ORIGINAL ARTICLE

Evaluation of Perioperative Factors for Prediction of Postcholecystectomy Syndromes

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Received on: 19 August 2023; *Accepted on*: 15 October 2023; *Published on*: XX XXXX XXXX

Abstract

Aim: To find the factors contributing to postcholecystectomy symptoms after laparoscopic cholecystectomy.

Methodology: A retrospective observational study with 50 symptomatic patients visiting the outpatient department (OPD) of the Department of Surgery and Department of Casualty following laparoscopic cholecystectomy whose perioperative clinical factors were evaluated to predict the development of postcholecystectomy syndromes using a Chi-square test.

Conclusion:

- Pain was the predominant symptom seen in all (100%) of the patients.
- Female sex (70%) and body mass index (BMI; 30%) were a strong significant predictor.
- Previous history of hospitalization ($p < 0.0008$) for acute cholecystitis (32%), acute pancreatitis (4%), obstructive jaundice (18%), cirrhosis (14%) were significant predictors of pelvic congestion syndrome (PCS).
- Ultrasonography (USG) findings ($p < 0.0471$) of thickened gallbladder (GB) wall (40%) and pericholecystic collection (16%) were strong predictors of difficult surgery and contributed to PCS.
- The most common type of early PCS was bile leak (16%).
- Age and previous abdominal surgeries were not significant predictors.

Keywords: Abdominal pain, Acute cholecystitis, Analysis, Bile duct injury, Calot's triangle, Cholecystostomy, Cholelithiasis, Gallstone, Laparoscopic cholecystectomy, Tokyo guidelines.

World Journal of Laparoscopic Surgery (2024): 10.5005/jp-journals-10033-1605

Introduction

Most outpatient department (OPD) patients of the Department of Surgery come with an incidental imaging finding of gallstone disease or complications.[1] The incidence and presentation vary between genders, races, ethnicities, and geographical locations.

The threshold levels with the dilemma of operating an incidentally found gallstone varies between various centers and their operating surgeons with some having a conservative, while others having a surgical approach irrespective of textbook indications of gallbladder (GB) removal.

With the advent of modern imaging systems and laparoscopic methods of surgery, the incidence of cholecystectomy increased making it a daycare surgery in patients of good performance scale hence causing a major impact on health care costs.[2] Symptomatic patients most of the time benefit from a cholecystectomy.[3,4]

Postcholecystectomy syndrome encompasses a wide variety of symptoms ranging from abdominal pain to jaundice and indicates its persistence despite surgery, hence indicating an alternate preoperative diagnosis that might coincide with gallstone disease such as acute or chronic cholecystitis, pancreatitis, or common bile duct (CBD) obstruction.

Since the entry of laparoscopy, its judicious use needs to be defined. Contrast to open surgeries, using minimal incisions, have also been highlighted.[5–7]

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How to cite this article: Aamir SMA, Acharya S. Evaluation of Perioperative Factors for Prediction of Postcholecystectomy Syndromes. World J Lap Surg 2024;x(x):xx–xx.

Source of support: Nil

Conflict of interest: None

Aim and Objectives

The study was designed to find the significant perioperative factors contributing to Postcholecystectomy symptoms after laparoscopic cholecystectomy.

Methodology

Study Methods

Fifty patients who presented with postcholecystectomy symptoms to surgery OPD and Casualty of SCB Medical College & Hospital,

a tertiary hospital in Odisha, India in between January 2021 and November 2022 were evaluated.

The patients had previously undergone laparoscopic cholecystectomy electively or in an emergency setting after admission to hospital for acute emergency relating to gallstones. Perioperative Clinical and Radiological Features were analyzed.

Inclusion Criteria

- Symptomatic patients presenting to the OPD following cholecystectomy.
- Patients whose preoperative ultrasonography (USG) and liver function test (LFT) were performed.
- Age, 18 years.

Exclusion Criteria

- Patients who were uncooperative.
- Below 18 years of age.
- Prophylactic cholecystectomy done with a primary procedure.
- Patients without complete documents of operated procedure.

The patients were evaluated routinely with the following:

- Routine investigation was done in all patients.
- Radiological investigations – USG of abdomen and pelvis, magnetic resonance pancreaticography in all patients.
- Endoscopy was done in 48 patients.

Data were analyzed using the statistical package for the social sciences (SPSS), version 2.0, software and Chi-square test was used to measure the association.

Results

Sex Distribution

- Fifty patients were taken up for the study.
- Most of our patients in the study were females (70%).

Age Distribution

The most aged patient in our study group was 62 years. Most patients in our study group were between 31 and 40 years.

Postoperative Symptoms

- Intermittent episodic colicky pain (<20 minutes) in the upper abdomen was the most common complaint.
- The other parameters are equally distributed.

