

Complications of Spilt Gallstones During Laparoscopic Cholecystectomy

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ABSTRACT

Background: Laparoscopic cholecystectomy is the gold standard for symptomatic gallstones because of cosmesis, less hospital stay, less post-operative pain and less disability in comparison to open cholecystectomy. Gallbladder perforation with stones spillage into the peritoneal cavity is more frequent in laparoscopic cholecystectomy which is about 6% to 40%. Only 13% to 32% of stones will be retained in the peritoneal cavity, rest of the stones can be retrieved by direct visualization and saline irrigation. Retained stones can be the cause of post-operative morbidity accounting for 0.1% to 6%. Most of the time it is asymptomatic and few can present with fever, chronic abdominal pain, intestinal obstruction. The aim of this study to document the incidence of gallstone spillage during laparoscopic cholecystectomy.

Material & Methods: The study included 50 randomized cases of laparoscopic cholecystectomy performed in the Department of General Surgery, S.P. Medical College and P.B.M. Associated Group of Hospitals, Bikaner between 1st June 2014 to 31st May 2015. A prospective collection of data were obtained in accordance with the proforma which documented patients details, diagnosis, preoperative physical and ultrasound abdomen findings, intraoperative details such as technique, spillage of stones, cause for spillage, method and port of extraction of specimen, postoperative events, and complications.

The follow-up was performed at the end of 1 week, 1 month, 6 months of postoperative. Data collected were analyzed for incidence of spillage of gallstones and complications related to such events during laparoscopic cholecystectomy.

Results: In this study the maximum numbers of cases were in the 15-30 years of age group. The 54.55% of cases of spillage occurred during dissection. In this study out of these 12 cases,

8 cases had gall stone spillage and 4 cases didn't have any spillage, which are statistically significant ($p=0.001$). The present study showed out of 50 cases, 11 cases had either increased or decreased volume of gall bladder in preoperative sonography. Among these 11 cases, 7 cases had gallstone spillage and 4 cases had normal laparoscopic cholecystectomy, which are statistically significant ($p=0.0065$).

Conclusion: We concluded that, the operative surgeons should be well trained in laparoscopic surgeries and surgeons should consider meticulous and care dissection while operative. Every effort should be made to remove gallstone spilled out by various approach. Operating surgeons should keep a clean follow up of these patients and common and rare complications should be kept in mind while treating these patients in immediate postoperative period and long term follow up.

Keywords: Laparoscopic Cholecystectomy, Gallstone Spillage, Complications.

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INTRODUCTION

Laparoscopic cholecystectomy has become the procedure of choice for symptomatic cholelithiasis due to its minor overall morbidity and recuperation time and its substantially better aesthetic results compared with lapotomy. Nonetheless, the increasing use of these minimally invasive techniques has been associated with an increased frequency of 2 already existing complications in lapotomy, bile duct injury and gallstone spillage into the abdominal cavity.^{1,2} The iatrogenic injury of the common bile duct during laparoscopy is a severe complication and therefore

has gained considerable attention.³ On the other hand, the presence of free intraperitoneal gallstones is generally considered harmless, not producing any deleterious effects.^{4,5}

Presence of stone in gall bladder is known as cholelithiasis or gall stone. Gallstones are an extremely common condition, occurring in approximately 10% to 20% of the adult population.⁶

Risk factor for gall stone formation includes female gender, obesity, long term TPN therapy (>3 months), pregnancy, rapid weight reduction, low level of physical activity, high calories and

carbohydrates intake, long term somatostatin analogue therapy, genetics, estrogen, progesterone, ceftriaxone, octrotide.⁷

Laparoscopic cholecystectomy is the gold standard for symptomatic gallstones because of cosmesis, less hospital stay, less post-operative pain and less disability in comparison to open cholecystectomy. Laparoscopic cholecystectomy is a safe and effective procedure for the treatment of the cholelithiasis. Cholecystectomy via laparoscopy is the standard access because of the diminished postoperative pain, shorter hospital stay and shorter absence from work, with morbidity comparable to the conventional surgery or through minilaprotomy.⁸

Gallbladder perforation with stones spillage into the peritoneal cavity is more frequent in laparoscopic cholecystectomy which is about 6% to 40%. Only 13% to 32% of stones will be retained in the peritoneal cavity, rest of the stones can be retrieved by direct visualization and saline irrigation. Retained stones can be the cause of post-operative morbidity accounting for 0.1% to 6%. Most of the time it is asymptomatic and few can present with fever, chronic abdominal pain, intestinal obstruction.⁹

The incidence of complication related to spillage of gall stone during laparoscopic cholecystectomy as per international data range between 2.3 and 7%, this incidence increase by greater than two fold when stone are un-retrieved.¹⁰ The aim of this study to documented the incidence of gallstone spillage during laparoscopic cholecystectomy.

