

FAIL TO RETRIEVE GALLSTONES IN LAPAROSCOPIC CHOLECYSTECTOMY- A STUDYPurujit Choudhury¹¹Associate Professor, Department of Surgery, Gauhati Medical College, Assam.**ABSTRACT****BACKGROUND**

Gallstone spillage during laparoscopic cholecystectomy is not uncommon and despite all precautions and adoption of safety measures spilt gallstone remain unretrieved. We are trying to document the incidence of spilt gallstones during laparoscopic cholecystectomy, the cause and consequences of such spillage, probable measure to be adopted to prevent gallstone spillage during laparoscopic cholecystectomy and to take care to retrieve all spilt stones.

MATERIALS AND METHODS

The study included 150 consecutive laparoscopic cholecystectomy performed between October 2014 and November 2015. Data were collected in a prospective manner. Detail study was conducted in terms of diagnosis and consequences of spillage of gallstones. Followup were performed at the end of 1 week, 1 month, 6 months and 1 year.

RESULTS

The spillage of gall stones during surgery occurred in 19.04% of the cases. Majority of the spillage occurred due to perforation of the gall bladder during dissection followed by application of toothed grasper. Although, all visible spilt stones were retrieved during surgery, complication rate of 0.66% was observed.

CONCLUSION

The incidence and complications secondary to the spillage of gall stones during standard laparoscopic cholecystectomy is low, but avoidable; various complications can occur over a large period of time. Thus, it is advisable to retrieve as many gallstones as possible, short of converting to a laparotomy.

KEYWORDS

Laparoscopic Cholecystectomy; Gall Stone Spillage; Unretrieved Intraperitoneal Gallstones.

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BACKGROUND

Laparoscopic cholecystectomy (LC) has been the gold standard for symptomatic gallstones for last 30 years. It is said to be the standard procedure for acute cholecystitis too. Overtime, the rate of common bile duct injuries from LC has declined. Unfortunately, the incidence of spillage of gallstones has remained unchanged. Gallbladder perforation with stone spillage into the peritoneal cavity is more frequent with laparoscopic cholecystectomy as compared with open cholecystectomy. Early reports on laparoscopic cholecystectomy stated that stones left in the peritoneal cavity had no deleterious effect.^[1] Although the incidence of spilt gallstones and their complications are low, they are of large variety.^[2] Thus, it makes a significant problem. The variety of complications are caused by lost gallstones^[3-5]; may range from simple surgical site infection to more serious forms like broncholithiasis. The incidence of complications related to spillage of gallstones during laparoscopic cholecystectomy is between 2.3% and 7%.

This incidence increases by greater than two-fold when the stones are unretrieved.^[3] In an inexperienced hand, chances of gallstones spillage increases during cholecystectomy in acute cholecystitis. Oedematous gall bladder wall-liver interface is equally a potential area of dissection through which gall bladder perforation and stone spillage is not uncommon during removal of gall bladder from liver bed in acute oedematous cholecystitis.

Aims and Objectives

- To document the incidence of gallstone spillage during laparoscopic cholecystectomy.
- To document the causes of gallstones spillage.
- To document the consequences of spilt gallstones.

MATERIALS AND METHODS

The study includes 150 consecutive cases of laparoscopic cholecystectomy performed between October 2014 and November 2015. The surgeries were performed by author and under supervision. A prospective collection of data was obtained in accordance with the proforma, which documented patient's detailed 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, duration of surgery and postoperative events and complications were documented.

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Size of GB- 88 (normal), 58 (distended), 1 (contracted)
Presence of sludge- 15
Number of stones- 2 (none), 10 (single), 135 (multiple)
GB wall thickness- 29 (> 3 mm)
CBD size- 15 (> 7 mm)
Size of Stone- 141 (mobile), 6 (impacted)
Size of Stone- 130 (< 10 mm), 4 (1 - 20 mm), 13 (> 2 cm)
Table 1. Ultrasound Findings

The follow-up was performed at the end of 1 week, 1 month, 6 months and 1-year postoperative. The reviews at 1 week were in the outpatient department, at 1 month some were outpatient visits, rest being telephonic interviews and the remaining follow-up at 6 months and 1 year was performed by telephonic interviews. Data collected were analysed for incidence of spillage of gallstones and complications related to such events during laparoscopic cholecystectomy.

RESULTS

Our study included 150 consecutive laparoscopic cholecystectomy patients between October 2014 and November 2015. Of these, 92 patients were female and the remaining 58 patients were male. The average age of the study group was 48 years. Of these 150 patients, 3 patients underwent conversion to open cholecystectomy due to the following-

- Extensive dense adhesions in 2 cases.
- Obliterated Calot with acute oedematous in 1 case.

Thus, it accounts for a conversion rate of 2%. Majority of the patients came with complaints of pain in the right upper quadrant and/or epigastric region. Second most frequently encountered complaint was that of nonspecific dyspepsia. A total of 39 patients had diabetes mellitus.

