

Spilled Gall Stones And Clips During LC Are They Cause For Concern?

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Abstract: Laparoscopic cholecystectomy is probably the most frequently done procedure. Being done in significant numbers all over the globe it is important and pertinent that the complications associated with the procedure will be encountered by all surgeons. It is important to realize that some of them are seen more frequently and some are seen rarely. This work is concentrating on the incident of stone spill, bile leak, and clip spill which are common events. Complications associated with them seem to be rare. Over the last 5 years study of LC's our experience has been different and we have not seen any complication both immediate and remote as reported in all the literature reported so far.

Keywords: Gallbladder perforation, Laparoscopic cholecystectomy (LC) Spilled gallstones, Spilled Surgical clips

I. Introduction

Laparoscopic cholecystectomy (LC) is the most common surgical procedure being performed all over the world. The complications in the last three decades have been reducing. This study has concentrated on two of the reported complications - spillage of stones with bile and spillage of clips their short term and the long term effects and their management. The study was undertaken in our hospital on the cases operated during the period from December 2012 to December 2016. Our hospital is a high volume centre for LC and all the surgeons perform LC with varied experience and a total of 787 cases have been included in the study who were worked up and diagnosed to have gall bladder stones alone. The exclusions were patients who had undergone conversion to an open procedure, none of the conversions were due to spillage of stones, bile or clips.

II. Materials and Methods

Present study was done in our hospital from December 2012 to December 2016. All patients underwent standard 4 port LC and were operated under General Anesthesia. Our institution being a teaching hospital all surgeons perform LC. The exclusions were patients who had undergone conversion to an open procedure and patients who opted for an open procedure by choice. All patients were given one dose of third generation Cephalosporin thereafter continued in cases of acute cholecystitis for 72 hrs and further antibiotic only in cases where there was clinical or any other evidence. Standard proforma was given to all the surgeons to record clearly the intraoperative incident of Gall bladder perforation the site and when it happened; whether the GB perforation was associated with bile leak and stones/sludge or was it only bile leak. Attempts at retrieval also was recorded and if any residual stones and/or clips were left. All patients were counselled about the stone spillage and spillage of clips both preoperatively and postoperatively apart from routine description of LC as is routinely practiced the details of the number of cases done are recorded in **Table 1**.

Table 1 Total number of laparoscopic cholecystectomy December 2012 to December 2016

Years	2012	2013	2014	2015	2016	Total
No of LC	120	138	157	184	188	787
Males	35	47	54	62	62	32.6%
Females	85	91	103	122	126	67.4%

Conversion rate was 7% numbering to 55, which in international literature is around 6 % (3). The sex distribution was 32.6 % males to 67.4 % females. The age distribution the youngest patient was 11 years and the oldest patient being 87 years. Conversion rate was almost double in males as compared to females. Number of total cases converted numbered 55 of which 37 were males and 18 were females. Standard 4 port LC was done

in all cases and as a routine all the cases a 22F abdominal drain was left during the initial period of the study viz. 2012, 2013, however 2014 onwards the practice was abandoned and drainage was done only in selected cases which had bile leak and stone spill and was taken out if the overnight drainage was < than 100 ml. As a matter of routine practice all efforts to retrieve stones and clips using laparoscopic grasper, use of ovum forceps, retrieval bags and large bore 10 mm suction with wash of the peritoneal cavity was practiced (4) Causes of conversion were due to dense adhesions and inability to delineate anatomy of Calot's triangle, lump formation, slipped clip of cystic duct and inability to either reapply the clips or apply an endoloop, bleeding from the liver bed, Mirrizi syndrome, and GB anomaly with sloppy large Hartman's pouch adherent to the CBD, contracted GB densely adherent to the liver bed. None of the cases were converted for stone/clip spill. **Tables 2 and 3** detail the incident of GB perforation with or without stone spill in males and females.

Table 2 GB perforations and associated spills of bile with or without stone spills in males

Years	2012	2013	2014	2015	2016
Total males	35	47	54	62	62
GB perforation	14 (40%)	17 (36%)	24 (44%)	12 (20%)	15 (24%)
Only bile leak %	07 (20%)	07 (15%)	09 (17%)	04 (06%)	05 (06%)
Stone spill %	07 (20%)	10 (21%)	15 (28%)	10 (16%)	10 (16%)

Table 3 GB perforations and associated spills of bile with or without stone spills in females.

Years	2012	2013	2014	2015	2016
Total females	85	91	103	122	126
GB perforation	25 (29%)	32 (35%)	36 (35%)	43 (35%)	43 (34%)
Only bile leak %	07 (08%)	10 (11%)	11 (11%)	13 (11%)	13 (10%)
Stone spill	18 (21%)	12 (14%)	25 (24%)	30 (25%)	30 (24%)

Table 4 Clip spills and total number of cases given in parentheses.

Years	2012	2013	2014	2015	2016	Total
Clip spill	07 (120)	07 (138)	10 (157)	12 (184)	09 (188)	45 (787)

III. Results

The purpose of our study was to highlight the fact that though there are reports of complications but it is definite that there is never a need to change the course of treatment postoperatively and in our study we conclude that there are no short term complications and we did not see any long term complication in the follow up of in a total of 490 cases which have been followed up for 36 months. 113 cases had got lost to follow up. Follow up was done at 10 days in the surgery outpatient's office followed by review at 06 weeks, 03 months, 12 months and 24 months post-surgery. The commonest complaint of patients being some discomfort in the epigastric region which disappeared in almost all the cases by 06 months.

