

Lost gallstones in laparoscopic cholecystectomy: all possible complications

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Abstract

Background: Laparoscopic cholecystectomy (LC) has been the gold standard for symptomatic gallstones for 15 years. During that time, several studies and case reports have been published which outline the possible complications of lost gallstones. The aim of this review is to categorize these complications and to evaluate the frequency and management of lost gallstones.

Data Sources: A Medline search from 1987 to 2005 was performed. A total of 111 case reports and studies were found, and all reported complications were listed alphabetically. Eight studies with more than 500 LCs that reported lost gallstones and perforated gallbladder were analyzed for frequency and management of lost gallstones.

Conclusion: Lost gallstones have a low incidence of causing complications but have a large variety of possible postoperative problems. Every effort should be made to remove spilled gallstones to prevent further complications, but conversion is not mandatory. © 2007 Excerpta Medica Inc. All rights reserved.

Keywords: Laparoscopy; Cholecystectomy; Lost gallstones

Laparoscopic cholecystectomy (LC) has been the gold standard for symptomatic gallstones for 15 years. However, there are 2 problems that are more frequent in LC than in open cholecystectomy: (1) injury to the common bile duct and (2) complications from lost gallstones. Over the last 15 years, the rate of common bile duct injuries in LC has declined as laparoscopic surgeons have become more experienced; unfortunately, the incidence of lost gallstones has been unchanged. Initially, lost gallstones were considered to be harmless, but with the shift from open cholecystectomy to LC, a wide variety of complications has been seen. Several case reports, prospective studies, and reviews have been published since 1987 about the incidence, complications, and management of the lost gallstones.

The aim of this review is to categorize these complications through a systematic literature search to show the variety of complications and to assess the frequency and management of lost gallstones in LC.

Methods

A systematic literature search in the NCBI National Library of Medicine (Pub Med; January 1987–January 2005) was conducted by the senior author (J.Z.). As mentioned in Brockmann et al [1], a systemic review according to the Cochrane recommendations is not possible because of the limitations of the primary literature.

A search strategy was set up using the following text words and combinations (Boolean operators): abscess, bile, fistula, lost gallstones, spilled gallstones, spilt gallstone, gallstone retrieval, gallbladder perforation, and laparoscopic cholecystectomy. Out of 412 listed references, titles, abstracts, and full text articles were screened to compile a selection of relevant studies. All reviews and case reports concerning lost gallstones in LC were then screened for the reported complications. These complications were categorized alphabetically with their references. Also, the reference lists of the retrieved literature were manually cross-searched for additional publications. No unpublished data or data from abstracts were used; no language restrictions were applied.

All studies with more than 500 LCs that reported the incidence of lost peritoneal gallstones and/or perforated gallbladder were analyzed in this review for incidence and importance of lost gallstones. Guidelines for surgical man-

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agement were created from these studies as well as from published reviews.

Results

List of possible complications

A total of 111 case reports and studies were found with documented complications after gallstone spillage or lost gallstones after LC. A list of possible complications categorized alphabetically with the references as mentioned in MEDLINE was created (Table 1). The most frequently reported complication was an abscess in the abdominal wall as a consequence of lost gallstones, which was mentioned in 16 case reports or studies. Intra-abdominal abscess was mentioned in 15 publications. Also, subhepatic and subphrenic abscesses were reported with a high frequency in 10

Table 1

List of possible complications of lost gallstones in LC categorized alphabetically with references

