



# Omental abscess due to a spilled gallstone after laparoscopic cholecystectomy

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## Abstract

Omental abscess due to a spilled gallstone is extremely rare after laparoscopic cholecystectomy. Herein, we report a 68-year-old man who presented with left upper abdominal pain after laparoscopic cholecystectomy for gangrenous cholecystitis. Seven months prior to admission, gallbladder perforation with spillage of pigment gallstones and bile occurred during laparoscopic cholecystectomy. The spilled gallstones were retrieved through vigorous peritoneal lavage. Abdominal computed tomography showed a 3 × 2.5 cm intra-abdominal heterogeneous mass, suspected to be an omental abscess, and ascites around the spleen. Exploratory laparoscopy revealed an inflammatory mass within the greater omentum. Laparoscopic partial omentectomy and abscess drainage were performed, and a small black pigment gallstone was unexpectedly found in the whitish abscess fluid. Abscess fluid culture results were positive for extended-spectrum  $\beta$ -lactamase-producing *Escherichia coli* and *Streptococcus salivarius*, which were previously detected in the gangrenous gallbladder abscess. The histopathological diagnosis was abscess in the greater omentum. Postoperative course was uneventful, and the patient was discharged 13 days later. In conclusion, we report a successful case of laparoscopic management of an omental abscess due to a spilled gallstone after LC. It is important to attempt to retrieve spilled gallstones during LC because they may occasionally result in serious complications.

**Keywords** Intra-abdominal abscess · Laparoscopic cholecystectomy · Omental abscess · Spilled gallstone

## Introduction

Laparoscopic cholecystectomy (LC) has become the standard treatment for symptomatic cholelithiasis and acute cholecystitis. However, LC is associated with some new complications that are rare in open cholecystectomy (OC). Gallbladder perforation with intra-abdominal spillage of gallstones is a common complication during LC, although it is not considered serious [1].

In contrast, omental abscess formation can be caused by several diseases including primary omental abscess and

omental infarction [2]. Herein, we report an extremely rare case of omental abscess due to a spilled gallstone after LC.

## Case report

A 68-year-old man was admitted to our hospital with left upper abdominal pain that persisted for a few days. He had a medical history of hereditary spherocytosis and type 2 diabetes. Additionally, 7 months prior to admission, he underwent LC for gangrenous cholecystitis with liver abscess after percutaneous trans-hepatic gallbladder drainage at our hospital. Gallbladder perforation with spillage of pigment gallstones and bile occurred during the operation. The spilled gallstones were retrieved through vigorous peritoneal lavage. He was discharged after 46 days because of postoperative abdominal abscess around the liver bed. Physical examination revealed maximal abdominal tenderness in the left upper quadrant, and exhibited signs of peritoneal irritation, muscle guarding and rebound tenderness. There

