

Evaluation of Incidence of Gallbladder Content Spillage and Factors Leading to it During Laparoscopic Cholecystectomy

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Abstract

Background: Laparoscopic cholecystectomy has replaced open cholecystectomy in the treatment of cholelithiasis. However, with the increase in the number of laparoscopic operations performed, there has also been a noticeable increase in the frequency of gallbladder (GB) content spillage and its complications. **Objectives:** Aim of this study is to evaluate the incidence of gallbladder spillage during laparoscopic cholecystectomy and factors affecting it. **Materials and Methods:** Cross-Sectional study conducted at General Surgery department of Saraswathi Institute of Medical Sciences, Hapur, UP. Data was collected preoperatively and intraoperatively from 126 patients who underwent laparoscopic cholecystectomy for cholelithiasis from Oct 2019 – Oct 2020. **Results:** Among total 126 patients, gallbladder spillage occurred in 16 patients. Dissection of gallbladder from hepatic fossa found to be major technical factor responsible for spillage. Distended gallbladder/ multiple stones/ peri GB adhesions found to be most common patient related factor responsible for spillage. **Conclusion:** During Laparoscopic cholecystectomy, gallbladder content spillage can occur in significant number of patients at multiple steps of the procedure due to interactive role of both patient related factors and technical factors and it can be a source of morbidity. So, every attempt should be made to prevent it rather than managing it afterwards.

Keywords: Cholelithiasis, Laparoscopic Cholecystectomy, Gallbladder Content Spillage.

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Introduction

Gallstone diseases constitute a major health problem throughout the world.[1]With the therapeutic option of laparoscopic cholecystectomy and popularity and quality of diagnostic ultrasound more gallstones are now detected and consequently operated upon. [2] With better patient satisfaction and a shorter hospital stay, laparoscopic cholecystectomy has become the gold standard for the surgical treatment of symptomatic gallstones. Complications of laparoscopic cholecystectomy include complications due to port entry [3], bowel injuries[4], bleeding[5] and biliary complications including spilled bile and gallstones[6], biliary leak and bile duct injuries.[7] Intraoperative gallbladder spillage has increased in frequency because of increased efforts to perform laparoscopic cholecystectomy, which has limited the visual field and mobility of the surgical instruments. Spillage can occur during dissection of the gallbladder off the liver bed, tearing with grasping forceps or during extraction of gallbladder

through one of the port sites. The incidence is more common when operating on an acutely inflamed gallbladder; it is also more common in men, the elderly, obese patients and in the presence of adhesions. [8]As gallbladder spillage can cause more postoperative pain, increase operative time, ileus and port site infection, which consequently increases the total duration of hospitalization, undermining the advantages of laparoscopic cholecystectomy and spilled gallbladder content can sometimes lead to severe comorbidities. Therefore, high suspicion for diagnosis is necessary. Every possible effort should be made to prevent the spillage and retrieve the spilled gallstones during the procedure due to potential complications.

Materials and Methods

The present study was conducted for evaluation of incidence of gallbladder content spillage and factors leading to it during laparoscopic cholecystectomy in the department of General Surgery at Saraswathi Institute of Medical Sciences, Hapur, UP. The data from 126 patients who underwent Laparoscopic cholecystectomy for cholelithiasis during a period of 1 year from October 2019 – October 2020 was collected and analysed by SPSS software. Frequency table along with the percentage were generated to see the distribution of variable. Independent t test was applied for normally distributed continuous variable to compare the mean difference in two independent groups. Chi square test was applied to see the association between categorical variables and Spillage. Statistical significance was seen at p-value < 0.05.

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Results

Table 1 shows the distribution of patients according to age group. Maximum number of patients of the present study belonged to the age group of 40-49 years.

Table 2 show the gender-wise distribution of patients. 105(83.3%) patients were female, while the remaining 21(16.6%) patients were male. Among total number of male patients, 2(9.5%) patients had spillage and among total number of female patients 14(13.3%) patients had spillage.