MATERIAL & METHODS

The study included 50 randomized cases of laproscopic cholecystectomy performed in the Department of General Surgery, S.P. Medical College and P.B.M. Associated Group of

Hospitals, Bikaner between 1st June 2014 to 31st May 2015. The surgeries were performed by four different consultant surgeons.

A prospective collection of data were obtained in accordance with the proforma which documented patients details, diagnosis, preoperative physical and ultrasound abdomen findings, intraoperative details such as technique, spillage of stones, cause for spillage, method and port of extraction of specimen, postoperative events, and complications.

The follow-up was performed at the end of 1 week, 1 month, 6 months of postoperative. The reviews at 1 week were noted in the outpatient department, at 1 month some were by outpatient visits and rest being telephonic interviews, and the remaining follow-up at 6 months was performed by telephonic interviews.

Data collected were analyzed for incidence of spillage of gallstones and complications related to such events during laparoscopic cholecystectomy.

Inclusion Criteria

- All patients >15 years of age admitted with cholelithiasis.

Exclusion Criteria

- Patients below 15 years of age
- Any previous laparotomy
- Patients with gallbladder mass
- Patients with CBD > 6mm with or without CBD stone.

Fifty patients were randomly selected according to inclusion and exclusion criteria. Pre-operative check-up done in all patients and a pre-operative USG abdomen of all these patients were done to see the wall thickness of gallbladder, numbers of stones, mobile or impacted stones, size of gallbladder (distended/contracted), sites of stones. After pre-anaesthetic check-up patients underwent laparoscopic cholecystectomy.

Table 1: Showing distribution of cases accordance to age and gender

Age	Female	Male	Total
15-30 years	21	2	23
31-45 years	14	3	17
46-60 years	7	0	7
>60 years	1	2	3
Total	43	7	50

Table 2: Mechanism of Spillage of Stones

Mechanism of Spillage of Stones	Numbers of Cases (N=11)
During Dissection	6 (54.55%)
Tooth Grasper	3 (27.27%)
During Traction	2 (18.18%)
Total	11 (100%)

Table 3: Showing relationship between spillage of gall stones to GB wall Thickness

Wall Thickness of GB	Spillage of Stones	Absence of Spillage of Stones	Total
Thickened	8 (66.66%)	4 (33.33%)	12
Normal	3 (7.89%)	35 (92.10%)	38
Total	11	39	50

Table 4: Showing relationship between spillage of gall stones to Size of GB

Size of GB	Spillage of Stones	Absence of Spillage of Stones	Total
Normal	4 (36.4%)	35 (89.7%)	39
Distended/Contracted	7 (63.6%)	4 (10.3%)	11
Total	11	39	50

Table 5: Showing Post-operative Follow-Up

Parameter	While in Hospital	1 week Post op	1 Month post-op	6 Months post-op
Pain abdomen	10	2	0	0
Referred pain to shoulder	1	0	0	0
Fever	2	0	0	0
Post-op TLaparoscopic cholecystectomy	2	1	0	0
Post-op USG	2	1	0	0
Others	1 (pleural effusion)	0	0	0
Avg. Day in Hospital	3	0	0	0

RESULTS

In this study the maximum numbers of cases were in the 15-30 years of age group (table 1). The 54.55% of cases of spillage occurred during dissection (table 2). In this study out of these 12 cases, 8 cases had gall stone spillage and 4 cases didn't have any spillage, which are statistically significant ($p=0.001$) (table 3).

The present study showed out of 50 cases, 11 cases had either increased or decreased volume of gall bladder in preoperative sonography. Among these 11 cases, 7 cases had gallstone spillage and 4 cases had normal laparoscopic cholecystectomy, which are statistically significant ($p=0.0065$) (table 4).

