

Spilled Gallstones Mimicking Peritoneal Metastases

Bobby V. M. Dasari, MRCS, William Loan, FRCR, Declan P. Carey, FRCS

ABSTRACT

Background: Spillage of bile and gallstones due to accidental perforation of the gallbladder wall is often encountered during laparoscopic cholecystectomy. Although spilled stones were once considered harmless, there is increasing evidence that they can result in septic or other potential complications.

Case Report: We report a case of spilled gallstones mimicking peritoneal metastases on radiological investigations; diagnosis was confirmed by diagnostic laparoscopy.

Conclusion: Every effort should be made to retrieve spilled gallstones during laparoscopic cholecystectomy. When all the stones cannot be retrieved, it should be documented in the patient's medical records to avoid delay in the diagnosis of late complications. Diagnostic laparoscopy is useful when the radiological investigations are inconclusive.

Key Words: Gallstones, Peritoneal metastases.

INTRODUCTION

Ever since Mouret introduced laparoscopic cholecystectomy (LC) in 1987, the procedure has gained popularity and is now the gold standard in the management of symptomatic gallstone disease. LC is associated with less postoperative pain, reduced morbidity (4% to 6% vs 2% to 11%), shorter duration of postoperative hospital stay, and better cosmesis compared with open surgery. However, the spectrum of complications associated with LC differs from that of open surgery; these pertain to the port sites, pneumoperitoneum, limited surgical access, and reduced tactile perception. One of these complications is the increased incidence of perforation of the gallbladder (GB) wall during the procedure, resulting in spillage of bile and gallstones¹ either due to a thin-walled GB or an inflamed friable GB wall.

Unretrieved or lost gallstones often remain clinically silent, although some patients develop septic complications. We describe a case of spilled gallstones mimicking peritoneal metastases on radiological investigations. The resulting clinical quandary, complications of spilled stones, its prevention, and principles of management are discussed.

CASE REPORT

A 67-year-old female was referred to our clinic by her general practitioner with a noncontrast enhanced whole-body computed tomographic (CT) scan and CT colography performed at the patient's self-referral to an independent provider. The CT scan revealed multiple soft tissue nodules in the abdomen suspicious of peritoneal metastases.

The patient had a history of recurrent lower abdominal pain associated with abdominal distension with no vomiting, bowel disturbances, or weight loss. She had emergency LC whilst on holiday in Spain for acute calculus cholecystitis 2 years earlier that was complicated by septicemia, requiring repeat laparoscopy and drainage of fluid collection (within 48 hours of primary surgery); vaginal hysterectomy with bilateral oophorectomy for uterine prolapse with a family history of ovarian cancer 9 years earlier, and bilateral prophylactic mastectomy with TRAM

Belfast City Hospital, Belfast Health and Social Care Trust, Belfast, BT9 7AB, United Kingdom (all authors).

Address correspondence to: Bobby Dasari, MS, MRCS, Specialist Registrar, Level 5, Belfast City Hospital, Belfast, UK BT9 7AB. Telephone: + 44 772 762 1372; E-mail: bobby.dasari@yahoo.com

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flap reconstruction 11 years earlier. The patient's medical history includes hypertension and bronchial asthma.

On examination, the abdomen was soft and nontender with no palpable mass. Blood investigations (FBP, U&E, LFT, CRP) were normal. Tumor markers (CEA, CA-125, CA 19.9) were within the normal range. Contrast enhanced CT scan of the abdomen and pelvis was repeated; this revealed multiple, round hyperdense soft tissue nodules (the largest measuring 18mm x 9mm in size) within the abdominal cavity suggestive of mesenteric lymphadenopathy and peritoneal metastases (**Figure 1**). CT colography and upper GI endoscopic examinations were normal. Ultrasound-guided needle biopsy of the nodules was inconclusive.

Diagnostic laparoscopy was performed with the patient under general anaesthesia and with informed consent. It revealed multiple spilled gallstones embedded within the omentum, small bowel mesentery, and paracolic gutter mimicking soft tissue nodules. Adhesiolysis was performed, and all the accessible stones were retrieved. Operative findings were documented in the patient's medical records, and the patient was informed about the unretrieved stones in the abdominal cavity. The postoperative recovery was uneventful, and the patient was discharged home on the first postoperative day.

