e-ISSN: 0976-822X, p-ISSN:2861-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2023; 15(3); 133-139

Original Research Article

# A Hospital Based Comparative Assessment of Laparoscopic Cholecystectomy with Spillage versus Without Spillage of Gall Bladder Contents

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**Received: 11-01-2023/ Revised: 19-02-2023 / Accepted: 22-03-2023**
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**Conflict of interest: Nil**

**Abstract**

**Aim:** This study was conducted to assess and compare Right shoulder Tip Pain after laparoscopic cholecystectomy with spillage versus without spillage of gall bladder contents patients, diagnosed, admitted and operated.

**Methods:** The present Study conducted at department of General Surgery, JLNMCH, Bhagalpur, Bihar, India and all the patients undergoing laparoscopic cholecystectomy at the dept. of general surgery in JLNMCH, Bhagalpur, Bihar were included. The time period of the study was 12 months. The 100 consecutive patients were selected from indoor patients admitted with cholecystitis with or without gall bladder stone and undergone laparoscopic cholecystectomy during the study period.

**Results:** There was no significant difference in the demographic data between both groups. There was no significant difference in HR mean value between both groups throughout the perioperative period. There was no significant difference in MAP between both groups throughout the perioperative period. The NRS mean value in group 2 was 1.16±0.72, 2.06±1.54, 4.86±2.08, 0.91±1.41, 1.52±1.73, and 1.78±1.59 at time 0, 2, 6, 12, 18, and 24 h, respectively. There was significant increase in NRS at 6 h postoperatively compared with preoperative mean value (p=0.001). In group 1, NRS mean value was 0.78±0.72, 1.45±1.25, 1.55±1.25, 4.46±2.18, 1.29±1.60, and 1.50±1.25 at preoperative, 2, 6, 12, 18, and 24 h, respectively. There was significant increase in NRS at 6 h and 12 h compared with preoperative mean value (p=0.001).

**Conclusion:** We showed that mean Right Shoulder Pain was significantly lower in without Spillage group compared to with Spillage group.

**Keywords:** Bile spillage, Laparoscopic cholecystectomy, Right shoulder tip pain.



## Introduction

Laparoscopic cholecystectomy has become the "gold standard" for the surgical management of symptomatic cholelithiasis, and has replaced traditional open cholecystectomy. Although laparoscopic cholecystectomy is associated with a slightly higher incidence of iatrogenic injury to the biliary tract compared to open techniques, overall complication rates appear to be similar for the two procedures. We and others have noted that iatrogenic perforation of the gallbladder occurs more frequently during laparoscopic cholecystectomy, leading to

intraperitoneal spillage of bile and gallstones. [1,2]

Although some authors initially suggested that intraoperative perforation of the gallbladder should prompt conversion to an open procedure, [3] the current practice at most institutions is to retrieve as many stones as possible and to irrigate the peritoneal cavity to evacuate the spilled bile. Although spillage of gallbladder contents is thought to be relatively innocuous, the long-term consequences of intraperitoneal spillage of bile and gallstones are undefined. Results of experimental studies in animals have been contradictory. Several studies showed a minimal fibrotic reaction to intraperitoneal stones, [2,4,5] whereas others demonstrated abscess formation. [6]

Gallbladder perforation generally occurs as a result of intraoperative retraction, dissection and extraction of gallbladder especially when gallbladder is acutely inflamed and fragile and there is peri-gallbladder omental adhesions. [7] With the increase in the number of laparoscopic operations performed, there has also been a noticeable increase in the number of complications specific to these procedures. Various short term and long term complications occurs with spillage of bile in peritoneal cavity. [8] Nowadays, laparoscopic cholecystectomy (LC) is one of the most common operations in general surgical units and is one of the most frequently performed laparoscopic procedures. [9] Symptomatic gallstone disease is the commonest indication for LC, and nearly 90% of cholecystectomies are nowadays performed laparoscopically. [10]

Bile spillage (BS) occurs frequently during laparoscopic cholecystectomy, yet its impact on postoperative outcomes remains unknown. Some authors had previously suggested that BS is not as innocuous as surgeons tend to believe and in fact might be associated with postoperative surgical site infections (SSI). [11-14]

Gall bladder contents can be spilled during both in open and laparoscopic cholecystectomy, but these contents are eliminated usually through direct removal, copious irrigation and mopping in open operations. Right shoulder tip pain is a common short term complaint. This study was conducted to assess and compare Right shoulder Tip Pain after laparoscopic cholecystectomy with spillage versus without spillage of gall bladder contents patients, diagnosed, admitted and operated. [15-17]

## Materials and Methods

The present Study conducted at General Surgery, JLNMCH, Bhagalpur, Bihar, India and all the patients undergoing laparoscopic cholecystectomy at the dept. of general surgery in JLNMCH, Bhagalpur, Bihar were included. The time period of the study was 12 months. The 100 consecutive patients were selected from indoor patients admitted with cholecystitis with or without gall bladder stone and undergone laparoscopic cholecystectomy during the study period.

