

# Lost Stones During Laparoscopic Cholecystectomy

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**Background:** Gallbladder perforation, with loss of calculi in the abdomen is frequent during laparoscopic cholecystectomy. Recent publications report complications in port sites or in the abdominal cavity. A study of 3686 laparoscopic cholecystectomies performed by 6 surgeons was undertaken. In 627 patients, perforation of the gallbladder occurred and in 254 stones were spilled into the abdominal cavity. In 214 they were retrieved and in 40 left in the abdomen. Twelve patients developed complications. Percutaneous drainage was successful in 2 with serous collections. Two patients with abdominal abscesses were reoperated, stones retrieved and the abdomen drained.

One patient developed an intestinal obstruction due to a stone in the ileum. One patient who had a cholecystectomy in another hospital developed a paraumbilical tumor. At reoperation a stone was retrieved. In another six patients, stones were found in port sites. Stones lost into the abdomen should be removed because of their potential morbidity, especially if they are large or if infection is present in the gallbladder at the time of initial surgery. There is no indication for routine conversion to open surgery when stone spillage occurs, although patients should be informed to avoid legal consequence, and to hasten early diagnosis of later complications.

*Keywords:* Laparoscopic cholecystectomy, lost stones

## INTRODUCTION

Gallbladder disruption with stones falling into the peritoneal cavity was rare during open cholecystectomy, but is frequent in laparoscopic cholecystectomy. Retrieval of stones is difficult during laparoscopic cholecystectomy.

Early reports on laparoscopic cholecystectomy stated that stones, left in the peritoneal cavity, had no deleterious effect [26, 31]. More recently as a consequence of spilled stones sepsis, adhesions and fistulae into abdominal organs or port tracts have been described [3, 6, 8, 14, 15]. In this paper we assessed the morbidity caused by stones abandoned in the abdomen or port tracts.

## METHODS

In a retrospective study the records of 3686 patients submitted to laparoscopic cholecystectomy operated by 7 surgeons using similar

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operative techniques between 1992 and 1995 were reviewed. Perforation of the gallbladder with spillage of stones and reports if they were retrieved or abandoned in the abdominal cavity were recorded in the operative records and in a special form recommended for laparoscopic biliary surgery by the Laparoscopic Committee of the Argentine Association of Surgery. The gallbladder was extracted through the umbilical incision in all patients.

Ultrasonography, CT scans and fistulographies were the methods used in detection of stones.

## RESULTS

Perforation of the gallbladder occurred in 627 cases (17%) and in 254 (6.9%) stones spilled into the abdominal cavity. In 214 patients (5.8%) the stones were retrieved but in 40 (1%) the calculi were abandoned in the abdomen (Tab. I). Of these 12 developed complications. In 5 patients, the gallstones presented with intraabdominal problems. Four developed abdominal collections, two serous and two purulent. Six other patients in which no stones were abandoned had post-operative abdominal collections. In 3 bile was responsible and the other 3 were due to blood. All patients recovered with percutaneous drainage [3] or reoperation [3]. One patient had a small bowel obstruction due to a stone lost in the abdomen which entered into the ileum (Tab. II). In 7 patients the stones appeared in fistulous tracts in port sites: 6 at the umbilicus and 1 in a subxiphoid location. In one patient fistulography revealed communication with the transverse colon.

TABLE I Symptoms (*n* 12)

Fever	4
Pain	4
Infected sinus tracts	7
Abdominal collections	4
Intestinal obstruction	1
Colonic fistula	1

TABLE II Intraabdominal stones (*n* 5)

Fever	4
Abdominal pain	1
Intestinal obstruction	1
Serous collections	2
Purulent collections	2

## TREATMENT

In 2 patients the serous collections were evacuated percutaneously and the stone left in place. The patients remain asymptomatic for 1 and 2 years respectively.

In the 2 cases with purulent abscesses a laparotomy was performed, the abdominal cavity drained and the stones retrieved. An emergency operation was performed for the intestinal obstruction, and a large stone was found in the terminal ileum. The stone was removed and the perforation closed (Tab. III).

Of the 7 patients with stones in sinus or fistula tracts, in 4 the stones were retrieved at the skin and in 3 of them a surgical exploration was performed to extract the stones. All fistulous tracts and the colonic fistulae closed spontaneously (Tab. IV).