DISCUSSION

Laparoscopic cholecystectomy (LC) is associated with an increased incidence of accidental gallbladder (GB) wall perforation (13% to 40%).¹ The GB wall may be perforated while being grasped with forceps, or while being dissected off the liver bed, or during extraction of the GB through the port site. The most important risk factor for GB perforation is acute inflammation of the GB with an edematous, friable, or gangrenous wall²; male sex and limited expertise of the surgeon are other contributing factors.¹ However, it is estimated that gallstones spill into the abdominal cavity in only 7.3% of these cases.³⁻⁵ Spillage of stones following perforation depends on the size of the perforation, number and size of the gallstones, and the surgeon's expertise.

Perforation in the GB wall is best dealt with immediately during surgery. Spillage of bile and contamination can be limited with the use of suction or by applying a grasper, ligature, or surgical clip to close the perforation. If the stones are spilled into the abdominal cavity, all the accessible stones should be retrieved. Care should be taken not to let the stones slip into inaccessible areas of the perito-

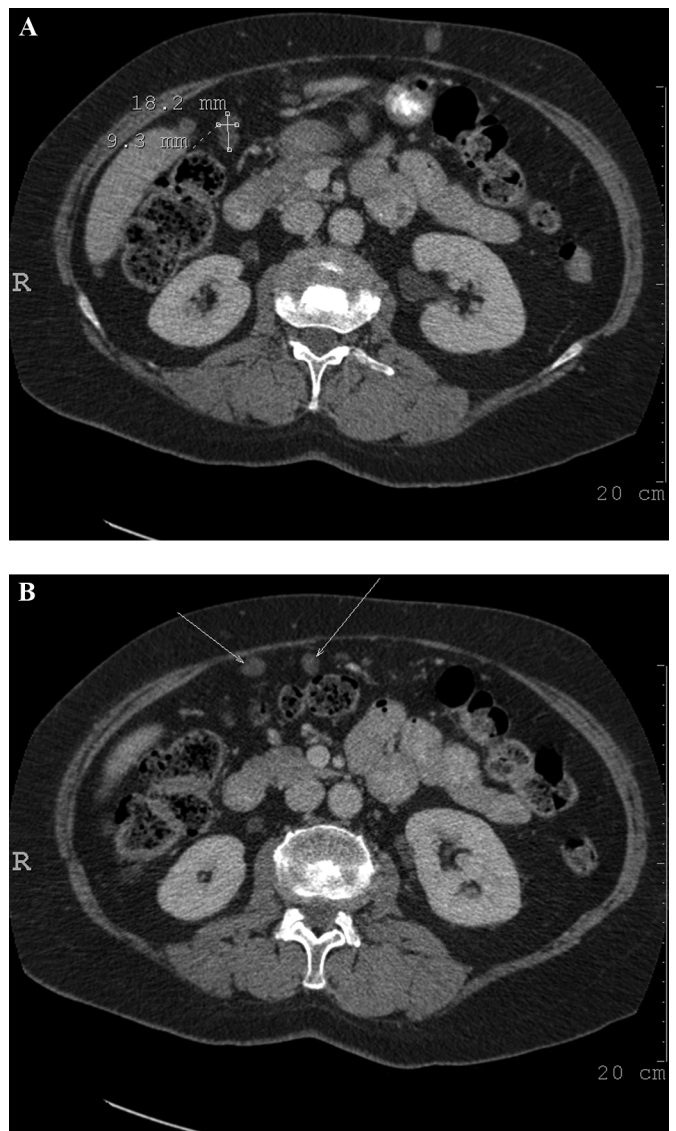


Figure 1. CT scans of the abdomen and pelvis, demonstrating multiple hyperdense soft tissue nodules mimicking peritoneal metastases.

neal cavity. In the majority of cases, spilled stones can be completely retrieved.⁶ Copious irrigation of the peritoneal cavity with large amounts of normal saline not only reduces the bacterial contamination but also provides a fluid-gas interface in which gallstones often float and facilitates stone retrieval. Extra ports, 30-degree scope, liver retractor, and shuttle stone collector⁷ are also helpful in retrieving the lost stones. Good practice dictates that these events are documented in the patient's medical records, and patients should be informed that spillage has

occurred to aid in the early diagnosis of late complications and to minimize litigation.

