

Spilled gallstones after laparoscopic cholecystectomy

A relevant problem? A retrospective analysis of 10,174 laparoscopic cholecystectomies

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Abstract

Background: Spilled gallstones after laparoscopic cholecystectomy may cause abscess formation, but the exact extent of this problem remains unclear.

Method: The data (collected by the Swiss Association of Laparoscopic and Thoracoscopic Surgery) on 10,174 patients undergoing laparoscopic cholecystectomy at 82 surgical institutions in Switzerland between January 1992 and April 1995 were retrospectively analyzed with special interest in spilled gallstones and their complications.

Results: In 581 cases (5.7%) spillage of gallstones occurred; 34 of these cases were primarily converted to an open procedure for stone retrieval. Of the remaining 547 cases only eight patients (0.08%) developed postoperatively abscess formation requiring reoperation.

Conclusions: Spillage of gallstones after laparoscopic cholecystectomy is fairly common and occurs in about 6% of patients. However, abscess formation with subsequent surgical therapy remains a minor problem. Removal of spilled gallstones is therefore not recommended for all patients, but an attempt at removal should be performed whenever possible.

Key words: Laparoscopy — Cholelithiasis — Spilled gallstones — Complications after laparoscopic cholecystectomy — Abdominal abscess

Laparoscopic cholecystectomy has rapidly become the standard treatment for symptomatic cholelithiasis and acute cholecystitis in western countries [7, 12]. Today, laparoscopic cholecystectomy has shown to be a safe and effective procedure in experienced hands and carries therefore a low morbidity and mortality rate [2, 3, 9]. However, introduction of laparoscopic cholecystectomy was associated with some new complications, which have been rare with tradi-

tional open cholecystectomy. An increased incidence of major bile duct injuries, especially during the learning curve, has been reported by many authors [8, 10]. Iatrogenic bile duct injuries probably represent the most serious complication of laparoscopic cholecystectomy and have therefore attracted the most attention. Perforation of the gallbladder with intraabdominal spillage of gallstones is a common problem after laparoscopic cholecystectomy although it is not considered to be as serious. The reported rate of gallbladder perforation after laparoscopic cholecystectomy varies from 10 to 32% [1, 4, 11, 14]. Mostly, inadvertent opening of the gallbladder occurs during the dissection from the liver bed. Furthermore, rupture of the gallbladder can either occur by tearing the gallbladder with grasping forceps or during the extraction through the abdominal wall. With open cholecystectomy intraperitoneal spillage of gallstones is easily recognized, and the lost stones can be retrieved without problems. Thus, retained gallstones were uncommon, and only one patient has been reported with intraabdominal abscess formation several years after open cholecystectomy [5].

The exact morbidity and complication rate of spilled gallstones after laparoscopic cholecystectomy are not well investigated. It is known that spilled gallstones may cause abscess formation [6]. But the incidence of complications due to spilled gallstones seems to be low or even very low [11]. Thus, it remains unclear if stone spillage should be considered an indication for conversion to an open procedure for stone retrieval.

The aims of this retrospective study were to investigate the frequency, the complications, and therapy of spilled gallstones after laparoscopic cholecystectomy.

Patients and methods

The Swiss Association for Laparoscopic and Thoracoscopic Surgery (SALTS) prospectively collects the data of patients undergoing cholecystectomy at 82 surgical institutions (universities, county and district hospitals, and surgeons in private practice) in Switzerland. More than 350 single items of data including personal records, ASA classification, indication for surgery, preoperative investigations, intraoperative findings, operative

Table 1. Characteristics of patients, indication for LC and operating time

Characteristic	Overall CE group	LC with spilled gallstones, no conversion	LC with spilled gallstones and conversion	LC with spilled gallstones and complications
No. of patients	10,174	547	34	8
M:F (%)	3,103:7,071 (31:69)	249:298 (46:54)	15:19 (44:56)	5:3 (62:38)
Mean age, range (years)	52.6 (2–96)	55.4 (19–92)	59.1 (30–82)	62.1 (39–79)
Indication (%)				
CCL	7,579 (74.5)	369 (67.5)	24 (70.6)	5 (62.5)
AC	1,049 (10.3)	82 (15.0)	8 (23.5)	3 (37.5)
Other	1,546 (15.2)	96 (17.5)	2 (5.9)	0 (0.0)
Operating time (%)				
<60 min	26.8	9.2	0	0
60–120 min	55.5	54.8	47.1	62.5
>120 min	17.7	36.0	52.9	37.5

AC, acute cholecystitis; CE, cholecystectomy; CCL, cholecystolithiasis; LC, laparoscopic cholecystectomy; Other: common bile-duct stones, gallbladder polyps, biliary pancreatitis.

complications, conversion rate, postoperative morbidity, reoperation rate, and mortality were recorded for every patient on a specially designed computerized worksheet [13].

