- during the dissection of adhesions and bands,
- during the dissection of Callot's triangle prior to cystic duct clipping,
- during the further dissection of Callot's triangle after cystic duct clipping,
- during the dissection of the gallbladder from the hepatic fossa,

- during the extraction of the gallbladder from the abdominal cavity.

In case of gallbladder perforation during laparoscopic cholecystectomy, the management was aspiration of free bile, irrigation of soiled areas with normal saline until clear, and spilled stones were retrieved whenever possible. These patients continued to receive intravenous and peroral antibiotics for 1 week in most instances. The placement of a drain and conversion to open surgery were decided by the operating surgeon.

Variables studied were presence/absence of previous laparotomy, previous gallbladder or gastroduodenal region surgeries, experience level of surgeon, degree of difficulty operation time; the presence or omission of drain placement; hospitalization period; complications; and re-hospitalization and its causes if any.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi-square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

RESULTS

During study period 168 laparoscopic surgeries were conducted satisfying study criteria. Gallbladder perforation during laparoscopic cholecystectomy was noted in 13 cases (7.74 %). Age (years), Gender, Body mass index (kg/m²), history of Previous hospitalization (for Acute cholecystitis, Biliary pancreatitis & Cholangitis) & USG findings were comparable among perforation & non-perforation group & difference was not significant statistically.

Table 1: General parameters.

Parameter	Perforation Group (n=13)	Non-perforation Group (n=155)	P value
Age (years)	48.9 ± 9.2	47.8 ± 10.8	0.89
Gender			0.43
Females	10 (76.92 %)	112 (72.26 %)	
Males	3 (23.08 %)	41 (26.45 %)	
Body mass index (kg/m ²)	26.5 ± 4.4	26.6 ± 4.5	0.53
History of Previous hospitalization for			0.62
Acute cholecystitis	3 (23.08 %)	32 (20.65 %)	
Biliary pancreatitis	2 (15.38 %)	21 (13.55 %)	
Cholangitis	1 (7.69 %)	6 (3.87 %)	
USG findings			0.58
Stone	10 (76.92 %)	146 (94.19 %)	
Polyp	2 (15.38 %)	6 (3.87 %)	
Sludge	1 (7.69 %)	2 (1.29 %)	
Residue gallbladder	0	1 (0.65 %)	
Stone size			0.62
>1 cm	8 (61.54 %)	113 (72.9 %)	
< 1cm	5 (38.46 %)	42 (27.1 %)	
Number of stones			0.69
Single	8 (61.54 %)	101 (65.16 %)	
Multiple	5 (38.46 %)	54 (34.84 %)	

In present study, experience of the surgeon, degree of difficulty, duration of post-operative ileus & port site infections were comparable among perforation & non-perforation group & difference was not significant statistically. Variables such as duration of surgery, drain use, duration of post-operative pain, duration of hospital stay were more in perforation group as compared to non-perforation group & difference was statistically significant.

Table 2: Operative & post-operative variables

Variables	Perforation Group	Non-perforation Group	P value
Experience of the Surgeon			0.94
Faculty	8 (61.54 %)	95 (61.29 %)	
Resident	5 (38.46 %)	60 (38.71 %)	
Degree of difficulty			0.65
I	7 (53.85 %)	84 (54.19 %)	
II	4 (30.77 %)	42 (27.1 %)	
III	2 (15.38 %)	29 (18.71 %)	
Other			
Duration of surgery (minutes)	92.76 ± 21.97	62.36 ± 14.94	0.001*
Drain use	9 (69.23 %)	39 (25.16 %)	0.001*
Duration of post-operative pain (days) (> 4 VAS)	6.18 ± 3.6	1.8 ± 0.5	0.001*
Duration of post-operative ileus (days)	1.4 ± 0.5	1.0 ± 0.4	0.51
Duration of hospital stay (day)	1.8 ± 0.7	1.2 ± 0.4	0.021*
Port site infection	1 (7.69 %)	6 (3.87 %)	0.065

DISCUSSION

Perforation of the gall bladder occurs frequently during laparoscopic cholecystectomy, while stone spillage is less frequent and the true incidence of unretrieved stones is difficult to determine. The incidence of complications related to spillage of gallstones during laparoscopic cholecystectomy as per international data ranges between 2.3 and 7 %. This incidence increases by greater than two-fold when the stones are unretrieved.^[7]

It has been advocated that male sex, a history of acute cholecystitis or previous laparotomies, the use of a laser, an inflamed or non-visualized gallbladder, and a difficult operation increase the risk of GP.^[8]

In study by Kundan et al,^[9] only 16 (5.17%) patients had gallbladder perforation. The perforation was more common during dissection from liver bed. The mean duration of surgery in perforated cases were 65 mins in patients without perforation. Mean duration of stay in hospital was 56 hrs in patients with perforation while it was 22 hrs. in patients without perforation

Kumar Pankaj et al,^[10] noted that out of 59 patients of spillage group 57(96.6%) has spillage of bile alone or with gallstones and 2 (3.4%) had no spillage of bile. 42 patients (71.2%) had spillage of stones either alone or with bile and 17 (28.8%) had no spillage of stones. 40 (67.8%) patients had spillage of both bile and gall stones. We also observed that 17 patients (28.8%) have spillage of bile only, 2(3.4%) had spillage of stones only while 40 (67.8%) had spillage of both bile and gall stones.

Yunus EA et al,^[10] observed 664 patients [524 (78.9%) females, 49.7±13.4 years of age] and GP occurred in 240 (36.1%) patients, mostly while dissecting the gallbladder from its bed (n=197, 82.1%). GP was not recorded in the operation notes in 177 (73.8%) cases. There was no significant risk factor for GP, except preoperatively elevated alanine

transaminase level (p=0.005), but the sensitivity and specificity of this measure in predicting GP were 14.2% and 7.4%, respectively. The two groups had similar outcomes, but the operation time (35.4±17.5 vs 41.4±18.7 min, p=0.000) and incidence of drain use (25% vs 45.8%, p=0.000) increased in the GP group. Similar findings were noted in present study. Zulfikar K et al,^[11] studied 114 patients (19.8%) who had iatrogenic perforation of gallbladder. No statistically significant difference was found in wound infection and surgical site infection, single dose antibiotic use is sufficient to prevent infectious complications in patients who had iatrogenic perforation of the gallbladder during LC. Adding intravenous and/or oral antibiotics does not contribute to prevention of infective complications in these patients.

Once spillage occur, clear documentation and a high index of suspicion for complications should be maintained for early recognition and treatment of complications from this surgery. Once spillage of stone occurs then every attempt should be made to retrieve all the spilled stones laparoscopically and by performing thorough peritoneal wash with aspiration. Intense irrigation and suction should be performed after collecting the visible stones in order to minimize the number of lost gallstones. This should be done carefully without spreading the gallstones into difficult accessible sites. Stone collection might be facilitated by the use of an intraabdominal bag and a laparoscopic grasper, a 10mm suction device, or a "shuttle" stone collector.^[12]

The best way to avoid complications from lost gallstones is to have awareness of the situations where perforation is likely, perform precise dissection, meticulously handle tissue and use devices such as endobags to retrieve dissected gallbladders through the port sites.

CONCLUSION

Gallbladder perforation (GP) in patients undergoing laparoscopic cholecystectomy is unpredictable in majority of cases, because there are less risk factors that increase the risk of GP. The early postoperative outcomes such as duration of surgery, drain use, duration of post-operative pain, duration of hospital stay were more in perforation group as compared to non-perforation group.

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