

# Refractory chyle leakage after laparoscopic cholecystectomy for gallstone disease

## A case report and literature review

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### Abstract

**Rationale:** Gallstone disease is commonly worldwide and safely treated by laparoscopic cholecystectomy. Chylous ascites is a rare but serious complication of many abdominal operations.

**Patient concerns:** We present a rare case of refractory chyle leakage post-LC for acute cholecystitis that is successfully treated in a 40-year-old man, and review current literature on the prevalence, diagnosis, and management of this complication.

**Diagnoses:** Refractory chyle leakage post-LC, a rare but serious complication after laparoscopic cholecystectomy.

**Interventions:** Conservative treatment was given initially; however, the outcome was frustrating. Surgical intervention was given without further delay.

**Outcomes:** After the reoperation, conservative treatment was still maintained. After nearly 8 months of treatment, the patient recovered and then was discharged.

**Lessons:** This case represents a previously unreported complication of refractory and high flow chyle leakage after laparoscopic cholecystectomy, which did not improve after conservative management with dietary changes and other measures. So we suggest that surgical intervention should be given for refractory cases without further delay. It can not only shorten the disease progression, but also alleviate the sufferings of the patient.

**Abbreviations:** LC = laparoscopic cholecystectomy, MCTs = medium-chain triglycerides, TPN = total parenteral nutrition.

**Keywords:** gallstone disease, laparoscopic cholecystectomy, refractory chyle leakage

### 1. Introduction

Gallstone disease is highly prevalent which is commonly and safely treated by laparoscopic cholecystectomy annually in worldwide countries. These have a low associated morbidity and mortality in the elective setting although complications, such as bile duct injury, may still occur. Chylous ascites is a rare but serious complication of many abdominal operations. The presence of a chyle leakage presents a morbid clinical dilemma, and the determination of whether to pursue operative or nonoperative management remains elusive. We present a rare case of refractory chyle leakage post-LC for acute cholecystitis

which is successfully treated and review current literature on the prevalence, diagnosis, and management of this complication.

### 2. Case report

A 40-year-old male presented with a 2-day history of epigastric pain. He once had a 2-year history of epigastric pain after fatty meals, and a family history of positive chronic hepatitis B virus for 20 years (the patient's father and brothers were both died of liver disease). On examination, all observations were within normal limits. His abdomen was mildly tender in the epigastrium without any palpable masses or evidence of peritonitis. Laboratory data showed elevated leukocytes  $12.4 \times 10^9/L$  (normal,  $4.0\text{--}10.0 \times 10^9/L$ ), Hepatitis B antigen positive (+). An ultrasound scan revealed a distended and thickened gallbladder containing gallstones. Computed tomography of the abdomen was performed, which showed the presence of gall stones, acute cholecystitis, and liver cirrhosis. After preparation, he was taken to the operation theater and underwent laparoscopic cholecystectomy, which was technically successfully. The gallbladder was removed intact from the gallbladder fossa and placed in a specimen retrieval bag for extraction without complication. At the time of surgery, there was a small amount of yellow effusion accumulated under the right side of the diaphragm. A silastic close-suction drain tube was placed in the right subhepatic space at the completion of the operation (Fig. 1 and Fig. 2). The patient tolerated the procedure well and resumed oral intake later on the day of surgery. Antiinfective and other supportive treatment were given after the operation. Postoperative pathology: acute cholecystitis with cholelithiasis.