Etiological Factors

Etiology contributing to the postcholecystectomy syndromes were divided into biliary and nonbiliary factors.

Perioperative Clinical Factors

- The following tabulated risk factors were taken into consideration.
- A total of 23 patients had previously undergone endoscopic retrograde cholangiopancreatography (ERCP) for choledocholithiasis.
- A total of 11 patients gave history of delayed surgery.
- A total of 15 patients had an elevated body mass index (BMI) (>25).
- Two patients had previous attacks of cholangitis.

Perioperative Radiological Factors

- A total of 20 patients had a thickened GB wall.
- Pericholecystic fluid collection was present in eight individuals.

Table 1: Age distribution

Age (years)	*Frequency (N)*	*%*
18–30	14	28.0
31–40	15	30.0
41–50	12	24.0
51–60	09	18.0
61–70	00	00
>70	00	00
Total	50	100.0

- Eight patients had multiple stones.
- Three patients had a cystic duct stump above 2 cm.

Intraoperative Findings

- A total of 35 patients had a contracted GB.
- One patient had a porcelain GB.
- Two patients had Mirizzi syndrome.
- Four patients had acute biliary pancreatitis.

Operative Outcomes

- A total of 11 patients had a prolonged duration.
- Seven patients had an intraoperative bleeding above 50 mL.
- A total of 22 patients had a difficult GB dissection.
- A total of 21 patients had a difficult extraction of specimen.
- Seven patients had to undergo conversion to open cholecystectomy (OC).

Significant Association

Significant Association of Clinical History Factors

- Pancreatitis ($p = 0.02$)
- Peptic ulcer ($p = 0.004$)
- Gastritis ($p = 0.05$)
- Cholangitis ($p = 0.05$)
- Cirrhosis ($p = 0.03$)
- Delayed surgery ($p = 0.03$)
- Body mass index >27.5 ($p = 0.02$)

Significant Association of Clinical and Radiological Features

- Palpable GB ($p = 0.05$)
- Recurrent CBD stones ($p = 0.02$)
- Stone impaction ($p = 0.03$)
- Pericholecystic fluid ($p = 0.002$)
- Thick GB wall ($p = 0.01$)

Significant Association of Perioperative Factors

- Contracted GB ($p = 0.02$)
- Conversion to open surgery ($p = 0.05$)
- Significant intraoperative blood loss ($p = 0.01$)
- Difficult GB dissection ($p = 0.04$)
- Difficult peritoneal access ($p = 0.02$)

Discussion

Age Distribution

- Most of our patients age spectrum were within the 31–40-year category (Table 1).
- As per our study, the age of the patient was not a significant predictor of postcholecystectomy syndrome.

Table 2: Types of postoperative symptoms and frequency

Symptoms	*Male (N = 15)*	*Female (N = 35)*	*Total*
Pain			
• Epigastric	02 (13.3%)	10 (28.6%)	12 (24.0%)
• Right hypochondrium	13 (86.7%)	25 (71.4%)	38 (76.0%)
Type of pain			
• Colicky	13 (86.6%)	23 (65.7%)	36 (72.0%)
• Gripping	01 (6.7%)	04 (11.4%)	05 (10.0%)
• Dull aching	01 (6.7%)	08 (22.9%)	09 (18.0%)
Radiation to back			
• Present	04 (26.7%)	10 (28.6%)	14 (28.0%)
• Absent	11 (73.3%)	25 (71.4%)	36 (72.0%)
Duration of pain (in months)			
• <6 months	04 (26.7%)	06 (17.1%)	10 (20.0%)
• ≥6 months	11 (73.3%)	29 (82.9%)	40 (80.0%)
Vomiting	08 (53.3%)	10 (28.6%)	18 (36.0%)
Fever	01 (6.7%)	05 (14.3%)	06 (12.0%)
Dyspepsia/bloating	01 (6.7%)	09 (25.7%)	10 (20.0%)

Gender Distribution

Major chunk of our samples were incidentally females (35/50) which signified a female predisposition of postcholecystectomy syndrome.

Presenting Complaints

Pain

Pain was the most common symptom in our study group present in all the members. All patients presented with nonresolution of pain post-surgery (Table 2). About 82% of patients presented with right colicky hypochondrial pain. Failure of proper preoperative evaluation to rule out gastritis and pancreatitis was the major nonbiliary factor

Weinert et al.,[8] in his study, found that pain was the most common symptom followed by nausea-vomiting and jaundice.

Vomiting

Patients presented with spontaneous vomiting in 38% of the patients during episodes of pain (Table 2). Disease severity was indicated by vomiting. Localized or diffuse Peritonitis due to Bile Leak causing Ileus was the established cause.