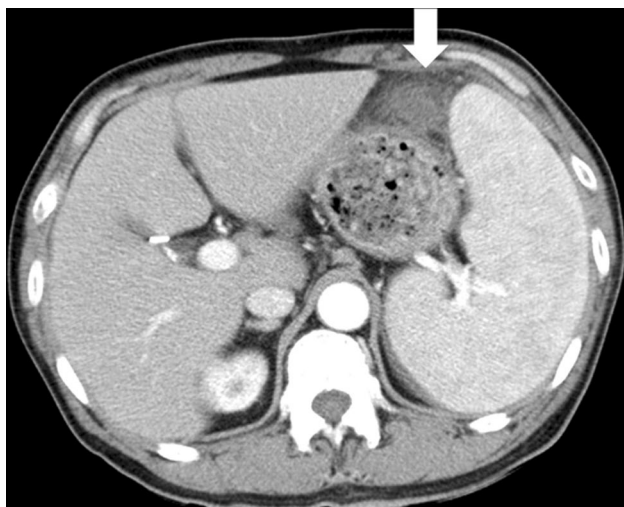
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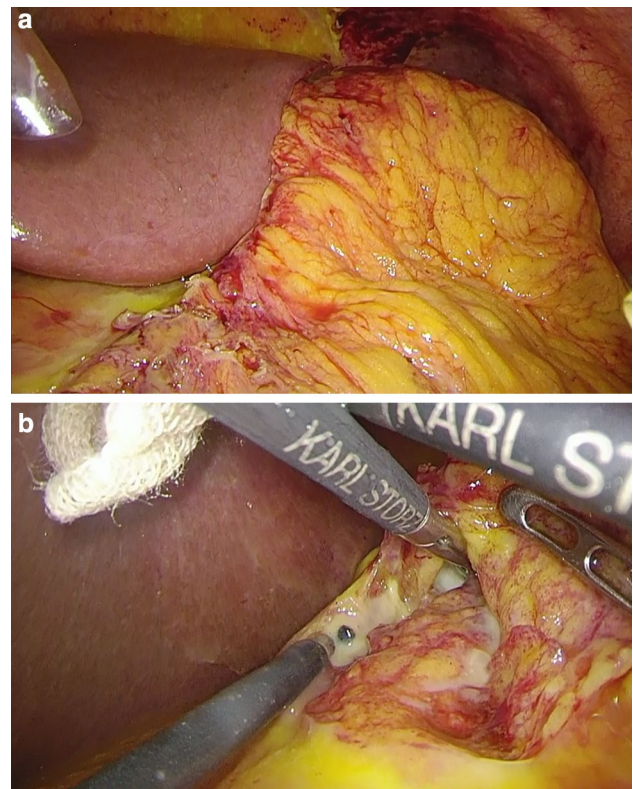
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was no palpable mass in the corresponding area. Laboratory investigations revealed an elevated white blood cell count (11,630/ $\mu$ L; segmented neutrophils, 64.6%), a lower hemoglobin level (10.3 g/dL), an elevated C-reactive protein level (8.7 mg/dL), and hyperbilirubinemia (total bilirubin level, 4.66 mg/dL; direct bilirubin level, 0.23 mg/dL). Abdominal computed tomography detected a 3  $\times$  2.5 cm intra-abdominal heterogeneous mass just under the abdominal wall and a small amount of ascites around the spleen (Fig. 1). Esophagogastroduodenoscopy showed no abnormal findings. A provisional diagnosis of omental abscess was initially made, and Meropenem was intravenously injected for 2 days. However, the patient experienced worsened abdominal pain and high fever. Additionally, the white blood cell count increased to 16,230/ $\mu$ L and C-reactive protein level to 32.4 mg/dL. We decided to perform exploratory laparoscopy to assess the abdominal cavity. The mass was located within the greater omentum between the stomach and the splenic hilum (Fig. 2a). Whitish-yellow turbid ascites was seen mainly around the liver and under the left diaphragm. No remarkable changes in the small or large intestines were observed, except for some adhesions around the hepatic hilum that developed after LC. During dissection of the mass within the greater omentum, whitish pus was released and a small black pigment gallstone was unexpectedly found in the abscess fluid (Fig. 2b). The omental abscess was successfully resected and intra-abdominal drainage was performed laparoscopically. Meropenem was continued postoperatively for 1 week. The patient reported immediate resolution of abdominal pain and was uneventfully discharged 13 days later. Abscess fluid culture results were positive for extended-spectrum

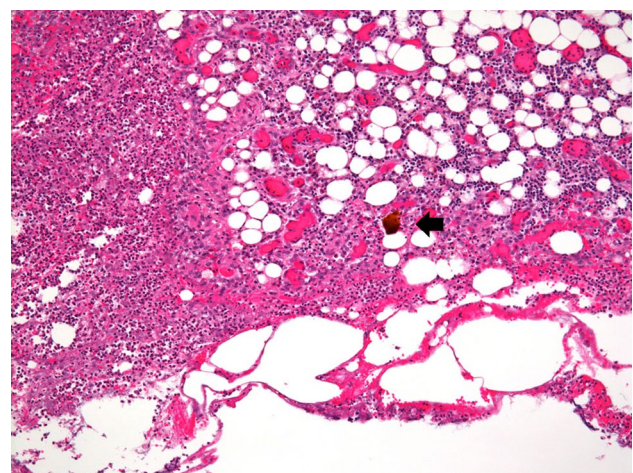


**Fig. 1** Preoperative abdominal computed tomography showing an omental abscess (white arrow)



**Fig. 2** Intraoperative findings during laparoscopic partial omentectomy. **a** The mass was located within the greater omentum between the stomach and the splenic hilum. **b** A black pigment gallstone was found in the abscess fluid

$\beta$ -lactamase-producing *Escherichia coli* and *Streptococcus salivarius*, which were previously detected in the gangrenous gallbladder abscess. Pathological examination of



**Fig. 3** Histopathological findings of the resected specimen. Suppurative inflammation of the fat tissue with abscess and hematoma formation and presence of bile pigment (black arrow) was observed (hematoxylin and eosin staining, original magnification  $\times 10$ )

the resected specimen revealed suppurative inflammation of the fat tissue with abscess and hematoma formation as well as bile pigment (Fig. 3). The histopathological diagnosis was abscess in the greater omentum.

