

## Case Report

# Ruptured hepatic subcapsular hematoma following laparoscopic cholecystectomy: Report of a case

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### Summary

Laparoscopic cholecystectomy is now a standard procedure for cholecystolithiasis because of its minimally invasive nature compared to the conventional method. However, severe complications that have never been seen for open surgery have also been reported. Here, we report the case of a 28-year-old woman who underwent laparoscopic cholecystectomy and then developed a ruptured subcapsular hematoma. On postoperative day 1, she developed shock, and postoperative bleeding was suspected. During re-operation, a ruptured subcapsular hematoma of the whole right lobe of the liver with active bleeding was found, and hemostasis was achieved. In this case, it was assumed that the rupture of the subcapsular hematoma was due to compression of the liver by the clamp for retrieving the spilled gallstones during the first operation and perioperative administration of non-steroidal anti-inflammatory drugs.

**Keywords:** Laparoscopic cholecystectomy, complication, ruptured subcapsular hematoma

### 1. Introduction

Laparoscopic cholecystectomy (LC) for symptomatic cholecystolithiasis is now a routine procedure worldwide. Due to its minimally invasive nature, including a smaller incision and shortened duration of admission, patients suffering from cholecystolithiasis have benefited greatly (1). However, despite these advantages, several kinds of severe complications occur with LC, some of which have not been observed following open cholecystectomy (2). The most frequently reported complication during LC is common bile duct injury, of which the incidence is 0.125%-0.25% (2), followed by bleeding from trocar sites and the liver bed, vascular injury (3), bile leakage, pneumoperitoneum, abscess formation due to peritoneal spilled gallstones (4), and bowel injury. On the other hand, intestinal volvulus (5) or ischemia (6), pseudoaneurysm of the cystic or hepatic arteries

(7), trocar site hernia (8), gas embolism (9), portal vein thrombosis (10), and migration of endoclips (11) are relatively rare but serious complications following LC.

In this paper, the case of a patient who developed a ruptured subcapsular hematoma of the liver after LC is presented, and particular attention is given to the incidence, differential diagnosis, and treatment of this complication.

### 2. Case report

A 28-year-old woman was admitted to our hospital complaining of right upper quadrant abdominal pain. She was diagnosed as having cholecystolithiasis, and LC was performed. During surgery, the gallbladder was injured, and the spilled gallstones were retrieved, during which some tiny subcapsular hematomas developed because the aspiration clamp compressed the liver (Figure 1A). Although the subcapsular hematomas gradually became larger during the operation, they were left untreated (Figures 1B and 1C). For treatment of the abdominal pain after the operation, the patient took flurbiprofen axetil, a non-steroidal anti-inflammatory drug (NSAID), 3 times (150 mg in total). On postoperative day 1, she developed hypotension, tachycardia, and severe anemia, and laboratory tests

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showed a low hemoglobin (4.4 g/dL) level (postoperative, 9.8 g/dL). Postoperative X-ray examination which was performed routinely showed displacement of the drainage tube that had been placed in the right subphrenic region (Figure 2). Ultrasonography demonstrated intraperitoneal fluid collection, suggesting hemorrhage after LC. The patient's hemodynamic condition worsened, and an emergency re-operation was performed. Laparoscopic exploration showed a ruptured subcapsular hematoma of the phrenic side of the entire right lobe of the liver with active bleeding (Figure 3A). Laparotomy was then performed (Figure 3B), the hematoma was removed, and hemostasis was achieved using an argon beam coagulator (Figure 3C). Further exploration within the abdomen showed no liver parenchymal or gallbladder bed injury, and no hemorrhage from the cystic artery (the amount of intraabdominal bleeding was 1,466 mL). The patient's postoperative course after re-operation was uneventful, and she was discharged without further complaints.

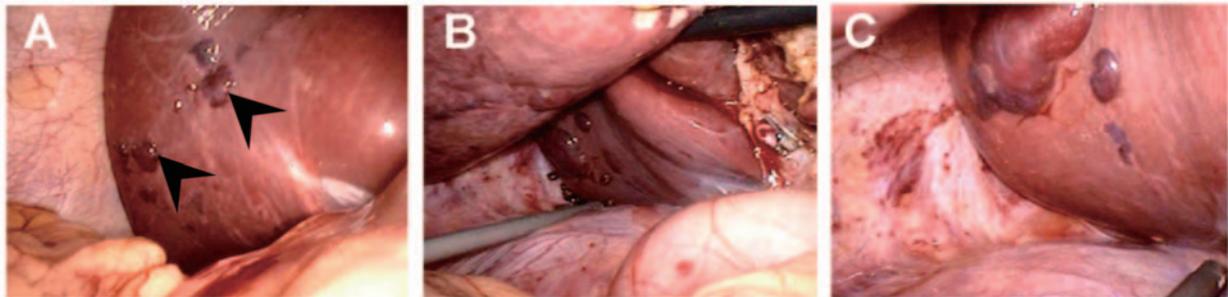
### 3. Discussion

Postoperative hemorrhage after LC is rare but one of the most life-threatening complications, and the sources of bleeding are diverse, *i.e.*, stump of the cystic artery,