Of the total study group 78% patients had uncomplicated symptomatic gallstones, 3.33% accounted for incidentally detected asymptomatic gallstones, 0.66% had gallbladder polyps, 16.66% accounted for gallstone complications (such as gallstone pancreatitis, cholecystitis, obstructive jaundice, Mirizzi’s syndrome, mucocele and empyema gallbladder) and 1.33% had acalculous cholecystitis. Table 1 represents the pre-operative ultrasound findings. In this table, the cut-off for normal thickness of gallbladder wall was taken as < 3 mm and that for common bile duct as < 7 mm. Increased wall thickness implied inflammation. A dilated common bile duct implicated either a stone, a stricture in the distal CBD or a passed stone. Majority of the patients exhibited multiple gallstones of < 1 cm and mobile. The duration of surgery was noted to be between 30 and 60 mins. in 87.75% cases. Adhesions of varying degrees were noted in 71.8% cases leading to conversion of 1.33%. Minimal bleeding was noted in 51.35% cases and moderate bleeding was noted in 37.16% cases, while no bleeding was noted in 10.2% cases. Gallstone spillage occurred in 19.04% cases. In 67.85% of these cases, three to five stones were spilt. In 32.14% cases, less than two stones were spilt and in 7.14% cases more than five stones were spilt. Peritoneal toileting was done in 53.74% cases. All visible peritoneal stones were completely retrieved. Details of the intraoperative findings are shown in Table 2. Table 3 represents mechanism for spillage of gall stones. It was

apparent that gallbladder perforation led to spillage in all cases. The most common case for gallbladder perforation was dissection followed by the application of tooth grasper to the gallbladder. The least traumatic method was application of no tooth grasper to the gallbladder. Table 4 delineates the postoperative events and observations noted during followup. Prior to discharge, two patients developed collections in the gallbladder fossa-

1. Haematoma secondary to slipped cystic artery clip, which was corrected following a relook surgery.
2. A biliary leak from the cystic duct stump with loculated collection was encountered in another patient who was managed conservatively.

1. Surgery duration	6 < 30 mins; 129= 30 – 60 mins; 12 = 60 – 90 mins; 2 > 90 mins.
2. Extension of incision	4
3. Spilt stones	28
4. Wash given	59 < 250 mL
5. Bleeding	15 none; 76 minimal; 55 moderate; 1 severe
6. Port of extraction	91 (umbilicus); 56 (epigastrium)
7. Adhesion	88- partial; 12- complete; 7- dense
Table 2. Intraoperative Findings	

Tooth grasper- 21
Non-toothed grasper- 2
During traction- 15
During dissection (blunt and sharp dissection)- 33
Table 3. Mechanism for Spillage

At 1 week of postoperative followup, one patient complained of pain and discharge at the umbilical port site. On removal of the suture, wound dehiscence was noted. Further exploration of wound on OPD basis revealed a gallstone in the subcutaneous plain. Another patient was readmitted for pancreatitis and found to have CBD sludge on investigations, which was managed by endoscopic retrograde cholangiopancreatography.

In our study, we observed a complication rate of 2.66% for laparoscopic cholecystectomy; however, complication rate from spilt gallstones was 0.66%. The world literature has documented complication rates for spilt gallstones to range between 1.3% and 2.3% for retrieved stones and as high as 7% for unretrieved stones. No complaints related to the surgery were observed at 1, 6 and 12 months of post-operative followup. In our study, 5 patients were lost for followup, of which 3 patients had documented spillage of gallstones.

DISCUSSION

Cholecystectomy has evolved from open to laparoscopic approach over the past decade,^[6] laparoscopy being the current gold standard for treating gallstone disease. One of the issues that have come up in the recent years with laparoscopic cholecystectomy is the unchanged incidence of

Parameters	While in Hospital	1 week Post-op	1 month Post-op	6 months Post-op	1 yr. Post-op
Fever	7	0	0	0	0
Pain abdomen	33	2	0	0	0
Refd pain to Rt shoulder	10	0	-	-	-
Post-op WBC	2	1	0	0	0
Post-op Ultrasound	3	1	0	0	0
Abnormal US	2	1	0	0	0
Average days in hospital	2.51	-	-	-	-
Discharge/sinus	0	1	0	0	0
Intestinal obstruction	0	0	0	0	0
Lost for followup	0	0	4	5	5
Table 4. Post-Operative Details as Inpatient					

Parameters	Our Study	International Data
Spillage of stones	18.91%	2%-11%
Complication related to spilt of GS	.66%	2.3% for retrieved stones and 7% for unretrieved
GB perforation	18.26%	11.6%- 20%
Unretrieved intraperitoneal stones	0	2.4%-4%
Followup	12 months	44.8 months
Table 5. Comparison between Our Study and International Data		