The data of 10,174 laparoscopic cholecystectomies performed between January 1992 and April 1995 were retrospectively analyzed with special regard for intraabdominally spilled gallstones. All patients with lost gallstones were identified. Their medical records and operative reports were collected from the referring surgical institutions or the general practitioner; they were then asked to answer an additional questionnaire concerning further details and follow-up. If necessary, the institutions were visited or telephoned by one of the investigators to collect data which were missing. The follow-up of all patients was guaranteed by contacting either the general practitioner or the patient.

Data collected from chart review, telephone call, and questionnaire were then carefully reviewed, and the patients who had had complications following spilled gallstones were identified. These few cases were then further investigated using a previously created protocol with selected criteria from the literature.

Results are expressed as mean, standard deviation, and range values, respectively.

Results

Characteristics of patients

There were 3,103 male (30.5%) and 7,071 female patients (69.5%). The overall mean age at the time of operation was 52.6 years (range 2–96 years).

Among the 10,174 patients, there were 581 patients (5.7%) with intraoperative gallstone spillage into the peritoneal cavity. Their mean age was 55.6 years (range 19–92 years); 547 of these 581 operations were finished laparoscopically, whereas in 34 cases the operation was converted to an open procedure during which all the spilled gallstones were removed.

Only eight patients (0.08%, five men and three women) with a mean age of 62.1 years (range 39–79 years), could be identified as having had a serious postoperative complication due to intraabdominally lost gallstones. The baseline data are shown in Table 1.

Indications of laparoscopic cholecystectomy

Symptomatic cholecystolithiasis was the main indication for patients undergoing laparoscopic cholecystectomy (62.5%),

followed by acute cholecystitis (10.3%) and some less frequent indications (15.2%, i.e., choledocholithiasis, biliary pancreatitis, polyps of the gallbladder). Patients undergoing laparoscopic cholecystectomy for acute cholecystitis had a higher incidence of intraabdominal gallstone spillage. Therefore, in the group with conversion to an open procedure for stone retrieval, as well as in the group with serious postoperative complications, 23.5% and 37.5% of the patients underwent laparoscopic cholecystectomy for acute cholecystitis, respectively (Table 1).

Operating time

The “French” procedure, with the surgeon’s position between the patient’s legs, is the most common surgical technique in Switzerland. As shown in Table 1, more than 80% of the laparoscopic cholecystectomies in the overall laparoscopic group were performed within 120 min. However, spillage of gallstones markedly increased the operating time, and at least one-third of these operative procedures lasted more than 120 min. Of course, conversion to the open procedure caused an even longer operating time. Nevertheless, patients with serious postoperative complications due to spilled gallstones did not have longer operating times than patients with “simple” spillage of gallstones.

Intraabdominally spilled gallstones: postoperative complications, postoperative reoperation, and intervention rate

As previously mentioned, there were 581 patients (5.7%) with intraabdominally spilled gallstones. Nearly all the procedures were finished laparoscopically; only 34 patients (5.8%) had a conversion to an open procedure for stone retrieval. Comparing these two patient groups, we found a considerably lower rate (5.9 vs 10.8%) of local postoperative complications in the group with conversion. In particular, no complications due to common bile-duct stones, bile leakage, bleeding, or spilled gallstones occurred. However, the systemic complication rate, i.e., cardiac failure, pulmo-

Table 2. Intraabdominally spilled gallstones: complications, reoperation, and intervention rate

	LC with spilled gallstones no conversion (n = 547)	LC with spilled gallstones and conversion (n = 34)
Postoperative complications (%)		
Local:	59 (10.8)	2 (5.9)
–CBD stones	8	0
–Bile leakage	18	0
–Intraabd. abscess formation	8	0
–Intraabd. bleeding	7	0
–Ileus	1	0
–Trocar herniation	1	0
–Trocar hematoma	10	0
–Wound infection	6	2
Systemic:	42 (7.7)	4 (11.8)
–Pulmonary embolism	1	2
–Cardiopulmonary insuffic.	15	1
–Sepsis	2	0
–Urinary tract infection	5	0
–Other	19	1
Reoperation rate (%)	5.5	0

CBD, common bile duct; LC, laparoscopic cholecystectomy.

nary complications, and thromboembolism, was higher (11.8 vs 7.7%) in the group with conversion.