There is no significant difference between the complication rates, duration of postoperative hospital stay, duration of antibiotic usage, and the use of analgesics in the perforated and nonperforated groups of acute cholecystitis.⁸ Therefore, conversion to open surgery following accidental perforation of the gallbladder and spillage of bile or stones is not routinely indicated.⁸ A short course of antibiotics to prevent postoperative sepsis is advisable.

Unretrieved intraabdominal gallstones most often remain silent and asymptomatic. Complications because of lost stones are encountered in 0.1% to 0.3% of LCs.^{1,5} Common complications encountered are intraabdominal, pelvic, and abdominal wall abscesses. Less common complications include fistula formation (to the skin, umbilicus, and intraabdominal viscera), cutaneous sinuses, retroperitoneal abscesses, intraabdominal adhesions, small-bowel obstruction, and pulmonary complications (pleural effusion, empyema, pleuroolithiasis, bronchololithiasis, choledolithoptysis). There are isolated reports of spilled stones presenting as jaundice due to compression of the common hepatic duct, pelvic pain, and migration of stones into the hernial sac and urinary bladder.⁵ Multiple pigment stones (≥ 15 stones), large stones (≥ 1.5 cm), infected bile (with organisms such as *Escherichia coli*, *Klebsiella pneumoniae*, and *Enterococcus*), old age, and male sex are identified as the factors associated with increased risk of septic complications.^{1,9}

Spilled stones mimicking peritoneal metastases are rare. Staging and management of primary cancer is different when peritoneal metastases are suspected; it also results in significant psychological trauma to the patient. Given the past surgical history of our patient, it was vital to prove the nature of the suspected lesions.

Radiological investigations often play an important role in the diagnosis of spilled stones. Abdominal x-ray is useful in demonstrating opaque stones. Hyperechoic images with posterior acoustic shadowing that roll over with percutaneous ultrasound-guided injection of normal saline into the abscess cavity is a confirmatory finding of spilled stones on ultrasound scan. Spilled stones appear as hyperdense lesions on spiral CT and as foci of low-signal intensity on gradient-echo T1-weighted magnetic resonance imaging (MRI).¹⁰ However, sensitivity of the radiological investigations in diagnosing spilled stones needs further evaluation. In a study by Manukyan et al,¹¹ 22 patients with retained intraabdominal gallstones after LC were followed up with spiral CT, but spilled stones were identified in only 2 of them at a median follow-up of 121

months. Ultrasound helps in the identification of stones with low-calcium content that are often missed on CT¹² and is more sensitive in detecting stones embedded in abscesses compared with MRI (it is difficult to differentiate between stones and gas in an abscess on MRI). However, a nonopaque calculus within an abscess may not be visualized by any of the standard imaging techniques and could result in confusion with the diagnosis of abscess due to other causes like actinomycosis or tumor.

Intraabdominal or pelvic abscess due to spilled stones are best managed by drainage of pus and removal of all the stones within the abscess cavity either by a laparoscopic or open approach. Percutaneous drainage of an abscess under radiological guidance has the advantages of being less invasive with a shorter duration of hospital stay but is associated with higher recurrence rates because stones in the abscess cavity are not extracted. For this reason, percutaneous drainage is followed by extraction of stones with (>1 cm size) or without (<1 cm size) lithotripsy using a choledochoscope or nephroscope.

In our case, CT scan and US were equivocal with the findings of peritoneal metastases. The significant family history of breast and ovarian cancer perhaps warranted an aggressive approach to obtain the diagnosis. Diagnostic laparoscopy has proven effective in the diagnosis by direct visualization and confirmatory histological examination.

CONCLUSION

Spilled gallstones are associated with uncommon but significant complications. Every effort should be made to retrieve spilled stones during a primary procedure to avoid late complications. Clear documentation in the patient's medical records and explanation to the patient are important in the management of complications. When the radiological investigations are equivocal, diagnostic laparoscopy is recommended to confirm the diagnosis.

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