## DISCUSSION

Perforation of the gallbladder with bile and calculi falling into the abdomen is common in

TABLE III

Intraabdominal stones ( <i>n</i> 5)	
Treatment	
Percutaneous drainage 2 (stones left in place)	
Surgical drainage of abdominal abscess and recovery of stones 2	
Operation for ileal obstruction 1	

TABLE IV Stones in port sites (*n* 7)

Surgical exploration of the sinus tracts	2
Surgical exploration of subcutaneous tumor	1
Spontaneous cure after stones were expelled	4

laparoscopic cholecystectomy [3, 8, 20, 23]. It occurs in 10% of cases [Strasberg, 22]. It was believed that stones left in the abdomen would not cause problems [19, 26, 31, 13]. Bile alone even infected, is not deleterious if aspirated, the cavity irrigated by saline solution, and antibiotic therapy instituted [8]. Recent reports by Catarci [3], Diez [8], Guy [10], Kent [13], Klaiber [14], Paul [17], Ponsky [19] and Targerona [23] report morbidity produced by abandoned stones and recommend that if possible all of them should be retrieved.

A variety of techniques and instruments are available to extract stones: ligature or clips on the gallbladder wall [20] aspiration of the small stones, [26] Dormia Baskets [14, 26] bags [13] finger gloves or condom [11, 13]. A 30 degree laparoscope is useful, it allows a better view of the recesses between the bowel and the liver. Using those methods in 40 of our patients (1%) stones were lost in the abdomen and 12 of them caused complications (25%).

Symptoms appeared from days to several months after the operation [3, 10]. Fever, pain and infection are common [1, 4].

The seriousness of the complications is different if the stones are in the abdominal cavity or in the port tracts.

Intraabdominal stones, produce serous or purulent collections and may cause generalized peritonitis, depending of the size of the stones [8, 21] and degree of bacterial contamination [33, 24]. Large or pigmented stones [3, 21] are more likely to produce these complications. Welch [27] in an experimental study demonstrated that some stones can shrink and even be reabsorbed. This might explain why many patients with lost stones remain asymptomatic.

Serous collections can be cured by percutaneous drainage, leaving the stones in the abdomen as occurred in our 2 cases. If the collection is purulent or generalized peritonitis is present, the abdomen should be explored, drained and stones removed either by laparoscopy or open laparotomy. Reoperation was successful in 2 of

our cases. Soper and Dunnegan [20, 30] had similar results.

Stones may migrate like sponges or other foreign bodies in the digestive tract [11] as in one of our cases or they can be confused with colonic tumors [2]. Rosin [19] reported stones in a hernia sac. Stones have also been the cause of thoracic empyema [16] and bronchopleural fistula with cholelithoptysis [9, 15]. The body tries to expel foreign bodies by the port sites or even through the bowel or other organs.

Persistent infections or subcutaneous tumors in the port sites, especially in the umbilicus are generally due to retained stones. Fistulography may show the stones.

Complications due to abandoned stones should be included in grade II type of Strasberg classification [5] because no mortality or lasting incapacity was present.

We agree with Welch [27] and other authors [3, 8, 18] that laparotomy is not routinely indicated when lost stones cannot be retrieved. Only 25% of them will cause complications. However laparotomy should be considered if a large stone or many stones are lost [23]. Laparotomy should be performed if the gallbladder is at large.

Patients should always be informed of stones left in their abdomen, both for legal reasons and for the purpose of early diagnosis of complications.

## CONCLUSIONS

Stones which fall into the abdomen during laparoscopic cholecystectomy may lead to severe complications. Every effort should be made to retrieve them.

Fever, pain, abdominal abscesses or infected sinus tracts at port sites may be result from lost stones, Fistulography, ultrasonography and CT scans should be performed.

As only 25% of those stones produce complications, laparotomy should not be routinely

performed to extract them. Patients should be informed in this contingency.

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## COMMENTARY

“What experience and history teach is this – that people and governments never have learned anything from history, or acted upon the principles deduced from it’ GWF Hegel 1770–1831, Philosophy of History.

Whilst this quotation is a little harsh to describe surgical practice and the influence of

our surgical forefathers, the revolution in minimally invasive surgery that has occurred over the past 10 years has in certain areas reflected Hegel's point of view. Following the introduction of laparoscopic cholecystectomy in the late 1980's, a certain complacency crept into some aspects of surgical practice. Many surgeon's attitudes to operative cholangiography changed as did their opinion of the need to recover stones "lost" within the peritoneal cavity. The data presented by Diez and colleagues is the latest in a series of papers showing that lost stones are not innocuous and that every attempt should be made to recover them at the time of laparoscopy. The overall risk of complications arising from

lost stones is not high but given the fact that most if not all of these complications are avoidable the message is very clear. We must return to the lessons taught us in the era of open cholecystectomy, namely that every effort must be made to remove stones and bile spilt during cholecystectomy."

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