### Inclusion criteria

The patients between age group of 15 years to 80 years admitted under dept. of general surgery diagnosed to have gall stone diseases clinically and on radiological basis [on ultrasonography (USG) and/or CT scan] and undergone for laparoscopic cholecystectomy giving their consent were included in the study.

### Exclusion criteria

Patients older than 15 and younger than 80 years, patient with open cholecystectomy, any other concurrent hepatic disorder like malignancy, cirrhosis, common bile duct stone etc. patient not giving consent to participate in study, previous biliary tract surgery and or obstructive jaundice and pancreatitis, patients with immune compromised conditions and patients not giving consent for study were excluded from the study.

## Ethical considerations

The current study was conducted according to the ethical guidelines laid down by the declaration of Helsinki for biomedical research involving human subjects.

All the cases of laparoscopic cholecystectomy, coming under inclusion criteria is included in this study. Then 100 patients were randomised into 2 groups. Group 1 (50 patients) had episode of bile spillage and group 2 (Control group) who does not had any bile spillage bladder during laparoscopic cholecystectomy. Surgery was done using CO2 pneumoperitoneum with 10-12 mm Hg pressure and using standard two 10 mm and two 5 mm ports. The timing was be noted from the first port site incision till the last ports closure. Post-operative right shoulder tip pain were recorded after till 24 hours of surgery and studied in terms of pain score (according to numerical rating scale) and post-operative analgesic requirement and they received standard postoperative care and follow up such as IV fluid, parenteral analgesics (NSAIDS or COX 2 inhibitors) or injection paracetamol inj. PPI for 24 hours and parenteral antibiotic up to discharge from hospital.[15-17]

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5.

## Results

**Table 1: Patients characteristics in the studied groups**

| Variables | Range | Mean±SD | T test | P value |
|---|---|---|---|---|
| **Age in years** | | | | |
| Group 1 | 22-60 | 37.5±10.5 | 0.420 | 0.640 |
| Group 2 | 22-58 | 36.4±9.01 | | |
| **Weight (kg)** | | | | |
| Group 1 | 60-98 | 75.5±10.19 | 1.150 | 0.240 |
| Group 2 | 65-105 | 78.82±9.72 | | |
| **Duration (min)** | | | | |
| Group 1 | 65-115 | 93.7±12.59 | 0.815 | 0.875 |
| Group 2 | 60-110 | 94.86±13.57 | | |

There was no significant difference between the demographic data including age and weight.

**Table 2: Comparison of heart rate changes in the studied groups (beats/min)**

| Variables | Range | Mean±SD | T test | P value |
|---|---|---|---|---|
| **HR (baseline)** | | | | |
| Group 1 | 67-90 | 81.45±6.70 | 1.335 | 0.245 |
| Group 2 | 65-91 | 76.04±7.64 | | |
| **HR (5 min)** | | | | |
| Group 1 | 67-93 | 81.49±7.30 | 0.189 | 0.645 |
| Group 2 | 70-90 | 80.50±6.90 | | |
| **HR (30 min)** | | | | |
| Group 1 | 70-89 | 80.45±5.75 | 2.035 | 0.155 |
| Group 2 | 67-89 | 76.74±6.74 | | |
| **HR (60 min)** | | | | |
| Group 1 | 67-90 | 81.29±6.70 | 3.430 | 0.06 |
| Group 2 | 65-90 | 77.53±7.13 | | |
| **HR (90 min)** | | | | |

| | | | | |
|---|---|---|---|---|
| Group 1 | 65-90 | 80.95±6.74 | 1.970 | 0.170 |
| Group 2 | 65-90 | 78.02±7.25 | | |
| **HR (120 min)** | | | | |
| Group 1 | 67-92 | 81.69±6.34 | 3.568 | 0.050 |
| Group 2 | 67-91 | 77.65±7.46 | | |

There was no significant difference in HR mean value between both groups throughout the perioperative period.

**Table 3: Comparison of mean arterial blood pressure changes in the studied groups (mmHg)**

| Variables | Range | Mean±SD | T test | P value |
|---|---|---|---|---|
| **MAP (baseline)** | | | | |
| Group 1 | 79-100 | 88.60±5.85 | 0.675 | 0.412 |
| Group 2 | 73-105 | 90.55±8.12 | | |
| **MAP (5 min)** | | | | |
| Group 1 | 67-102 | 86.95±6.94 | 0.080 | 0.750 |
| Group 2 | 67-105 | 86.24±9.80 | | |
| **MAP (30 min)** | | | | |
| Group 1 | 75-96 | 86.54±5.03 | 0.070 | 0.756 |
| Group 2 | 74-99 | 87.03±7.53 | | |
| **MAP (60 min)** | | | | |
| Group 1 | 78-97 | 86.94±5.25 | 0.052 | 0.820 |
| Group 2 | 76-98 | 87.36±5.85 | | |
| **MAP (90 min)** | | | | |
| Group 1 | 79-97 | 87.03±4.76 | 0.190 | 0.650 |
| Group 2 | 75-104 | 87.83±7.23 | | |
| **MAP (120 min)** | | | | |
| Group 1 | 66-95 | 86.04±5.85 | 1.215 | 0.260 |
| Group 2 | 72-106 | 88.12±6.94 | | |

There was no significant difference in MAP between both groups throughout the perioperative period.

