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SPILLED BILE AND GALLSTONES;

THE CONSEQUENCES DURING LAPAROSCOPIC CHOLECYSTECTOMY: EXPERIENCE AT LIAQUAT UNIVERSITY HOSPITAL

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ABSTRACT… Objectives: Intra-peritoneal bile leak and gallstones spillage is a common event, during laparoscopic cholecystectomy. Some time it is not possible to retrieve all spilt gallstones, these unretrieved intra-peritoneal gallstones, initially considered harmless, with time a number of complications have been reported. Our aim was to study, factors predisposing to gallbladder perforation during laparoscopic cholecystectomy, and the incidence and adverse consequences of intra-peritoneal spilt gallstone. **Period:** November 2008 to December 2011. **Setting:** Liaquat University Hospital were studied. **Method**: Patients who underwent successful laparoscopic cholecystectomy for biliary colic and cholelitiasis. Patients who had intra-peritoneal bile and gallstones spillage during laparoscopic cholecystectomy were follow up for long period, and all patients studied for risk of perforation and complications. **Results**: 1038 patient underwent successful laparoscopic cholecystectomy, among them in 812(78.23%) patient intact gallbladder were removed, and in 226 (21.77%) patient gallbladder perforation occurred. Patients had gallbladder perforations in 129(12.43) patients only bile leak was noted, and in 97(9.34%) patients bile and gallstones spillage occurred. **Conclusion**: We concluded the outcome and incidence of serious complications after intra-operative spillage of gallstones and bile, during laparoscopic cholecystectomy, is low and avoidable.

Key words: Gallstones spillage, laparoscopic cholecystectomy, Intra-peritoneal bile leak

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INTRODUCTION

Laparoscopic Cholecystectomy is common surigical procedure performed by general surgeon throughout world. Few years after introduction of LC, it is recognized as the procedure having low post-operative morbidity and early recovery, and has replaced the traditional open cholecystectomy and has become the "gold standard" for the surgical management of symptomatic cholelithiasis.[1] Although the Laparoscopic Cholecystectomy (LC) has slightly higher incidence of iatrogenic injury to the biliary tract compared to open procedure, leading to intra-peritoneal spillage of bile and gallstones.[2,3] The incidence of gallbladder perforation during LC is up to 30%[4], and of gallstones spillage is up to 16%.[5] If these spilled gallstones left unretrieved can result in seriouscomplications.[6] A review of literature shows that lost gallstones during LC result in septic, fistulous and even intestinal complications with different presentations in different location.[7,8,9]

In laparoscopic cholecystectomy GB perforation usually occur during separation from liver bed or during extracting through the port.[10]

Leaks of GB content is considered relatively harmless, the long term consequences of intra-peritoneal spillage of bile and gallstones are undefined. Some studies showed minimal fibrotic reaction to intraperitoneal stones[9], whereas some showed abscess formation.[11] The purpose of this study was to determine the factors predisposing to intraoperative perforation of gallbladder and the incidence and spectrum adverse consequence related to spillage of gallstones.

MATERIAL AND METHODS

Patients (1038) who underwent Laparoscopic

Cholecystectomy (LC), from November 2008 to December 2011, for biliary colic, chronic cholecystits and symptomatic cholelithiasis, in Liaquat University Hospital Jamshoro, were included in this study. All patients, clinical, diagnostic, operative and follow up data were collected prospectively. Patients who were converted to open cholecystectomy, because of adhesions or miscellaneous causes, were not included in this study. All patients were pre-operatively informed about possibility of spillage of bile and gallstones. Patients who had intraperitoneal spillage of bile only, and bile plus gallstones because of gallbladder perforation (GBP) were short listed and followed up. Patients of GBP group were divided into two groups (1-Bileleak only, 2-Bile+gallstones spillage), and they were compared for complications. Patients were followed up in surgical clinic (OPD), 2 to 3 weeks interval for 3 months then 4-6 month interval up to three year post-operatively.

RESULTS

Total 1038 patients underwent successful laparoscopic cholecystectomy (LC) between November 2008 and December 2011. In 226 (21.77%) patients (table-1), iatrogenic perforation of gallbladder (GBP) occurred. Among them in 129 (12.43%of total and 57.07 of GBP) patients only spillage of bile occurred, while in 97 (9.34% of total and 42.92% of PGB) patients spillage of both bile and gallstones has occurred (table-2 and tabl-3). More male patients were present in GBP group compared to intact GB patients (42.25% vs. 10.1% of group). Mean age of patients having gallbladder perforation was slightly greater than that of patients in whom gallbladder was removed intact (46±17 vs. 42±15, p=0.006). Adhesion between the GB and the omentum imposed a greater risk of GB perforation (68.58% vs. 36.08%, p<0.001).