Abscess in the abdominal wall [5,23–27]
Broncholithiasis, stone expectoration [38–42]
Cellulites [5]
Dyspareunia [43]
Erosion to the back [44–46]
Fat necrosis posterior of the rectus muscle [47]
Fever [5,33,48–50]
Fistula formation [25,28,48,51–56]
Gallstone granuloma [57,58]
Gluteal abscess [59]
Granulomatous peritonitis mimicking endometriosis [60]
Ileus, intestinal obstruction [7,61–63]
Implantation malignancy [64]
Incarcerated hernia [23,65]
Intraabdominal abscess [6,7,24,27,34,37,66–74]
Jaundice [68,75,76]
Liver abscess mimicking malignancy [77]
Middle colic artery thrombosis [78]
Mimicking acute appendicitis [45]
Paracolic abscess [43,59,79]
Paraumbilical tumor [7]
Peritoneal abscess formation [80–82]
Pelvic abscess [83]
Pelvic stones [43,84–86]
Peritonitis [87]
Pleural empyema, fluid collections [41,88–91]
Pneumonia [48,92]
Port site stones [7,34,93]
Port site abscess [7,94]
Recurrent staphylococcal bacteraemia [95]
Retrohepatic abscess [46]
Retroperitoneal abscess [49,96–98]
Retroperitoneal actinomycosis [99]
Right flank abscess [26,100]
Small bowel obstruction [101,102]
Stones in gastrocolic omentum [68]
Stones in hernia sac [103,104]
Stones of the ovary, tubalithiasis [84,85,105]
Subhepatic abscess [8,48,59,92,95,106–110]
Subphrenic abscess [5,88–90,111–115]
Thoracoabdominal mycosis [38]
Transdiaphragmatic abscess [116]
Umbilical wound abscess [5,7,117]
Vesical granuloma [118]

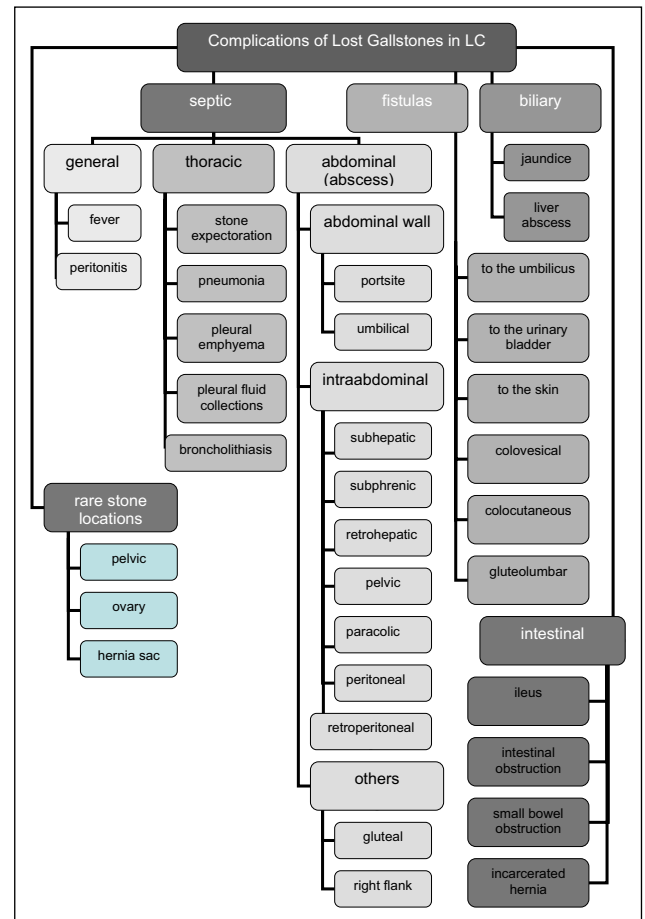


Fig. 1. Diagram of possible complications.

and 9 studies, respectively. In several case reports, fistula formation of all different kinds is mentioned. This ranges from fistulas of the skin to fistulas of the gluteolumbar region (Fig. 1). Stone expectoration is a very rare complication but was reported in 4 case reports. Other rare complications were published with stones in the hernia sac, stones in the ovary, and also a case report of tubalithiasis.

Studies with more than 500 LCs

Eight studies [2–9] with more than 500 LCs were found and analyzed (Table 2). Woodfield et al [10] analyzed 6 of these studies with a total of 18,280 operations in their publication in 2004. The incidence of gallbladder perforation was 18.3% (3356/18280) with an estimation that in 40% of gallbladder perforation cases gallstones fall out of the gallbladder [2,5], resulting in a 7.3% incidence of gallstone spillage. The incidence of lost gallstones (unretrieved peritoneal gallstones) was reported only in 2 studies. Sarli et al [4] reported that 50% of the 52 spilt gallstones were not retrieved, whereas Diez et al [7] reported that 16% were lost. Woodfield et al [10] estimated the incidence of unretrieved gallstones at 33%.

Experimental studies assessing the consequences of lost gallstones in LC

In 1991, following studies using a rabbit model and a postal questionnaire of patients in whom gallstones were

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