Dyspepsia

A total of 22% of the patients presented with dyspepsia (Table 2).

On upper gastrointestinal endoscopy (UGIE), three of them had duodenal ulceration.

Gastritis, gastroesophageal reflux disease (GERD), aerophagia, use of nonsteroidal anti-inflammatory drugs (NSAIDs) may coexist with cholelithiasis.

Fever

Fever was present in 12% of the patients (Table 2) which was associated with chills and rigors due to cholangitis launching a systemic inflammatory response syndrome (SIRS).

In our study, febrile patients were associated with a thickened GB wall and pericholecystic fluid collection and those patients subsequently had a difficult cholecystectomy.

Hence, fever was a strong predictor of PCS in our study design.

Table 3: Etiology

Etiological factors			
Biliary factors	*Frequency [N(%)]*	*Nonbiliary factors*	*Frequency [N(%)]*
Recurrent CBD stone	03 (6.0%)	Gastritis	42 (84.0%)
Retained CBD stone	06 (12.0%)	Pancreatitis	02 (4.0%)
CBD stricture	02 (4.0%)	Peptic ulcer	19 (38.0%)
Bile leakage	08 (16.0%)	No obstructive cause	06 (12.0%)
Sphincter of Oddi dysfunction	03 (6.0%)		

Table 4: Perioperative clinical risk factors

Risk factors	*Frequency (N)*	*%*
History of ERCP	23	46
Obesity	15	30
Delayed surgery (>6 weeks)	11	22
Attack of cholecystitis	16	32
Raised BMI	15	30
Previous abdominal symptoms	15	30
Liver cirrhosis	07	14
History of acute cholangitis/pancreatitis	02	4
Previous t/t (percutaneous drainage)	00	00

t/t, treatment

Etiology

After patient evaluation, we found the following:

- Bile Leak was found in 16% of the patients as the most common biliary etiology (Table 3).
- Gastritis was the most common (84%) nonbiliary etiology (Table 3).

History

Of the 50 patients, 2 had undergone lower segment cesarean section (LSCS), 11 had undergone tubectomy, 1 had undergone hysterectomy, 1 had undergone appendicectomy, and 1 patient presented with obstructive jaundice due to CBD calculus, and he underwent ERCP with CBD stenting (Table 4).

Three patients had attack of acute cholecystitis which required hospitalization and were managed conservatively. One patient had acute pancreatitis and was treated conservatively with hospitalization.

In our study design, history of previous abdominal surgeries did not correlate to the development of PCS symptoms.

History of previous hospitalization due to an attack of acute cholecystitis was a significant predictor in my study design.

General Physical Examination

Obesity (BMI >30 kg/m^2) correlated with a problematic access to peritoneal cavity to achieve a pneumoperitoneum ($p = 0.05$) and difficult specimen retrieval thus corresponding to a difficult cholecystectomy (Table 4).

Ultrasonography

Preoperative ultrasound data were evaluated in all the patients.

As per our study design, preoperative ultrasound with thickened GB wall with pericholecystic fluid (Table 5) was a strong predictor of PCS due to a difficult laparoscopic cholecystectomy.

Table 5: Preoperative radiology findings

Parameters	*Frequency (N)*	*%*
Thick-walled GB (>4 mm)	20	40
Contracted GB	09	18
Packed stone	08	16
Polyp	05	10
Evidence of acute cholecystitis		
• Edematous GB	10	20
• Pericholecystic fluid collection	08	16
• Air in GB (emphysematous cholecystitis)	00	
• Subphrenic collection	00	
• Intraperitoneal fluid collection	01	2
Fatty liver with hepatomegaly	05	10
Liver cirrhosis	07	14
Portal vein thrombosis (PV)	01	2

Table 6: Intraoperative findings

Parameters	*Frequency (N)*	*%*
Mucocele	3	6
Gangrenous GB	4	8
Contracted GB	35	70
Mirizzi syndrome	2	4
Porcelain GB	1	2
Cholecystoenteric fistula	1	2
Acute biliary pancreatitis	4	8

Table 7: Operative outcomes

Parameters	*Frequency (N)*	*%*
Duration of surgery, above 1 hour	11	22
Bleeding during symptoms, above 50 mL	07	14
Difficult peritoneal access	14	28
Difficult dissection	22	44
Difficult extraction	21	42
Conversion to OC	07	14

Intraoperative and Outcomes

The most common intraoperative pathology found in patients presenting with PCS was a contracted GB (Table 6) causing inadequate Calot's Triangulation and difficulty in dissection (Table 7).