Average perforations % in males was 33% and the same in females was 34%. Review of literature reported % of stone spill was an average stone spill % in males was 20% and the same in females was 21%. Complications as reported detailed in Table 5 has not been encountered in any of the cases so far. The clip spills a rare incident and happened invariably from the gall bladder end of cystic duct or during extraction and rarely while handling the endo stapler.

IV. Discussion

All patients had clinical symptoms suggestive of gall bladder disease and stones in the gall bladder confirmed by an abdominal ultrasound with no evidence of choledocholithiasis and normal LFT. Acute cholecystitis were also included who were worked up and were operated between 3rd and the 5th day after the diagnosis. A single institutional study of patients undergoing LC with a special emphasis on effects of stone spill, bile leak and clip spills. Incidence of GB perforation with stone spills have been reported in literature time and again with both short term and long term complications. 2 This study has analyzed cases of LC done in our hospital over the last 05 years between 2012 -2016 Perforation of the gall bladder occurs fairly frequently during laparoscopic cholecystectomy and is reported in the range of 10%–40% in various series. 2. In our series we have recorded to be 33% in males and 34 % in females. (2, 3, 4) The spillage of bile and gallstones generally occurs because of gallbladder perforation during dissection (42%-75%), traction (15%51%), or extraction of the gallbladder through a trocar opening that is too narrow (5%-10%), or due to slippage of the cystic duct clip during handling of the gallbladder (14%-21%). (5, 6, 7, 8).

Table 5 Complications of laparoscopic cholecystectomy reported in various series (Percentages in parentheses)²

Series	Laparoscopic cholecystectomy	Bile leak	Spilled stones	Postoperative complications
Schafer et al	10174	-	581 (5.7)	08 (0.08)
Memon et al	856	-	106 (12.3)	05 (0.58)
Diez et al	3686	627 (17)	254 (6.9)	12 (0.32)
Rice et al	1059	306 (28.9)	103	03 (0.28)
Sarli et al	1127	-	131 (11.6)	-
Kimura et al	110	29 (26.3)	03 (2.7)	-

Table 6 Modes of clinical presentations secondary to stone spillage (2)

Infective

Local: Liver abscess, Subhepatic abscess, Retrohepatic abscess, Intra-abdominal abscess

Distant: Retroperitoneal abscess, Loin abscess, Pelvic abscess

Cutaneous complications

Sinus formation, Port site infections, Granuloma formation, Colocutaneous fistula

Mechanical

Intestinal obstruction, Lodgment in distant hernial sacs, Dyspareunia, tenesmus (pelvic migration)

Migration to other systems

Chest: empyema, cholelithoptysis

Urinary tract: excretion, hematuria

Systemic - Septicemia

As reported in literature the complications associated with stone spill are tabled as Table 6. (2)As per review of literature there is a definite risk of a complication following spilled Gall stones however our study has not reported any complication as mentioned in Table 6 or otherwise in follow-up period upto 36 monthsA review of literature both in animal studies and large series the incidence of complications mentioned have been remote and in our study we have not encountered a single mentioned complication.The most frequent definite locations of lost gallstones are the right hypochondrium (41%) and the pelvis (33%) 15.

Twenty per cent of gallstones remain inadvertently lost in the peritoneum during surgical intervention, while in those laparoscopic cholecystectomies in which gallstone spillage is identified, their complete extraction is only possible in 50%-67% of cases.11, 12, 13 The difficulty in recovering all gallstones laproscopically makes the rate of complications due to lost gallstones higher in laparoscopic cholecystectomy than in open cholecystectomy.14In all cases where there was a stone spill attempts were made to remove the spill but a complete clearance could not be done except when the case was of a solitary calculus which had slipped, however all cases there was bile spill including in some cases of acute cholecystitis. No post-operative complication was encountered in these cases too.

Clip spill numbers are shown in **Table 4**, nonetheless, it is not an infrequent event, occurs generally during handling of the endostapler and during extraction of the gallbladder without a collection bag. The clips applied to the cystic duct may also slip due to incorrect application, a short or wide cystic duct, or even during dissection, retraction, or aspiration.15 When it is known during surgery that there are loose clips in the peritoneum, these are usually recovered laproscopically without great difficulty, but there are occasions when, inadvertently, clips may remain in the peritoneal cavity.Clip migration and slippage have been recorded in literature however we did not experience; it has been reported to occur as a reaction to local infection and/or ischemia of the cystic duct.16. This slippage usually occurs within the first month following surgery16, may lead to a biliary fistula and later lodging of the clip in the peritoneum, which generally is found in sloped areas such as the pelvis, Morrison’s pouch, and the right iliac fossa.17 Additionally, there are various articles that describe the secondary formation of choledochal calculi around metallic clips which have migrated through the wall of the biliary tract.16

IV Conclusion

This study has been done to establish that the event of stone spill and clip spill are fairly common events as per review of literature and as experienced by this study we have had no complications as mentioned in the various studies; careful surgical approach to avoid this event is very important; attempts to remove the spilled stones and or clips is to be followed.There is definitely no role for converting to an open procedure to remove stones /clips.

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*Dr. Suresh Kalyanasundar. "Spilled Gall Stones And Clips During LC Are They Cause For Concern?" IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) 16.7 (2017): 55-58.