Significant association was found between these sonographic findings and some of these intraoperative findings with gallbladder spillage ($p < 0.05$).

Table 4 show the percentage of technical factors leading to spillage of gallstones. Dissection from the gallbladder fossa was the major technical factor, responsible for spillage in 62.5 % of patients. It also shows that excessive traction at fundus, slippage of Ligaclips on gallbladder side and during extraction of gall bladder through epigastric fossa were the other technical factors responsible for spillage. In the present study, the least common technical factor which led to gallstone spillage was slippage of ligaclip on gallbladder side, which was found in 12.5% of patients and extraction of GB through port site in 6.2% of cases.

Table 1: Age-wise distribution of patients

Age (years)	Number of patients (n=126)	No. of patients with spillage of GB content
20-29	25	04
30-39	35	07
40-49	55	03
50-59	07	02
60-69	04	-
Total	126	16
Mean Age (years)+ SD	38.01 ± 8.90	35.75 ± 8.51

Table 2: Gender-wise distribution of patients

Sex	Spillage		Chi Square	p – value
	No	Yes		
Male	19 (90.5)	2 (9.5)	0.229	0.632
Female	91 (86.7)	14 (13.3)		

Table 3: Association of ultrasound findings and intraoperative gallbladder status with gallbladder spillage

Factors		Spillage		Chi Square	P Value
		No	Yes		
Single Stone	Absent	90(88.2)	12(11.8)	0.421	0.735
	Present	20(83.3)	4(16.7)		
Multiple Stones	Absent	20(83.3)	4(16.7)	0.421	0.735
	Present	90(88.2)	12(11.8)		
Contracted	Absent	33(75.0)	11(25.0)	9.229	0.002*
	Present	77(93.7)	5(6.1)		
Distended GB	Absent	77(93.9)	5(6.1)	9.229	0.002*
	Present	33(75.0)	11(25.0)		
Wall Normal	Absent	8(40.0)	12(60.0)	47.982	0.000*
	Present	102(96.2)	4(3.8)		
Wall Thickened	Absent	102(96.2)	4(3.8)	47.982	0.000*
	Present	8(40.0)	12(60.0)		
Chronically Inflamed	Absent	16(76.2)	5(23.8)	2.806	0.143
	Present	94(89.5)	11(10.5)		
Mucocele	Absent	104(89.7)	12(10.3)	7.303	0.007*
	Present	6(60.0)	4(40.0)		
Peri GB Adhesions	Absent	47(92.2)	4(7.8)	1.822	0.177
	Present	63(84.0)	12(16.0)		
Short Cystic Duct	Absent	66(90.4)	7(9.6)	1.514	0.219
	Present	44(83.0)	9(17.0)		

*Significant association were observed ($p < 0.05$)

Table 4: Technical factors responsible for spillage

Factors	No. of patients with spillage	%
Traction or grasping of gallbladder	3	18.7
Slippage of Liga clip on GB side	2	12.5
Dissection of GB from hepatic fossa	10	62.5
Extraction of GB through port site	1	6.2
Total	16	

Discussion

In the present study, 126 patients were studied. The mean age of patients in our study was 38 years. Majority of the patients of the present study were in the age group of 40 to 49 years. 83.33% of the

patients were female, while the remaining 16.66% of the patients were male. Our results were in concordance with the results obtained by Pankaj K et al (2018)[9] who also reported similar findings in their study in which patients had a mean age of 45.08 years ranging