The reoperation rate was 0% and 5.5% for the groups with conversion and without conversion, respectively. Bile leakage, intraabdominal abscess formation, and bleeding were the main reasons for reoperation. None of the 34 patients whose operations were converted to an open procedure for stone retrieval developed any further problems from spilled gallstones (Table 2).

Serious postoperative complications due to spilled gallstones requiring reoperation

Among the 10,174 patients undergoing laparoscopic cholecystectomy we identified eight patients (0.08% for the overall group or 1.4% of those with spilled gallstones, respectively) with serious postoperative complications following intraabdominally spilled gallstones. There were five men and three women. Mean age at the time of operation was 62.1 years (range 39–79 years). Five patients underwent laparoscopic cholecystectomy for cholecystolithiasis, while the remaining three were operated on for acute cholecystitis. Six operations were elective procedures, whereas two were performed as emergencies. All the patients, bar one, developed intraabdominal abscess formation requiring reoperation. Three of these seven patients not only developed an intraabdominal abscess but also fistulas and abscess formation into the abdominal wall. In one patient who complained postoperatively of upper abdominal pain, gallstones had become sandwiched between the liver and the diaphragm intraoperatively. Reoperation was always performed by open access. Four patients were reoperated in the early postoperative course (2–21 days); the remaining four patients were reoperated on after 2.3, 4.5, 5.0, and 18.4 months. Gallstones were found in seven patients. In four cases, bacterial growth was detected; in the remaining four cases, bacterial culture was either negative or not performed. Unfortunately, chemical analysis of the retrieved gallstones was only per-

formed in one case. Also, the number and the size of the gallstones were only poorly documented (Table 3).

Follow-up

Follow-up time was 16–56 months. None of the eight patients with abscess formation who had required reoperation had further complications. They all recovered fully and their further postoperative course was uneventful. The same uneventful postoperative course was found in the patient group with conversion to an open procedure.

Discussion

The purpose of our current study was to investigate the clinical relevance of spilled gallstones after laparoscopic cholecystectomy. To this end, the data of 10,174 laparoscopic cholecystectomies performed at 82 surgical institutions in Switzerland were retrospectively analyzed.

Intraoperative spillage of gallstones occurred in 5.7% of our cases. Since Fitzgibbons has suggested that spillage of gallstones occurs in about two-thirds of gallbladder perforation [4], the effective perforation and rupture rate of the gallbladder is probably even higher, although it did not occur in our study. The perforation rate of the gallbladder according to the literature varies considerably, from 10 to 32% [1, 4, 10, 11]. The exact number of lost gallstones was not recorded by SALTS and thus could not be evaluated. However, in the small group of patients with postoperative complications, more than one lost gallstone was found in the peritoneal cavity.

Symptomatic cholelithiasis was the most frequent indication for laparoscopic cholecystectomy, followed by acute cholecystitis. Patients with acute cholecystitis had an increased rate of spilled gallstones as well as a higher complication rate. On the other hand, patients who underwent

Table 3. Patients with serious postoperative complication due to intraabdominally spilled gallstones

Patient	Sex	Age (years)	ASA	Ind.	Reop (days)	Complication	Bacterial culture	Gallstones					
								<5 mm	5–10 mm	>10 mm	size unknown	no GS found	
1	M	39	1	CCL	150	Fistula of the umbilicus, intraabdominal abscess	Not performed			+			
2	M	53	1	AC	2	Irritation of the diaphragm	Negative					+	
3	M	62	2	AC	21	Intraabdominal abscess	Enterococcus faecalis	+					
4	M	75	2	AC	3	Intraabdominal abscess	Negative						+
5	M	79	2	CCL	552	Intraabdominal abscess	Streptococcus milleri	+					
6	F	41	1	CCL	10	Abscess formation intraabdominally and abdominal wall	Pseudomonas aeruginosa					+	
7	F	69	2	CCL	70	Fistula of the abdominal wall	Not performed		+				
8	F	79	3	CCL	132	Intraabdominal abscess	Escherichia coli					+	

AC, acute cholecystitis; CCL, cholecystolithiasis; GS, gallstone; Ind., indication; Reop., reoperation (days after the first operation).

laparoscopic cholecystectomy for cholelithiasis had a lower conversion rate and also a lower complication rate due to spilled gallstones.