DISCUSSION

Laparoscopic cholecystectomy has become the gold standard for symptomatic gall stones. In recent years one of the issues that have come into notice is unchanged incidence of bile and gallstones spillage into peritoneal cavity in laparoscopic cholecystectomy. The reason for this includes limited space for dissection, tendency to deal with acute friable gallbladder. Instruments that cause laceration of gallbladder and experience of surgeons. Spillage of bile and gallstones during laparoscopic cholecystectomy is very common among surgeons who performed this type of operation and the incidence is reported to be 10 to 40% of cases.¹¹

Retrieval of stones that have spilled into the peritoneal cavity was not always possible in cases when the stone crumbled into pieces when grabbed by forceps and slid down into folds around the operation field. Once the stones break up, chopping them into smaller pieces for removal by irrigation was attempted but the removal was incomplete. Repeated massive irrigation, using the glove finger pouch since 2003 has helped a lot in removing stones but still some stones are retained.¹²

In our study most common age group undergoing laparoscopic cholecystectomy are 15-30 years followed by 31-45 years 46-60 and least common age group was >60 years. Shrestha et al¹³ study show mean age group for Laparoscopic Cholecystectomy was 35 years.

In present prospective study gallstones spillage occurred in 11 patients. It was noted that 63.63% of cases of spillage occurred during dissection in calot's triangle or separation of gallbladder from liver bed, making it most common mechanism of gallbladder perforation and gallstones spillage. Other mechanism for gallbladder perforation and stones spillage are tooth grasper and during traction.

Our study was similar to Virupaksha¹¹ who found that most common mechanism of gall bladder perforation was dissection followed by application of tooth grasper and during traction.

In present study, the incidence of spilt gallstones noted by us was 22%. Schafer et al¹⁴ reported a population of 10,174 Laparoscopic Cholecystectomies with 581 intraoperative gallstone spillage (5.7%). Memon et al¹⁵ reported 856 cases, 165 perforations (19%), and 106 unretrieved gallstones in their study. Manukyan et al¹⁶ reported 580 Laparoscopic Cholecystectomies, 101 perforations (17%). Virupaksha reported 150 cases of laparoscopic cholecystectomy, in 28(18.91%) gallstones spillage occur.¹¹ So, our study is comparable with above mentioned studies.

In our study spillage of gallstones were more common in cases, in which USG abdomen showing wall thickness of gallbladder is > 3mm, gallbladder distended/contracted, and stone impacted at neck of gallbladder. In 12 cases; wall thickness >3mm was noted in pre-operative sonography. Out of these 12 cases, 8 cases had gallstones spillage showing p-value of 0.001; which is statistically significant and showing a relationship between gallbladder wall thickness and gallstones spillage.

Out of 50 cases, 11 cases had distended/contracted gallbladder in -operative sonography. Among these 11 cases, 7 cases had gallstones spillage. The p-value for this is 0.0065, which is statistically significant showing strong relationship between size of gallbladder and spillage of gallstones.

In our study 8 cases had gallstones impacted at neck of gallbladder. Among these 8 cases, 6 cases had gallstones spillage p-value for this 0.032, which is statistically significant showing strong relationship between impaction of stone at neck of gallbladder and gallstones spillage. Haldeniya et al¹⁷ found that significant correlation of difficulty during laparoscopic cholecystectomy in cases whom preoperative ultrasonographic findings were wall thickness of gall bladder >3mm and gall bladder is distended/contracted and stone impacted at neck of gall bladder. Similar findings were also noted in study done by Fried et al¹⁸ where they found that wall thickness >3mm a significant risk factor and et al¹⁹ found that gall bladder size (contract/distended) as a predictor for conversion of Laparoscopic Cholecystectomy to Open Cholecystectomy.

So there is significant risk of gallbladder perforation and stone spillage particularly in cases in which pre-operative USG show gall bladder wall thickness >3mm, gallbladder distended/contracted, gallstones impacted at neck of gallbladder. Complication rate in our study is higher than literature, is likely due to small sample size, tendency to deal with acute friable gallbladder and less experience of Laparoscopic Cholecystectomy. It is recommended that every attempt is made to remove all spilt gallstones either by forceps, irrigation or by use of endobags for extraction of gallbladder.

Operative Step Recommended to Prevent Gallbladder Perforation and Spillage Are:

1. Careful dissection in Calot's triangle and during separation of gallbladder from liver bed.
2. Suctioning out gallbladder content prior to starting dissection in a fully distended gallbladder.
3. Appropriate use of instruments.
4. Diligent application of clips to close the cystic duct.
5. Use of endobags for extraction of gallbladder.
6. Liberal use of irrigation if spillage occurs.

CONCLUSION

We concluded that, the operative surgeons should be well trained in laparoscopic surgeries and surgeons should consider meticulous and care dissection while operative. Every effort should be made to remove gallstone spilled out by various approach. Operating surgeons should keep a clean follow up of these patients and common and rare complications should be kept in mind while treating these patients in immediate postoperative period and long term follow up.

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