

PROPORTION OF SPILLAGE OF GALL STONES AND FACTORS LEADING TO IT IN LAPAROSCOPIC CHOLECYSTECTOMY- A PROSPECTIVE ANALYSIS

Surgery

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ABSTRACT

BACKGROUND AND OBJECTIVES: The advantages of laparoscopic cholecystectomy (LC) over open cholecystectomy have established laparoscopic approach as treatment of choice. However, with increase in the number of laparoscopic operations performed, there has also been increase in the number of complications specific to these procedures. Intraperitoneal spillage of gall stones is one of the common complications of LC procedure. The purpose of this study is to assess the proportion of gallstone spillage and factors responsible for it.

METHODS: The study was conducted at surgical department of GGS medical college and hospital Faridkot, Punjab, which serves as a tertiary care centre. The data was collected preoperatively and intraoperatively from 80 patients for assessment of proportion of spilled gall stones and factors responsible for it.

RESULTS: In 0.325 (26 patients) proportion of patients, spillage was present, while in remaining proportion of patients, spillage was absent. Perforation of the gall bladder while dissection from gall bladder fossa was major technical factor, responsible for spillage in 12 patients out of 26 patients (46% or proportion of 0.46). Distended gall bladder/ multiple stones was most common patient related factors leading to spillage of gall stones in 10 patients out of 20 patients (50 percent or proportion of 0.5).

CONCLUSION: During LC gall stone spillage can occur in significant proportion of patients at multiple steps of the procedure due to interactive role of both patient related and technical factors.

KEYWORDS

Cholelithiasis, Laparoscopic Cholecystectomy, Gallstone Spillage

INTRODUCTION

Laparoscopic cholecystectomy (LC) has replaced open cholecystectomy in treatment of cholelithiasis. It is now considered first option and has become the "gold standard" in treating benign gall bladder disease.¹ The advantages of laparoscopic cholecystectomy (LC) over open cholecystectomy have established laparoscopic approach as treatment of choice. However, 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. Intraperitoneal spillage of gall stones is one of the common complications of LC procedure. In open cholecystectomy the spilled stones are eliminated usually by direct removal, copious irrigation and mopping with laparotomy sponges. In laparoscopic procedures, these techniques are difficult to apply and stones can disappear from sight and can become "lost". Studies show that incidence of spilled gall stones during LC accounts for 6 to 40% of procedures performed. Complications from stones lost in peritoneal cavity can cause significant morbidity.² Zehetner et al (2007)³ looked into all complications from lost gall stones and these ranged from most common like intra-abdominal and subcutaneous abscesses and fistulas, to less common, such as liver abscess, staphylococcus bacteraemia, broncholithiasis and expectoration, empyema, granulomas, bowel obstruction and incarceration within a hernial sac. Gall bladder perforation during laparoscopic cholecystectomy is a reasonably common problem and may result in spilled and lost gall stones. Though uncommon, these stones may lead to several early or late complications, which can be a diagnostic challenge and cause significant morbidity to the patient. Proper care should be taken so as to avoid spillage of gall stones. If gall stone spillage occurs, clear documentation and a high index of suspicion for complications should be maintained for early recognition and treatment of complications from gall stone spillage.⁴ The present study is aimed to determine these factors and to find the proportion of gall stone spillage in LC.

AIMS & OBJECTIVES

To determine the proportion of spillage of gall stones in laparoscopic cholecystectomy and to find out technical and patient related factors which lead to spillage of gall stones in LC.

MATERIALS AND METHODS

Study Design:

Prospective study-

The study was conducted at surgical department of GGS medical

college and hospital Faridkot, which serves as a tertiary care center.

Data Collection

The data was collected preoperatively and intraoperatively from 80 patients operated for laparoscopic cholecystectomy during a period from February 2017 to January 2019. The patients' consent was obtained prior to study. The data recorded includes history, clinical features, past history, findings of laboratory investigations and imaging and intraoperative factors that lead to spillage of gall stones.