Gallbladder perforated during dissection of gallbladder from the liver in 52% of patients, during extraction through the abdominal wall 19%, and remaining 29%, perforation occurred as result of intra-operative retraction and separation of adhesions to clear the anatomy. The operative time in Patients of PGB group was longer than intact GB group (91±30 minutes vs. 73±22 minutes, p<0.001), and the operative time in patients in whom bile and gallstones spillage occurred was slightly longer, compared to patients in whom only bile leak occurred (98±32 minutes vs. 85±28 minutes, p=0.0146), that is slightly significance. Mean hospital stay was longer in perforated GB group, compared to intact GB group (49±10 hours vs. 38±12, p<0.001). In PGB group, the mean hospital stay was longer in patients, having spilled bile and gallstones, compared to patients had only bile leaked (56±12 hours vs. 42±8 hours, p<0.001).

In this study, no peri-operative death and bile duct injury has occurred. No any iatrogenic injury occurred to duodenum or intestine in any patients. Six patients require re-operation in GBP group, among them one in only bile leak group, the remaining five Bile plus gallstones spillage group, 4 patients were operated for intra peritoneal abscess (subhepatic, pelvic), and one for sub hepatic granuloma. No case was reported, of post-operative intra-peritoneal infection in uneventful cholecystectomy. In GBP group, 4 (4.12%) patients developed post-operative sub-hepatic abscess in bile plus gallstones spillage sub-group, and in 1(0.78%) patient of only bile leaked sub-group (p=0.57615). Pelvic abscess also noted more in patients of bile plus gallstones spillage sub-group, compared to patients having only bile leaked (3(3.09%), vs. 1(0.78%), p=0.504985). In GBP patients 63 patients developed port site infection, among them 28(28.86%) cases was in bile and gallstones spillage sub-group, and 35(27.13%) cases was noted in only bile leaked sub-group, and statistically it is not significance. Ileus has been noted in patients of all groups, without any significant difference and these patients managed conservatively. Mean time to return to work was slightly more in GBP group (Table-I&II). Among 226 patients of GBP group 6 patients was operated for intra-abdominal abscess, the remaining were managed by needle aspiration under ultrasound guidance, and conservative management. All patients were satisfied with their operation.

	GB intact	GB Perforated	'p' value
Patients (n=1038)	812	226	-
Bile leak only	-	129	-
Bile+ Gallstones Spillage	-	97	-
SEX Male	82(10.1%)	18	-
Female	730(89.9%)	69	-
Mean age in years	42±15	46±17	0.006*
Adhesions	293(36.08%)	155(68.58)	<0.001
Mean Operative Time in minutes	73±22	91±31	<0.001
Mean Hospital stay in hours	38±12	49±10	<0.001
Post-operative fever	47(5.8%)	33(14.6%)	-
Return to work in days	11±7	14±8.5	<0.001

Table-I. Patient and operative characteristics
**. Significant*

	Bie leak only	Bile plus GS Spillage	'P' Value
Patients (n=226)	129(57.07%)	97(42.92%)	-
SEX Male	37(28.68%)	23(23.7%)	-
Female	92(71.32%)	74(76.3%)	0.402258
Mean age in years	47±18	45±17	0.3981
Adhesions	83(64.34%)	72(74.22%)	NS
Mean Operative Time in minutes	85±28	98±32	0.0146*
Mean Hospital stay in hours	42±8	56±12	<0.001
Post-operative fever	16(12.4%)	17(17.5%)	-
Return to work in days	13±9	15±8	0.0844

Table-II. Patient and operative characteristics of perforated gallbladder
**. Significant*

Complications	Bile leak only	Bile plus GS spillage	'P' Value
Patients n=226	129	97	
Sub hepatic abscess	1(0.78%)	4(4.12%)	0.57615
Retrohepatic abscess	-	-	-
Pelvic abscess	1(0.78%)	3(3.09%)	0.504985
Granuloma formation	-	1(1.03%)	NS
Intestinal obstruction(ileus)	2(1.55%)	1(1.03%)	NS
Dyspareunia, Tenusmus	-	1(1.03%)	NS
Septicaemia	-	-	NS
Wound Infection(port site)	35(27.13%)	28(28.86%)	0.574628

Table-III. Complications: Perforated gallbladder (bile leak only vs. bile plus gallstones spillage)
NS. Denotes not significant

DISCUSSION

Since the introduction of Laparoscopic cholecystectomy in 1989, it has rapidly become gold standard and treatment of choice for symptomatic cholelithiasis.[9,1] The laparoscopic cholecystectomy (LC) however is not without complications, like other surgical procedure. LC has known specific complications, among them bile duct injury is the most serious and dreaded. Luckily the rate of this serious complication has been reported to as low as 0.2%.[12] In our study, no injuries to bile ducts were noted. Many trials and studies have established the LC to be a safe procedure with low incidence of major complications.[11] A gall bladder perforation with bile and gallstones spillage is the other more common complication of LC than with open cholecystectomy.[10] Spillage of bile and GS during LC is very common among surgeons who perform this type of operation, and the incidence

is reported to be 10% to 40% of cases.[6,13,14] In this study the incidence of GBP is 21.77%, and the rate of gallstones spillage was 9.34%. This incidence is slightly greater than described in a Canadian Multicenter study (9%)[15], but in some studies, incidence of GBP is greater(32%) than our study[8,9], 18.19% in SuviViupaksha's study[16] and 29% in Ibrahim A and colleague's study.[17]