from 30 to 55 years. Out of 118 patients, there were 66.95% females and 33.05% were males suggesting cholelithiasis is more common in females. In the study conducted by Saud JD et al mean age was 38.6 years and female patients were 84% while male patients comprised 16%. [10,11] Among all the patients with gallbladder content spillage, 87.5 percent of the patients were female, while the remaining 12.5 percent of the patients with spillage were male. Varying results have been observed by authors from the past literature. In a study conducted by Pankaj K et al (2018), [9] authors reported that 61.4 percent of the patients with spillage were female, while the remaining 38.6 percent of the patients were male. [10] Therefore, it can be inferred that higher incidence of spillage in females than males can be correlated to higher prevalence of disease in females than males. With increasing age, the chronicity of disease increases making the dissection of gall bladder difficult, hence leading to more chances of gallstone spillage. Spillage was found to be present in 12.69 percent of the patients (16 patients) in the present study. Our results were in concordance with the results obtained by Peponis T et al (2018), [12] who reported that gall stone spillage was present in 20.2 percent of the patients of their study group. In studies conducted by Schafer M et al (1998), [13] Memon MA et al (1999) [14] and Sarli L et al (1999) [15] prevalence of gallstone spillage was found to be 5.7%, 12.3% and 11.6% respectively. Sonographic findings in our study in total number of patients with spillage (16) revealed that 25% of them had single stone and 75% of them had multiple stones. 31.25% had contracted gallbladder while 68.75% had distended gallbladder. 25% had normal gallbladder wall while 75% had thickened gallbladder wall. When these patients underwent laparoscopic cholecystectomy, the intraoperative findings of these cholecystectomies revealed that 31% had chronically inflamed GB out of which 11% turned out to be mucocele. 33% of the patients had peri GB adhesions and 25% had short cystic duct. Significant association was found between these sonographic findings and some of the intraoperative findings with gallbladder spillage ($p < 0.05$). In our study it was found that peri GB adhesions, chronically inflamed GB, distended GB and multiple stones were the most common findings in the patients with spillage. Our findings were in concordance with the findings of following authors. In study by Memon MA et al. 95% had chronically inflamed GB while other 5% had acutely inflamed GB and 57% had peri GB omental adhesions. Another study done by Rice et al. at Mayo Clinic revealed that 89% had chronically inflamed GB and 42% had peri GB omental adhesions. In another study conducted by Pankaj K et al (2018), [9] authors summarized that dense adhesions around the 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 the gall bladder is manipulated by laparoscopic instruments or during dissection from the liver bed. Spillage may also be caused by the slipping of the cystic duct clip or the tearing of the gall bladder when it is being retrieved from the port site. [10,16] Among various technical factors responsible for spillage, the most common was perforation of gall bladder while dissection from gall bladder fossa found to be present in 62.5 % of the spillage cases. Factors such as excessive traction at fundus of Gall bladder and slippage of Liga clip on GB side were responsible for occurrence of spillage in 18.7 % and 12.5 % of patients respectively. Extraction of gall bladder through port site was responsible for occurrence of 6.2% of the spillage cases. Our results were in concordance with the results obtained by Asaad Mohammad Kadhim (2019), who also reported similar findings. They summarized that the gallstone spillage can occur during dissection of the gall bladder off the liver bed (63.6%), tearing with grasping forceps (18.2%), or during extraction of the gall bladder (3%) through the port sites. [17] 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 but it is

essential to document spilled stones in the operative 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. [18,19] 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. [20,21] 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. [22]

Conclusion

Laparoscopic cholecystectomy is the gold standard for gallstone disease. During laparoscopic cholecystectomy gallbladder content 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. Gallbladder spillage occurs as a result of intraoperative retraction, dissection and extraction of gallbladder especially when gallbladder is inflamed and fragile and there are peri GB omental adhesions. Gallbladder content spillage is an uncommon occurrence in most of the cases but when it occurs, main goal of all surgeons should be to manage these complications with minimal harm to the patients and to minimize unwanted consequences of these complications. Surgeon should take utmost care and attempt to remove all visible stones and should irrigate abdominal cavity to dilute infected bile. There is no indication for routine conversion to open surgery just for sake of removal of spilled gallstones. Spillage occurrence should be documented, and such patients should be kept under close follow up to aid in early diagnosis of late complications.

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