The effluent from the drainage was noted milky and odorless on the second day after surgery. The initial output of the effluent was

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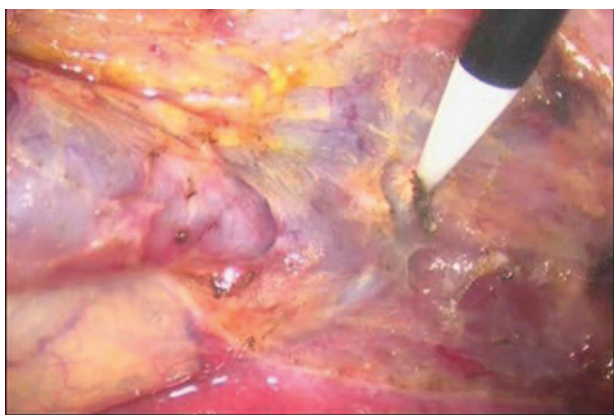
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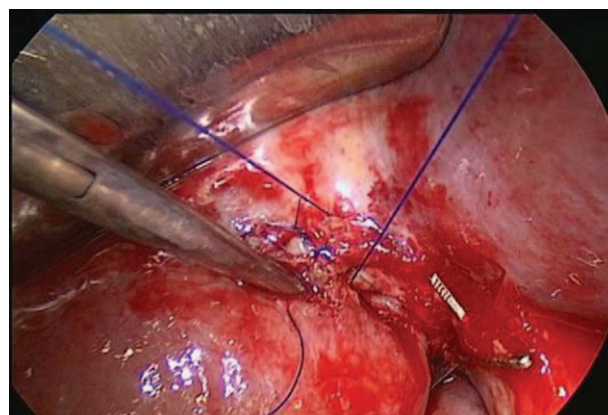
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**Figure 1.** Laparoscopic cholecystectomy: the electric separation of the gallbladder.



**Figure 3.** Reoperation: 3-0 Prolene suture was placed in figure-of-eight fashion encompassing the area of leakage.

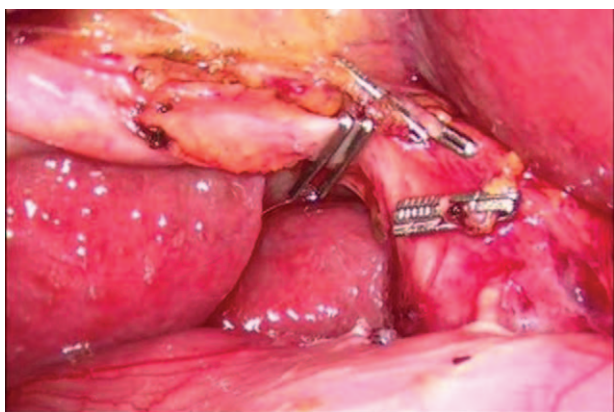
about 500 mL per day, but increased day by day, to the seventh day postoperative, it began significantly up to and maintained 8000 to 9000 mL per day. The patient had abdominal discomfort, bloating, and nausea, but had no fever. A CT scan was performed, revealing significant ascites. The effluent's laboratory analysis revealed elevated levels of triglycerides (1245 mg/dL), protein (28.5 g/L), and leukocytes ( $685 \times 10^6/L$ ), consistent with chyloperitoneum. Conservative management was provided initially on the third day post-LC. The patient was given a total parenteral nutrition (TPN) in combination with medium-chain triglyceride supplementation, and with no oral intake. Simultaneously, liquid recovery, electrolyte and albumin replenishment, antibiotic prophylaxis, plasma transfusion, diuretic, somatostatin continuously intravenously infusion, and other effective treatment were also afforded to maintain the patient's liquid, electrolyte, and acid-base balance. Frustratingly, after a week of conservative therapy, output from the patient's abdominal drain did not diminish. So we decided to give surgical intervention for this refractory case without any delay. The patient was taken to the operation room again for laparoscopic reexploration at the tenth day postoperative. At the time of reexploration, an active chyle leak was identified from the base of the gallbladder fossa, emanating directly from the parenchyma of the liver bed, but no evidence of injury to bowel, lymphatic vessels or structures within the portahepatis was identified. Then we turned to open the abdominal cavity, 3-0 Prolene suture was

placed in figure-of-eight fashion encompassing the area of leakage, fibrin glue was then placed as well after stitching, with resolution of the leak. We carefully observed to confirm no obvious leakage after the reoperation (Fig. 3 and Fig. 4). The patient was returned to ICU ward after the second surgery, and was still given continuous conservative therapy. The next day after the reoperation, the drainage output diminished from about 9000 mL per day down to about 5000 mL per day. After a long period of conservative treatment (lasting almost 7 months), the drainage gradually decreased to zero. Abdominal sonography on the eighth postoperative month revealed no fluid accumulation in abdominal cavity, especially in the right subhepatic space, and then the drain was removed. The patient was discharged home without further difficulty during the 1-year follow-up.