Inclusion Criteria

- All patients who underwent laparoscopic cholecystectomy for symptomatic cholelithiasis as proven by Ultrasonography.

Exclusion Criteria

- The patients who had contraindication for laparoscopic cholecystectomy i.e.; patients with Chronic obstructive pulmonary disease, Coronary Artery Disease Coagulation Disorders, Common Bile Duct Stone, Pregnancy, Suspected Carcinoma, Pelvic inflammatory disease, Extensive Scarring and those not willing for laparoscopic cholecystectomy or to participate in the study.

Statistical Analysis

- All the results were analyzed by SPSS software. Chi-square test and Mann Whitney U test were used for assessment of level of significance.

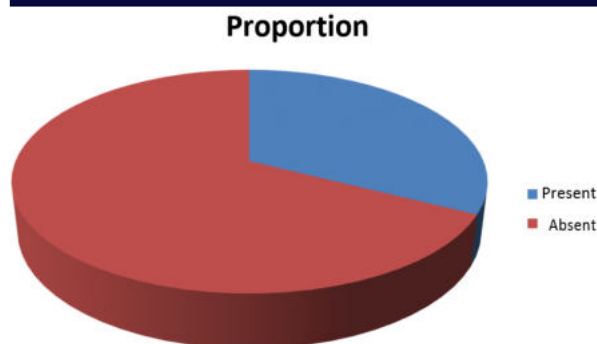
RESULTS

Table 1 and Graph 1 show the Proportion and Percentage of gall stone spillage among patients. In 0.325 (26 patients) proportion or 32.5% of the patients, spillage was present, while in 0.675 (54 patients) proportion or 67.5% of the patients, spillage was absent.

Table 1: Proportion & Percentage Of Gall Stone Spillage Among Patients

Spillage	Number (n)	Proportion	Percentage (%)
Present	26	0.325	32.5%
Absent	54	0.675	67.5 %

Table 2 and Graph 2 show the proportion of technical factors leading to spillage of gall stones. Perforation of the gallbladder while dissection from the gall bladder fossa was the major technical factor, responsible for spillage in 0.46 proportion or 46% of patients (12 patients).

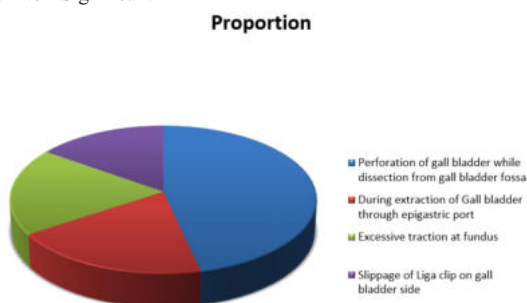


Graph 1: Proportion Of Gall Stone Spillage Among Patients

Table 2: Proportion Of Technical Factors Leading To Spillage Of Gall Stones

Technical factors (Total number of patients =80)	Number of Patients	Proportion	P-value
1.Perforation of gall bladder while dissection from gall bladder fossa	12	0.46	0.098 (NS)
2. During extraction of gall bladder through epigastric port	5	0.19	
3. Excessive traction at fundus	5	0.19	
4. Slippage of Ligaclip on gall bladder side	4	0.15	
Total	26	1	

*NS=Non-Significant



Graph 2: Proportion Of Technical Factors Responsible For Spillage Of Gallstones

Table 2 and Graph 2 also show that excessive traction at fundus and during extraction of gall bladder through epigastric fossa were the other technical factors responsible for spillage in 0.19 proportion or 19% of patients (5patients) each. In the present study, the least common technical factor which led to gallstone spillage is slippage of Ligaclip on gall bladder side, which was found in 0.15 proportion or 15% of patients(4 patient). No significant result was obtained while assessing various technical factors responsible for spillage.