## Discussion

Gallbladder perforation with spillage of gallstones is a more common problem during LC than during OC. Although uncommon, these gallstones may lead to early or late complications which can be a diagnostic challenge and cause significant morbidity. Complications due to peritoneal gallstones after LC are infrequent with a rate of 1.7 complications per 1000 cases [3]. Brockmann et al. reported that the most frequent complication due to intraperitoneal gallstones is abscess formation, accounting for 60% of complications [4]. In their report, the predisposing factors for the development of complications after gallstone spillage were older age, male sex, acute cholecystitis, spillage of pigment gallstones, number or size of stones, and perihepatic localization of lost stones. Retrieving spilled gallstones through vigorous peritoneal lavage is important to reduce the rates of subsequent complications. If complications occur, definitive treatment requires both drainage of any abscess and removal of the spilled gallstones.

In contrast, omental abscess formation is rare and can be caused by several diseases including primary omental abscess and omental infarction [2]. The presence of foreign bodies in the omental abscess, such as suture materials or fragments of gauze, has also been reported in the literature [5–7]. Omental abscess may be associated with antecedent surgery such as appendectomy [2, 8]. Previous reports indicated surgery as the first-line treatment for omental abscess, and appropriate antibiotics should be injected based on the results of the abscess culture.

Omental abscess due to a spilled gallstone is extremely rare after LC. To our knowledge, only one case of omental abscess due to a spilled gallstone after LC has been reported [9]. In our patient, a spilled pigment gallstone was determined to be the cause of the omental abscess because the bacterial species in the omental abscess fluid were previously detected in the gangrenous gallbladder abscess. Omental abscess formation was most likely associated with the pigment gallstone as a predisposing factor in the presence of type 2 diabetes. Pigment gallstones appear to have a very high potential to cause postoperative complications because bacterial contamination is highly present in pigment gallstones compared to cholesterol gallstones [4, 10]. Because our histopathological findings indicated the presence of bile pigment, the pigment gallstone might have dissolved and released the bacteria into the greater omentum.

The indication of LC for acute severe cholecystitis including gangrenous cholecystitis is controversial. In recent years, severe (gangrenous, empyemic) cholecystitis does not preclude LC [11]. Moreover, there are several reports stating that LC is a safe option for patients with gangrenous cholecystitis [12, 13]. Our institutional policy is that we prefer performing LC for acute severe cholecystitis. In our patient, gallbladder perforation with spillage of pigment gallstones and bile occurred during LC. Although stone spillage has not been considered to be an indication for conversion to OC, conversion should be considered in selected cases [14]. The omental abscess may not have developed, had we converted to OC, retrieved the spilled gallstones, and irrigated the abdominal cavity.

Laparoscopic partial omentectomy and intra-abdominal abscess drainage were successfully performed to treat the omental abscess in our patient despite the absence of a report on the laparoscopic management of omental abscess in the literature. A consensus statement showed that diagnostic laparoscopy is technically feasible and can be applied safely for selected patients with acute nonspecific abdominal pain [11]. Thus, we consider that exploratory laparoscopy is a useful diagnostic tool for omental abscess, and laparoscopic surgery is a feasible treatment if an omental abscess is well localized. However, it should be noted that pneumoperitoneum created for laparoscopic surgery may cause spillage of the abscess and contaminated fluid into the abdominal cavity. Conversion from laparoscopic to open omentectomy should be considered when the abscess has widely spread in the abdominal cavity.

In conclusion, we report a successful case of laparoscopic management of an omental abscess due to a spilled gallstone after LC. Regardless of its etiology, omental abscess should be considered in the differential diagnosis of an intra-abdominal inflammatory mass. Certainly, it is important to attempt to retrieve spilled gallstones during LC because they may occasionally result in serious complications.

## Compliance with ethical standards

**Conflict of interest** Takeshi Urade, Hidehiro Sawa, Koichi Murata, Yasuhiko Mii, Yoshiteru Iwatani, Ryoko Futai, Shohei Abe, Tsuyoshi Sanuki, Yukiko Morinaga and Daisuke Kuroda declare that they have no conflict of interest.

**Human Rights** All procedures followed have been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

**Informed Consent** Informed consent was obtained from all patients for being included in the study.

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