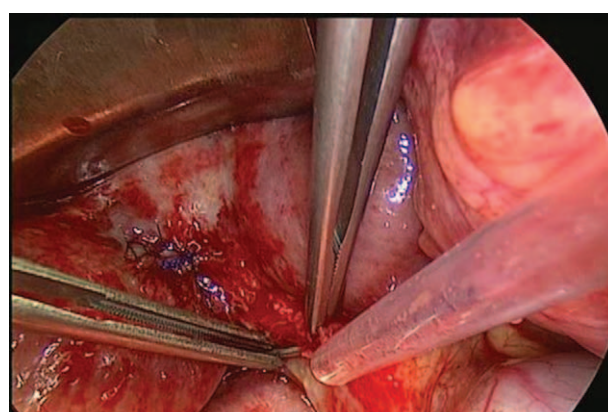
### 3. Discussion

There are amount of well-researched complications after laparoscopic cholecystectomy, such as injury during trochar or veress needle placement, bleeding, bile leakage, common bile duct injury, and gastrointestinal injury. However, postoperative chyle leakage is an extremely rare complication with only 3 cases having been reported before.

Jensen et al<sup>[1]</sup> have reported chyle leakage after LC for the first time in 2006. The patient was presented with symptomatic



**Figure 2.** Laparoscopic cholecystectomy: the cystic duct and gallbladder artery were clamped with titanium clip.



**Figure 4.** Reoperation: 3-0 Prolene suture was placed in figure-of-eight fashion encompassing the area of leakage.

cholelithiasis and underwent laparoscopic cholecystectomy successfully. However, postoperative chyle leakage occurred. The patient was then given paracentesis and an intraabdominal drainage was left in place. Initial treatment was conservative, the patient maintained on total parenteral nutrition (TPN) with no oral intake. However, drain output continued at 1000 to 1500 mL per day of milky-white fluid. Lymphoscintigraphy revealed a collection at the level of the gallbladder fossa. Laparoscopic reexploration was then given, found that an active chyle leak was identified from the base of the gallbladder fossa, emanating directly from the parenchyma of the liver bed was placed in figure-of-eight fashion encompassing the area of leak. It was managed by laparoscopic ligation of the leaking ductusing. A single liver suture and application of fibrin glue. The drain output rapidly diminished, and it was removed after several days.

Huang et al<sup>[2]</sup> reported another case of chyle leakage after LC for acute biliary pancreatitis in 2009. When confirmed, the patient was given conservative treatment initially, including a low-fat diet with medium-chain triglyceride supplementation, the drainage gradually decreased, and vanished 3 weeks postoperative. The patient got well during the outpatient follow-up, with no reoperation.

Gogalniceanu et al<sup>[3]</sup> reported the third case of chyle leakage after LC for acute biliary pancreatitis in 2010. The output of the milky drain effluent was 340 mL/day initially, but once a fat-free diet was provided, it gradually diminished to zero over the next 7 days. The patient was discharged home with no further symptoms during the 3-month follow-up.