Table 3 and Graph 3 shows proportion of various patient related factors responsible for spillage. Distended gall bladder /multiple stones were most common patient related factors responsible for occurrence of spillage in 0.5 proportions or 50% of patients (10 patients). Short cystic duct with inadequate gall bladder neck was responsible for occurrence of spillage in 0.25 proportions or 25% of patients (5 patients).

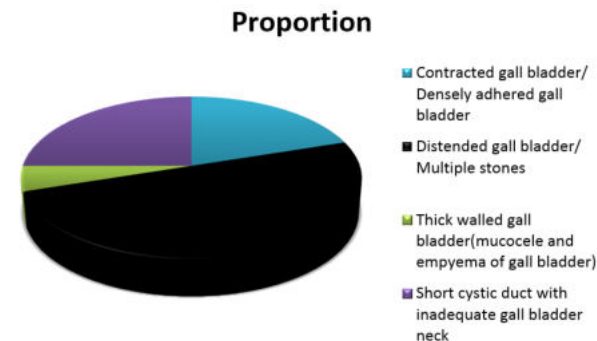
Contracted gallbladder/densely adhered gallbladder was responsible for spillage in 0.2 proportions or 20% of patients (4 patients). In the present study, the least common patient related factor which led to gallstone spillage is thick walled gallbladder; this was found in 0.05 proportions or 5% patients (1 patient). Significant results were found while assessing the patient related factors. P- value (0.019).

Table 3: Proportion Of Patient Related Factors Responsible For Gallstone Spillage

Patient related factors	Total No. of patients	No. of patients	Proportion	P-value
1. Contracted gall bladder/ Densely adhered gall bladder	20	4	0.2	0.019 (S)

2. Distended gall bladder/ Multiple stones	20	10	0.5	0.05
3. Thick walled gall bladder (mucocele and empyema of gall bladder)	5	1	0.05	
4. Short cystic duct with inadequate gall bladder neck	15	5	0.25	
Total	60	20	1	

*S=Significant



Graph 3: Proportion Of Patient Related Factors Responsible For Gallstone Spillage

DISCUSSION

Laparoscopic cholecystectomy, since its introduction in the 1980s has supplanted open cholecystectomy as the gold standard for gall bladder disease. The great enthusiasm for laparoscopic cholecystectomy is based on the patient's greater comfort in terms of less postoperative pain, speedier recovery, shorter hospital stay, and earlier return to work.

Unfortunately, these advantages are gained at the expense of an increased incidence of biliary injury. Moreover, a unique problem that was almost unknown in the era of open surgery emerged, namely the problem of spilled gall stones. The limited ability of the surgeon to retrieve spilled stones laparoscopically leads many surgeons to leave them behind. Although there are no major consequences in the majority of cases, a certain group of patients are at increased risk for developing complications.^{5,6,7,8}

Perforation of the gall bladder occurs frequently during laparoscopic cholecystectomy(LC) and is reported in the range of 10%-40% in various series. Non-significant results were obtained while assessing the occurrence of individual patient related and technical factors responsible for gallstone spillage (P- value > 0.05). Spillage of stones can occur during dissection of the gall bladder off the liver bed, tearing with grasping forceps, or during extraction of gall bladder through one of the port sites. The incidence is more common when operating on an acutely inflamed gall bladder and in the presence of adhesions. Stones spilled may remain in the peritoneal cavity adjacent to the liver or may migrate to various distant sites.^{9-11,12-14}

Among various technical factors responsible for spillage, the most common were perforation of gall bladder while dissection from gall bladder fossa found to be present in 46 percent of spillage cases. Factors such as extraction of Gall bladder through epigastric port and excessive traction at fundus were responsible for occurrence spillage in 19 percent of patients each. Slippage of Liga clip on gall bladder side was responsible for occurrence of 15 percent of the spillage cases. Our results were in concordance with the results obtained by previous authors, who also reported similar findings. They summarized that gallstone spillage can occur during dissection of gall bladder off the liver bed (75%), tearing with grasping forceps, or during extraction of gall bladder (25%) through port sites.^{15,16,17,18}

Patient related factors were found to be present in 76.9 percent of spillage cases. Occurrence of distended gall bladder/multiple stones was present in 50 percent of patient related factor among spillage cases, while Contracted gall bladder/ densely adhered gall bladder were responsible for occurrence of 20 percent of patient related factors of spillage cases. Out of 20 patients with distended gall bladder/ multiple stones, spillage occurred in 50 percent of patients. Therefore

chances of spilled gall stones are significantly more in subjects with distended gall bladder/ multiple gall stones.