Patients variable associated with greater risk of intra-operative GBP were, male sex and increasing age. Similar finding were noted by David G(1), Rice et al[8], and John and colleague.[9] In this study we observe that gallbladder is more prone to perforation, when it is loaded with multiple gallstone and wall were stretched because of inside pressure, and there is more fat around cystic duct, also if patient is fatty having thick abdominal wall (adipose tissue), it need more force to retract the GB in cephaloid direction, in this situation carefully retract the GB and dissect Calot's triangle to prevent GB perforation. Secondly to prevent bile and GS spillage, when a large and multiple GS burden prevent extraction of GB through epigastric or umbilical port, GB sample can be placed in a bag before crushing or remove stones from using forceps or incision the port area can be increased.[10]

It is not always possible to retrieve all intra-peritoneal spilled gallstones, especially when crumbled by forceps, and the pieces slid down into folds (intestinal, peritoneal) around the operative field. Removal of stones by saline irrigation was attempted, but the removal was usually incomplete[18], and some stones are retained. It is not clearly known about the fate of spilt GS. In the early days of laparoscopic cholecystectomy, it was recommended that spilt GS are harmless and can be left alone.[19,20] In the same early era of LC it is noted by Clinc in rate model, and by Welch in animal models, that there is no deleterious effect from spilt GS left in peritoneal cavity.[19,20] With the time as data accrued, severe complications were reported. Backmann concluded from their study that, GBP and stones spillage might cause hazardous complications, and in case of loss of numerous or large pigmented stones, conversion to open surgery might justified.[21] Exact fate and natural history of free peritoneal GS is not clear. A number of animal studies have been undertaken to determine the potential consequence of spilled GS in the abdominal cavity. Some studies showed, spilled GS are harmless and thus do not warrant exploratory laparotomy.[20,22] Some GS provoke inflammatory response to cause it to be walled off by omentum and local fibrosis, some result in partial reabsorption.[20] The inflammatory response is greater the presence of infection[23,24], stone fragmentation[24], and with pigment stones.[25,26] Pigment stones are more likely to be infected than cholesterol stones, up to 80% to 90% of pigmented stones contain bacteria[22,27], such as E-coli, klebsiella Pneumonia, and enterococcus.[26,28] The most frequent complications of intra-peritoneal GS is abscess formation[26,27], and accounting for 60% of complications.[21] It must recognize the distinctive look of intra-abdominal abscess, due to the radiographic appearance can mimic more serious diseases such as tumors or bowel obstruction.[28] Super and Dongguan study showed that the mortality rate and the incidence of serious complications of retained gallstones gallstones very low[29], they advised the surgeons against converting LC to an open procedure in case of spillage.[9,30] Rice DC and colleagues[8] in their study, stressed the need to eliminate many of the stones can be via laparoscopy, it is recommended to switch to an open, fair process for patients is not possible to recover most of the endoscopic gallstones, especially when bacteriobilia suspicion.

Luckily there is low incidence of complication in our study, to some extent it is related to more advanced innovations in laparoscopic surgery, and also experienced surgeons. To prevent GS and bile spillage to some extent, and reduce post-operative complications, and psychological trauma to patients, few suggestions are recommended.

- Pre-operatively inform the patients about the possibility of gallstones and bile pillage.
- During procedure, carefully dissect, the Calot triangle and gallbladder from liver bed.
- If gallbladder is fully distended and turgid,

due to GS and bile, suction out GB content (bile), prior to starting dissection.
- Use appropriate instruments, such as non-toothed grasper (non-traumatic).
- Apply clips carefully and appropriately.
- If GS and bile spillage occur, every effort should be made to retrieve the GS, and peritoneum should be irrigated with copious saline, and use endo-bag for collection of spilled GS to avoid port site complications4.
- Patients should be informed about spillage of GS and document it, and follow up the patient for long period.

There is no need to convert into open surgery.

CONCLUSION

The outcome and incidence of serious complications after intra-operative spillage of gallstones and bile, during laparoscopic cholecystectomy, is low and avoidable. If spillage does occur, removal of stones and peritoneal irrigation with saline is the key step to avoid complications, and the patients should be informed post-operatively about the event. Such patient should be follow up for long to avoid waste of time and money, for unnecessary examination and investigations, to diagnose the related post-operative complications.

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"The less you know,
the more you believe."

Bono

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