Spillage of gallstones extended the operating time, but there was no difference between the patient group with “simple” spillage of gallstones and those with postoperative complications.

Although we found 581 patients (5.7%) with intraabdominally lost gallstones, spillage of gallstones only led to conversion to an open procedure for stone retrieval in 34 cases. Therefore, it can be suggested that either the majority of the spilled stones were completely retrieved or they were so utterly lost in the peritoneal cavity that the surgeons decided not to search for them. The exact reasons why the spilled gallstones led to conversion are unknown.

Different complication rates were found for local and systemic complications. Local complications were markedly more frequent in the group with “simple” spillage of gallstones compared to the group with conversion for stone retrieval. In particular, no complications due to common bile-duct stones, bile leakage bleeding, or spilled gallstones occurred. Additionally, there were no complications related to laparoscopic access such as trocar hematoma and herniation. However, systemic complications were more frequent after conversion to an open procedure. Since these patients were older and their operating time was longer, they possibly had an increased risk of systemic complications.

Although intraabdominal spillage of gallstones was not an uncommon problem, complications following such spillage were very rare, and only eight patients were identified among these 10,174 cases. All these patients (five men and three women) had a “simple” spillage of gallstones, and the laparoscopic cholecystectomies were uneventful. The indication for laparoscopic cholecystectomy was symptomatic cholelithiasis in five patients and cholecystitis in three patients. Thus, this small patient group showed a threefold increase in the rate of acute cholecystitis compared to the overall cholecystectomy group. Leakage of infected bile and gallstones are probably responsible for this increased complication rate. Furthermore, the inflamed wall of the gallbladder is vulnerable and the local inflammatory reaction makes the dissection more difficult. Intraabdominal abscess formation, which is also the most frequent complica-

tion in the literature, occurred in seven patients [6]. One patient was reoperated on 2 days after the laparoscopic cholecystectomy and so in all likelihood had not yet developed abscess formation in this short postoperative period. But all of these eight patients were reoperated on with open access. Four patients were reoperated on early after laparoscopic cholecystectomy (within the first 3 postoperative weeks), among whom were all three cases with acute cholecystitis. The remaining four patients developed abscess formation and cutaneous fistula in the late postoperative course. Gallstones of different size and number were found in seven cases. Chemical analysis was only performed in one case, which revealed bilirubin stones. In four cases, bacterial growth was detected with four different types of bacteria. In two cases, the bacterial cultures were sterile, and in the remaining two cases no bacterial culture was performed.

During the follow-up time, all patients who underwent reoperation due to septic complications or with conversion to an open procedure for stone retrieval developed further complications, but no mortality occurred. Therefore, all these additional operative procedures were successful.

The final question is whether spillage of gallstones is an indication for conversion to an open procedure for stone retrieval. Although spillage of gallstones may lead to severe postoperative complications, the incidence and the mortality are low, even very low. Thus, obligatory conversion to an open procedure for stone retrieval is inappropriate. However, an attempt should always be made to remove spilled gallstones and to irrigate the abdominal cavity.

In conclusion, spillage of gallstones during laparoscopic cholecystectomy is a common problem (5.7%), but serious postoperative complications are fortunately very rare (0.08%). Elderly patients with acute cholecystitis with infected bile and spilled stones may have an increased risk of intraabdominal abscess formation. Therefore, perforation and rupture of the gallbladder should be prevented whenever possible. In cases of spilled gallstones, the surgeon must try to retrieve these lost gallstones and the abdominal cavity should be irrigated to dilute the infected bile and spilled gallstones. But there is no need for obligatory conversion to an open procedure for stone retrieval because the incidence and the mortality rate of serious complications are so low.

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