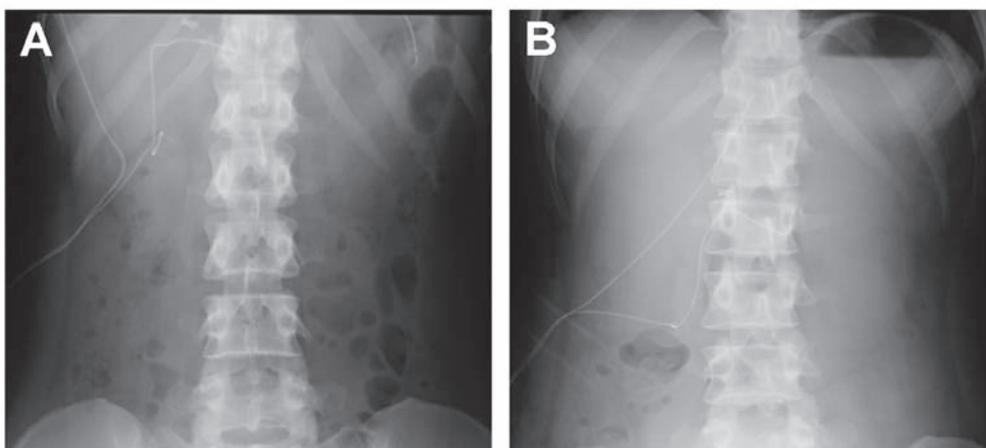
gallbladder bed, vessels of the greater omentum, and rupture of a subcapsular hematoma of the liver (2).

Seven cases of subcapsular hematoma of the liver after LC have been reported, two cases of which were accompanied with rupture, as in our case (12,13). Most patients with subcapsular hematoma of the liver complain of right upper quadrant pain or discomfort, and physical examination shows tachycardia and hypotension (12-18); they also develop severe anemia with shock in cases with rupture, as in our case (12,13). Subcapsular hematoma after LC usually occurs within a few days, and within 24 h in cases of rupture, and, therefore, careful monitoring is necessary for patients with such complaints for a few postoperative days, even after LC is performed as a day surgery procedure, if possible (19).

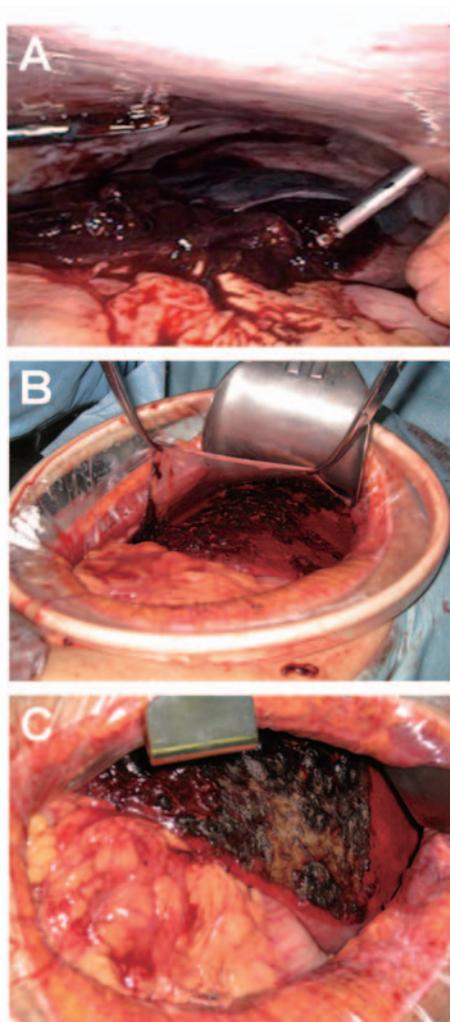
If subcapsular hematoma is not accompanied with rupture, interventional procedures such as CT- or US-guided aspiration of the hematoma is effective, or it may be treated conservatively (14-18), whereas laparoscopic or laparotomized exploration of the abdomen and hemostasis are necessary for ruptured subcapsular hematomas (12,13). In the present case, we confirmed the intraperitoneal fluid collection, which led us to diagnose severe postoperative hemorrhage and therefore, the patient was not considered to be a



**Figure 1. Laparoscopic and intraoperative view of the first surgery.** (A) Small subcapsular hematoma found during laparoscopic cholecystectomy (arrow heads). (B) and (C) Subcapsular hematoma which grew gradually during operation.



**Figure 2. X-ray obtained after surgery.** (A) A drainage tube was placed in the right subphrenic space (arrow head) postoperatively. (B) The tube is displaced to the left side by the huge hematoma on postoperative day 1.



**Figure 3. Laparoscopic and intraoperative view of the second surgery.** (A) Laparoscopic view of the ruptured subcapsular hematoma of the right lobe of the liver. (B) Ruptured subcapsular hematoma of the right lobe of the liver after laparotomy for hemostasis. The ablated liver capsule is lifted. (C) The right lobe of the liver after hemostasis using an argon beam coagulator.

candidate for interventional therapy, but for surgery.

The causes of subcapsular hematoma of the liver after LC are not known. Some researchers have assumed that ketorolac, which is a NSAID that is used to relieve severe pain after surgery, may cause subcapsular hematoma of the liver, because ketorolac induces substantial gastrointestinal bleeding and their patients had no evidence of parenchymal injury during LC (13,16,18). In the present case, some minor subcapsular hematomas of the liver were recognized because the aspiration clamp had compressed the liver surface in order to retrieve the spilled gallstones during the initial procedure (4). During the procedure, you can see that the small subcapsular hematomas grow gradually by compressing the liver with the aspiration clamp. The present patient had also received frequent NSAID injections postoperatively, which may have exacerbated the small subcapsular hematomas and led to rupture.

In summary, the case of a patient with a ruptured subcapsular hematoma of the liver after LC was presented. In order to avoid such a rare but severe postoperative complication, surgeons should keep in mind that the liver is not to be handled roughly during the procedure, and that NSAIDs may result in lethal hemorrhages and therefore use them with caution perioperatively.

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