At present, the real reason for chyle leakage post-LC is still unclear, or has no exact diagnostic criteria.<sup>[4]</sup> Current literature suggests that this may occur after iatrogenic injury to lymphatic vessels. The color and the output of the effluent from the abdominal drainage is usually the most direct manifestation of lymphatic leakage.<sup>[11]</sup> Once lymphography was considered as the gold standard in the diagnosis of lymphatic leakage; however, because of its invasive process for diagnosis and contrast agents related complications, its clinical application has been gradually declined.<sup>[5]</sup> Lymphoscintigraphy has the advantage of minimal invasion, no contrast agent related complications, it not only can be applied to the diagnosis of postoperative lymphatic leak, but also can be used in reoperative localization and postoperative prognosis evaluation to some extent.<sup>[6]</sup>

Once chyle leakage was diagnosed, active treatment should be provided. At the same time, to make sure the drainage tube patency. Unfortunately, optimal management of chyle leakage has not been established. Its therapy measures divided into 2 aspects presently, conservative treatment and surgical treatment. The existence of a chyle leakage mostly represents a significant complication with serious metabolic, nutritional, and immunologic implications. The initial treatment is conservative, aimed at the reduction of enteral lymphatic flow and replenishing nutritional loss.<sup>[7]</sup> All patients should be provided low-fat, high protein-based diet, or total parenteral nutrition (TPN). Medium-chain triglycerides (MCTs) supplementation is also significant, this is because of the fact that MCTs may be directly transported within the portal venous system, unlike long-chain triglycerides that are transported via enteral lymphatics, thereby reducing enteral lymphatic flow. Some specialists even suggest that although the chyle leakage is cured, maintenance of a low-fat, MCTs diet also should be provided for several months to prevent recurrence. Furthermore, antibiotic prophylaxis is consensus advocated to prevent secondary abdominal cavity infection.<sup>[8]</sup> Except nutritional modifications and antibiotic prophylaxis, the application of pancreatic lipase inhibitors (eg, orlistat)<sup>[8]</sup> and synthetic somatostatin analogues (eg,

octreotide)<sup>[9]</sup> has also gained support, in order to decrease triglyceride absorption and enteral lymphatic flow. It can be used either alone or in conjunction with other conservative modalities.

Conservative measures may cannot yield good results. So surgical intervention is another significant management. Nevertheless, because of its rarity, the optimal reoperation opportunity and reexploration approach are difficult to establish. The decision to resort to surgical measures should be individualized according to the performance status of the patient, the original surgical procedure, the underlying disease and the severity of the chyle leak.<sup>[2]</sup> Reoperation intervention has been recommended in the presence of high-volume leaks (> 500 mL per day), sustained output or in the presence of nutritional compromise.<sup>[8]</sup> Huang et al<sup>[2]</sup> also argued that chyle leaks after LC detected by lymphoscintigraphy are significant enough not to resolve by conservative therapy, requiring surgical intervention. In experienced surgeons, minimally invasive techniques including laparoscopic exploration can provide safe and effective measures to address difficult surgical problems, even in the face of reoperative surgery.

In this case, we describe a refractory chylous ascites after laparoscopic cholecystectomy. The output of the drainage began to increase from the second day post-LC, to the seventh day after the operation, the drainage flow up to nearly 9000 mL per day. Conservative treatment was given initially, including diet manipulation consisting of medium-chain triglycerides (MCTs), somatostatin subcutaneously as a continuous infusion, nutritional supplementation, maintain fluid and electrolyte balance, and so on. Because of the lack of relevant experience in diagnosis and cure this rarely complication, we spend 1 week for conservative treatment. However, the outcome was frustrating. We decided to proceed with surgical intervention without further delay. The second day after the reoperation, the flow decreased to 5000 mL per day, and conservative treatment was maintained. After nearly 8 months of treatment, the patient recovered and then was discharged.

The anatomy of the lymphatic system makes it prone to injury during many abdominal procedures, particularly those involving the retroperitoneum. This case represents a previously unreported complication of refractory and high flow chyle leakage after laparoscopic cholecystectomy, which did not improve after conservative management with dietary changes and other measures. So we suggest that surgical intervention should be given for refractory cases without further delay. It can not only shorten the disease progression, but also alleviate the sufferings of the patient.

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