Conclusion

- The cardinal symptom in our study population was pain (100%).
- Female sex (70%) and BMI (30%) were strong significant predictors.
- History of hospital admission ($p < 0.0008$) for an acute attack of cholecystitis (32%), acute pancreatitis (4%), surgical jaundice (18%), cirrhosis (14%) were significant predictors of PCS (Fig. 1).
- Ultrasonography findings ($p < 0.0471$) of thickened GB wall (40%) and pericholecystic collection (16%) (Fig. 2) with a contracted GB with difficult dissection (Fig. 3) were strong predictors of difficult surgery and contribute to PCS.
- The most common type of early PCS was bile leak (16%).
- Age and previous abdominal surgeries were not significant predictors.

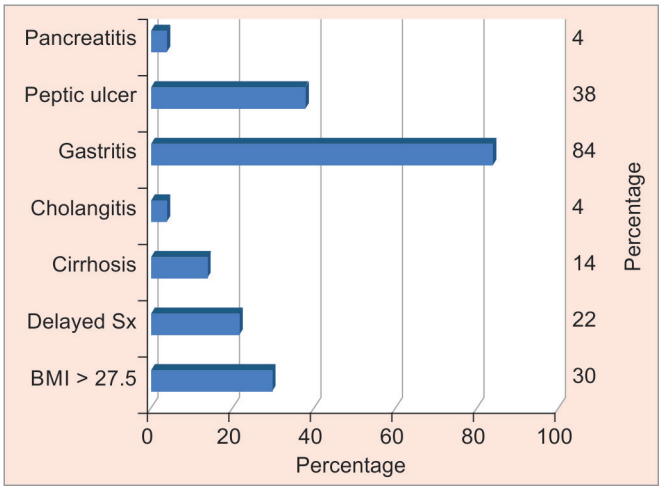

Fig. 1: Percentages of patients with significant history findings

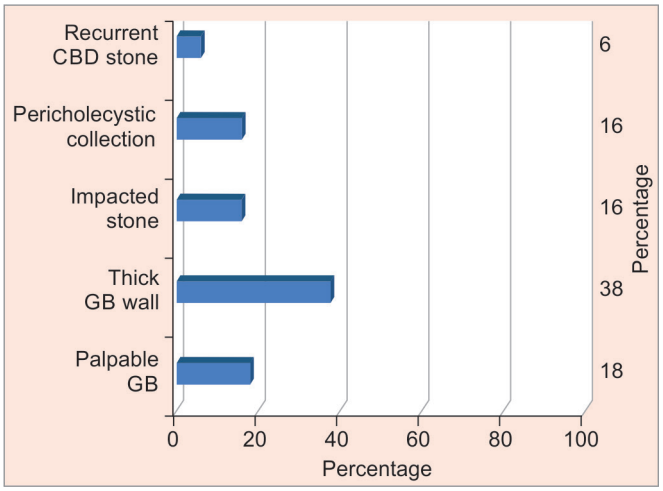

Fig. 2: Percentages of patients with significant radiological findings

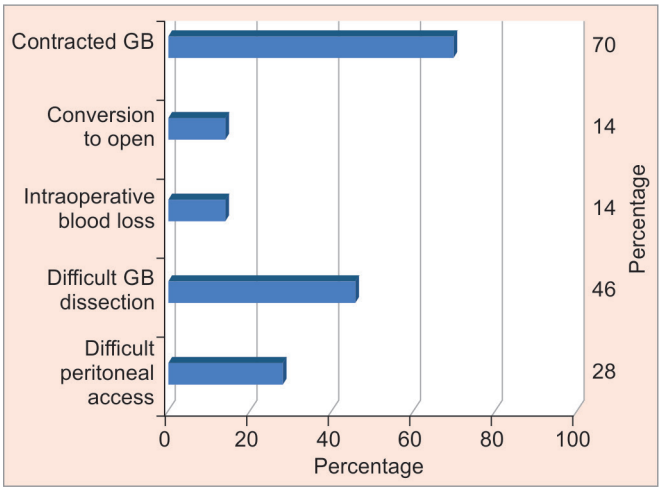

Fig. 3: Percentages of patients with significant intraoperative factors

- Patients should be educated about the postoperative course of the surgery and should be counseled about the possibility of the persistence of symptoms.

- Communication between the patient and surgeon regarding frequently associated postoperative problems will help reveal subtle symptoms of PCS.
- Postoperatively, colonic symptoms show poor resolution.
- Patients with colonic symptoms had a history of neuroses such as depression and history of antidepressant intake.
- So, those with a history of psychotropic drugs intake may have a silent GB calculi and irritable bowel syndrome. This subset of patients do not recover from laparoscopic cholecystectomy.
- Hence, it is important to analyze the perioperative factors that can predispose to postcholecystectomy syndromes.

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