Bile and gallstone spillage into the abdominal cavity.^[7,8] The reason for this includes limited space for dissection, issues with instrumentation that causes laceration of the gallbladder wall and the tendency to deal with acute friable gallbladders, as the experience of surgeons for this procedure has increased. The fate of spilt gallstones^[9,10,11] is not clearly known. In the earlier era of laparoscopic cholecystectomy, it was recommended that spilt gallstones are harmless and can be left alone.^[12,13] Earlier reports by Clinic in the beginning of the era of laparoscopic cholecystectomy claim no deleterious effect from spilt gallstones left in the peritoneal cavity through rat models.^[12] Similar conclusions were drawn by Welch with animal models.^[13]

However, as data accrued, several complications^[14,15] were reported. Brickman’s study published in 2002 included 116 papers derived from a Medline search looked into a total of 91 cases of gallstone complications following laparoscopic cholecystectomy over a period of 8 years. They concluded that gallbladder perforation and stone spillage might cause hazardous complications, and in case of loss of numerous or large pigmented stones conversion to open surgery may be justified.^[16]

Some of these complications are not so significant, while some others are very significant which include abscess in the abdominal wall, broncholithiasis, stone expectoration, cellulitis, dyspareunia, erosion to the back, fat necrosis

posterior of the rectus muscle, fever, fistula formation, gallstone granuloma, gluteal abscess, granulomatous peritonitis mimicking endometriosis, ileus, intestinal obstruction, implantation malignancy, incarcerated hernia, intra-abdominal abscess, jaundice, liver abscess mimicking malignancy, middle colic artery thrombosis, mimicking acute appendicitis, paracolic abscess, paraumbilical tumour, peritoneal abscess formation, pelvic abscess, pelvic stones, peritonitis, pleural empyema, fluid collections, pneumonia, port site stones, port site abscess, recurrent staphylococcal bacteraemia, retrohepatic abscess, retroperitoneal abscess, retroperitoneal actinomycosis, right flank abscess, small bowel obstruction, stones in gastrocolic omentum, stones in hernia sac, stones of the ovary, stones in the fallopian tube, subhepatic abscess, subphrenic abscess, thoracoabdominal mycosis, transdiaphragmatic abscess, umbilical wound abscess and vesicle granuloma.^[3,4,16,17] In this prospective study, we have documented the late complication of spilt stones in our institution. The incidence of spilt gallstones was noted to be 18.91% in our series.^[18,19] In the literature, the incidence ranges between 2% and 11%.^[15]

The reason for our incidence being higher is likely to be the policy of taking on all gallbladder disease irrespective to the state of acuteness and friability of the gallbladder. The reported incidence of unretrieved^[20,21,22] gallstones is 0% in our series, while an attempt was made to take out all the spilt stones^[23] diligently. It is difficult to claim no stones were left behind. Data suggest an incidence of 2.4% - 4%.^[13,24,25] The incidence of complication from retained stones in our series is very low at 0.66%. The literature suggests 2.3% for retrieved stones and 7% for unretrieved stones.^[26] These data were produced by Woodsfield who included six studies, covering 18,280 laparoscopic cholecystectomy cases. The low incidence in our study is likely to be a fortuitous occurrence. Also, in our study the number is limited and the follow-up is of short duration compared to other series with an average follow-up of 44.8 months.^[27] Thus, it can be said that there is a significant incidence of spilt gallstones during laparoscopic cholecystectomy, particularly when cases are not selective. While our study showed a small complication rate, the recommendation is that every attempt must be made to extract all spilt stones. However, this process entails damage to the surrounding structures, the occasional gallstone may be left behind. In such a case, it is important to document it. It is important to note that spillage itself should be prevented to the extent possible.

The Operative Steps suggested to Prevent Spillage are as Follows-

- Careful dissection.^[27,28]
- Making sure not to cause gallbladder perforation.^[29-35]
- Suctioning out gallbladder content prior to starting dissection in a fully distended turgid gallbladder.
- Use of appropriate instruments such as non-toothed graspers.
- Diligent application of clips to close the cystic duct wall.
- Liberal use of irrigation and Endobags to avoid port site complications.^[33]

Table 5 shows a comparison between observations of our study and those of international data.

CONCLUSION

Incidence and complications secondary to the spillage of gallstones and bile during standard laparoscopic cholecystectomy are low and avoidable. When spillage occurs, removal of the stones and peritoneal toileting is the key step to avoid complications. In our study, complications due to spilt and unretrieved gallstones account for 0.66% of all the cases, which is much lower than described in available data. As noted by International data, the rates of complications range are around 2.3% for retrieved intraperitoneal gallstones and 7% for unretrieved gallstones.^[26] It is therefore advisable to retrieve as many gallstones as possible during LC, short of converting to a laparotomy.^[24-34]

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