**Table 4: Numerical rating scale in the studied groups**

| Variables | Range | Mean±SD | T test | P value |
|---|---|---|---|---|
| **NRS (T0)** | | | | |
| Group 1 | 0-2 | 0.78±0.72 | 1.620 | 0.210 |
| Group 2 | 0-4 | 1.16±0.72 | | |
| **NRS (2 h)** | | | | |
| Group 1 | 0-4 | 1.45±1.25 | 2.229 | 0.136 |
| Group 2 | 0-6 | 2.06±1.54 | | |
| **NRS (6 h)** | | | | |
| Group 1 | 0-6 | 1.55±1.25 | 46.620 | 0.001 |
| Group 2 | 0-7 | 4.86±2.08 | | |
| **NRS (12 h)** | | | | |
| Group 1 | 0-7 | 4.46±2.18 | 44.720 | 0.001 |
| Group 2 | 0-5 | 0.91±1.41 | | |
| **NRS (18 h)** | | | | |

| | | | | |
|---|---|---|---|---|
| Group 1 | 0-6 | 1.29±1.60 | 0.218 | 0.640 |
| Group 2 | 0-5 | 1.52±1.73 | | |
| **NRS (24 h)** | | | | |
| Group 1 | 0-4 | 1.50±1.25 | 0.459 | 0.210 |
| Group 2 | 0-5 | 1.78±1.59 | | |

The NRS mean value in group 2 was 1.16±0.72, 2.06±1.54, 4.86±2.08, 0.91±1.41, 1.52±1.73, and 1.78±1.59 at time 0, 2, 6, 12, 18, and 24 h, respectively. There was significant increase in NRS at 6 h postoperatively compared with preoperative mean value (p=0.001). In group 1, NRS mean value was 0.78±0.72, 1.45±1.25, 1.55±1.25, 4.46±2.18, 1.29±1.60, and 1.50±1.25 at preoperative, 2, 6, 12, 18, and 24 h, respectively. There was significant increase in NRS at 6 h and 12 h compared with preoperative mean value (p=0.001).

## Discussion

Most common disease of gall bladder and biliary tree is cholelithiasis. Gall bladder concentrates bile. This increase in solute concentration combined with stasis in the gall bladder between meals predisposes to stone formation. Gallstones are present in about 10% to 15% of the adult population and 3-6% of adult Indian population. [18] Between 1% and 4% become symptomatic in a year requiring cholecystectomy, making cholecystectomy one of the most common operations performed by general surgeons. The term chronic cholecystitis refers to an on-going or recurrent inflammatory process involving the gall bladder. In majority of patients (>90%), gall stones are the causative factor and lead to recurrent episodes of cystic duct obstruction manifesting as biliary pain or colic. [19]

There had been a few studies looking into the impact of spilled bile or gallstones on postoperative outcomes after laparoscopic cholecystectomy. [20-22] Sarli and colleagues examined 1,127 patients who underwent laparoscopic cholecystectomy for cholelithiasis. [11] They reported that bile was spilled in only 11.6% of them and found no difference in postoperative complication rates between patients with and without BS. They concluded that adequate prophylactic antibiotic therapy and generous peritoneal irrigation might be sufficient to eliminate the potential risk of postoperative infections. One needs to notice that a retrospective review of medical records almost certainly underappreciates the rate of BS and could potentially bias the conclusions since a lot of patients with BS may be examined in the group without BS, simply because the spillage was not reflected in the operative report. Another more recent study by Jain and colleagues studied 113 patients out of whom 18 had BS. [23]

Parajuli et al found that iatrogenic gallbladder perforation with bile spillage (BS) during laparoscopic cholecystectomy (LC) occurs frequently but its impact to the patient can range from port site surgical site infection (SSI), bowel obstruction, intraperitoneal abscess to none. [24] Pankaj et al found that biliary tract disorders are one of the commonest abdominal conditions that the surgeons, gastroenterologists and radiologists come across. They excluded immunecom promised patients, patients on immunosuppressive therapy, those having preoperative fever and associated choledocholithiasis. [25]

Ray et al found that gallbladder perforation and stone spillage is a common intraoperative problem during laparoscopic cholecystectomy. The incidence of lost or unretrieved stones is approximately 2%, and very few patients may develop complication. Most common complication of dropped or spilled gallstones is abscess, particularly around the abdominal wall

port sites and in the perihepatic space. [26] Kimura et al found that gallbladder perforation often occurs during laparoscopic cholecystectomy. They also evaluated intraperitoneal contamination by bacteria and gallstones at the time of gallbladder perforation and investigated whether perforation caused early or late postoperative complications. There was no difference in the incidence of postoperative complications between the patients with and without perforation either in the early postoperative period or during follow-up for 24-42 months. [27,28]

## Conclusion

We showed that mean Right Shoulder Pain was significantly lower in without Spillage group compared to with Spillage group.

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