In another study conducted by Pankaj K et al (2018)¹⁹, authors summarized that dense adhesions around gall bladder make dissection potentially more difficult, and a tense, distended gall bladder that has not been decompressed is at risk of perforation. This may occur when gall bladder is manipulated by laparoscopic instruments or during dissection from liver bed. Spilled stones may also be caused by slipping of the cystic duct clip or tearing of gall bladder when it is being retrieved from port site.^{2,8}

If spillage occurs, first and foremost thing to do is to do normal saline irrigation of peritoneal cavity and aspiration. All attempts should be made to retrieve all gall stones laparoscopically. It should not be considered as an indication to convert the procedure to open one. Following steps are recommended during laparoscopic cholecystectomy in case of spillage: Informed consent from patient and family should be obtained. They should be told that dropped stones are common depending on the size of stones and condition of the gall bladder wall and liver bed. All effort should be made by the surgeon to retrieve the gall stones and the peritoneum should be irrigated with copious saline. In case of spillage, there is no need to convert the laparoscopic procedure to a laparotomy for spilled stones, but it is essential to document spilled stones in the operation notes. All possible complications and their symptoms should be told to the patient. The surgeon should keep a long term follow up of such patients unlike other routine cholecystectomy, as there is possibility of delayed complications.^{20,21}

Grasping the perforated part of the gall bladder, application of a clip, or an Endoloop are possible solutions to prevent spillage. However, when the grasper is used to keep the perforation closed, it is no longer available for effective traction. An experienced surgeon should replace the trainee to complete the procedure under such circumstances. There was no need for such a change in our cases, which we consider an advantage in terms of surgical training.²²⁻²⁴

Preventing stone spillage is paramount, as retrieval of the stones can be difficult and time consuming. It is helpful to drain the tense gall bladder first. In addition, using atraumatic graspers without teeth will decrease the incidence of tearing the gall bladder wall. Hydrodissection has been described to decrease tearing of the wall. However, this technique has not been widely accepted. Finally, one can use a retrieval bag when dealing with a gall bladder full of stones. It is important to use the retrieval bag when dealing with a severely infected gall bladder with a friable wall, along with widening the trocar site through which the gall bladder is being removed.^{24,25}

CONCLUSION

The study was conducted at surgical department of GGS medical college and hospital Faridkot, Punjab, which serves as a tertiary care and referral center. The data was collected preoperatively and intraoperatively from 80 patients.

- In 0.325 (26 patients) proportion of the patients, spillage was present, while in the remaining proportion of the patients, spillage was absent.
- Perforation of the gall bladder while dissection from the gall bladder fossa was the major technical factor, responsible for spillage in 12 patients out of 26 patients (46% or proportion of 0.46). Excessive traction at fundus and during extraction of gall bladder through epigastric fossa were the other technical factors responsible for spillage in 5 patients each (19.2% or proportion of 0.19). Slippage of Liga Clip on gall bladder side was found to be responsible in 4 patients (15.3 % or proportion of 0.15)
- Distended gall bladder/ multiple stones was the most common patient related factors leading to spillage of gall stones in 10 patients out of 20 patients (50 percent or proportion of 0.5)

IMPLICATIONS

During Laparoscopic cholecystectomy gall stone spillage can occur in significant proportion of patients at multiple steps of the procedure due to interactive role of both patient related factors and technical factors. Further studies are required for application of measures to reduce gallstone spillage during laparoscopic cholecystectomy.

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