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Original Research Article

Post operative effect of bile spillage in laparoscopic cholecystectomy

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ABSTRACT

Background: Most common disease of gall bladder and biliary tree is cholelithiasis. Laparoscopic cholecystectomy is now gold standard treatment. 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. Aims and objectives were to study right shoulder tip pain, its duration and severity in post-operative period of patients having spillage versus non spillage of gall bladder contents.
Method: It is a hospital based prospective comparative study was conducted in KPC medical college and hospital, Jadavpur, Kolkata. Time frame was April 2021- July 2022. Sample size was 100.
Result: Our study showed that, less number of patients had right shoulder tip pain (in numerical rating scale) and requirement of rescue analgesia in case compared to control group.
Conclusions: Right shoulder-tip pain, which may occur post-laparoscopic cholecystectomy, is variable in duration, severity and character and is more in spillage group.

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

INTRODUCTION

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.[1] 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.[2] For symptomatic cholelithiasis Laparoscopic cholecystectomy is now gold standard treatment.[3] 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.[4] 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.[5]

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.[6] Symptomatic gallstone disease is the commonest indication for LC, and nearly 90% of cholecystectomies are nowadays performed laparoscopically.[7]

Minor complications (biliary and non-biliary) are usually treated conservatively. Major complications (biliary and vascular) are life threatening and increase mortality rate, therefore creating the need for conversion to open surgical approach in order to treat them. The frequency of complications associated with laparoscopic cholecystectomy varies from 0.5 to 6%.[8,9] The most serious complications are associated with high mortality rate: injury of common bile duct with an incidence of 0.1-0.6%, injuries of large blood vessels 0.04-1.22% depending on the study.[10,11] The most common complication is iatrogenic perforation of the gallbladder with spilt gallstones with an incidence of 10-30%.

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 is 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

Place of study

Study conducted at KPC medical college and hospital, Jadavpur, Kolkata

Study population

All the patients undergoing laparoscopic cholecystectomy at the dept. of general surgery in KPC medical college and hospital, Jadavpur, Kolkata.

Period of study

Study carried out from January 2021 to June 2022.

Inclusion criteria

The patients between age group of 15 years to 80 years admitted under dept. of general surgery KPCMCH, Kolkata from January 2021 to June 2022 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.

Study design

It is an institution based observational study.

Sample size

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.

Statistical analysis plan

Statistical analysis was carried out according to standard statistical analytical protocols.

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 CO_2 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.[12-14]

RESULTS

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.

A total of 100 patients were randomly allocated into two equal 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. Patients with failed technique (dropped out) owing to technical problems (4 in group 1 and 2 in group 2) did not complete the study. Therefore, 46 patients in group 1 and 48 patients in group 2 were included.

There was no significant difference between the demographic data including age and weight (Table 1).

Table 1: Patients characteristics in the studied groups.

Variables	Range	Mean±SD	T test	P value
Age (years)				
Group 1	22-62	38.7±10.9	0.478	0.634
Group 2	22-55	37.4±9.06		
Weight (kg)				
Group 1	60-99	76.4±11.19	1.160	0.252
Group 2	65-100	79.84±9.72		
Duration (min)				
Group 1	65-120	94.8±12.69	0.854	0.841
Group 2	60-119	95.83±13.62		

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, (Tables 2 and 3).

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	80.44±6.91	1.365	0.248
Group 2	65-91	78.04±7.60		
HR (5 min)				
Group 1	67-93	81.40±7.30	0.192	0.663
Group 2	70-90	80.52±6.90		
HR (30 min)				
Group 1	70-89	80.39±5.71	2.028	0.161
Group 2	67-89	77.79±6.74		
HR (60 min)				
Group 1	67-90	81.26±6.70	3.451	0.07
Group 2	65-90	77.50±7.16		
HR (90 min)				
Group 1	65-90	80.96±6.71	1.984	0.166
Group 2	65-90	78.08±7.25		
HR (120 min)				
Group 1	67-92	81.61±6.31	3.888	0.055
Group 2	67-91	77.63±7.46		

The NRS mean value in group 2 was 1.17±1.27, 2.09±1.59, 4.87±2.01, 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 VAS at 6 h postoperatively compared with preoperative mean value (p=0.001). In group 1, NRS mean value was 0.79±0.72, 1.46±1.28, 1.58±1.21, 4.50±2.17, 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 12 h compared with preoperative mean value (p=0.001), (Table 4).

There was significant increase in group 2 regarding the amount of rescue analgesia of diclofenac needed (p=0.001). Total diclofenac consumption in group 2 was 90 mg, with a mean value of 3.91±1.41 mg, whereas in group 1, it was 57 mg, with a mean value of 2.38±1.53 mg. A significantly higher number of patients in group 2 required rescue analgesia, with 46 (100%) patients, compared with only 12 (25%) patients in group 1 (p=0.001) (Table 5).

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	79-101	88.88±5.87	0.698	0.408
Group 2	73-110	90.56±8.17		
MAP (5 min)				
Group 1	67-103	86.96±6.97	0.080	0.779
Group 2	67-106	86.28±9.80		
MAP (30 min)				
Group 1	75-96	86.57±5.03	0.076	0.785
Group 2	74-99	87.08±7.58		
MAP (60 min)				
Group 1	78-97	86.96±5.22	0.054	0.817
Group 2	76-98	87.33±5.86		
MAP (90 min)				
Group 1	79-97	87.04±4.74	0.194	0.662
Group 2	75-104	87.83±7.23		
MAP (120 min)				
Group 1	66-95	86.09±5.87	1.230	0.273
Group 2	72-106	88.17±6.92		

Table 4: Numerical rating scale in the studied groups.

Variables	Range	Mean±SD	T test	P value
NRS (T0)				
Group 1	0-2	0.79±0.72	1.634	0.208
Group 2	0-4	1.17±0.72		
NRS (2 h)				
Group 1	0-4	1.46±1.28	2.227	0.143
Group 2	0-6	2.09±1.59		
NRS (6 h)				
Group 1	0-6	1.58±1.21	46.614	0.001
Group 2	0-7	4.87±2.01		
NRS (12 h)				
Group 1	0-7	4.50±2.17	44.788	0.001
Group 2	0-5	0.91±1.41		
NRS (18 h)				
Group 1	0-6	1.29±1.60	0.224	0.638
Group 2	0-5	1.52±1.73		
NRS (24 h)				
Group 1	0-4	1.50±1.25	0.459	0.201
Group 2	0-5	1.78±1.59		

Table 5: The need for rescue analgesia in the studied groups.

Variables	Group 1, (n=48)	Group 2, (n=46)	T test	P value
Amount of rescue analgesia (Mean±SD) (mg)	2.38±1.53	3.91±1.41	12.829	0.001
Patients who received rescue analgesics, N (%)	12 (25)	46 (100)	6.591	0.001

The recovery from anesthesia, in terms of ambulation after surgery, was significantly faster for the patients in the 1st group than those in the 2nd group. Recovery from anesthesia was significantly faster ($p<0.05$) for patients in the 1st group than those in the 2nd group (Table 6).

Table 6: Mean time taken for ambulation.

Variables	Group 1, (n=48)	Group 2, (n=46)	P value
Mean time (Hours)	6.4	12.8	0.001

DISCUSSION

It is an institution based observational study was conducted in all the patients undergoing laparoscopic cholecystectomy at the dept. of general surgery in KPC medical college and hospital, Jadavpur, Kolkata. The study period was January 2021 to June 2022. 100 patients were included in this study.

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.[15]

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 immunocompromised patients, patients on immunosuppressive therapy, those having preoperative fever and associated choledocholithiasis.[17]

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.[18]

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.[31]

We observed that, mean OT-time was significantly higher in with Spillage group [77.1892±14.8546] compared to without Spillage group [54.7619±14.4085] ($p<0.0001$).

In the present study, post-operative right shoulder tip pain was recorded at 12, 24 after operation by using NRS and was slightly lower in control group (Group 2).

Limitations

In spite of every sincere effort my study has lacunae.

The notable short comings of this study are: The sample size was small. Only 100 cases are not sufficient for this kind of study. The study has been done in a single centre. The study was carried out in a tertiary care hospital, so hospital bias cannot be ruled out. Ongoing COVID 19 pandemic and lockdown has further hampered the study.

CONCLUSION

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

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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