CASE REPORT

Thoracic Empyema Caused by Percutaneous Transhepatic Gallbladder Drainage

Shungo Yukumi 1, Hideaki Suzuki 1, Masamitsu Morimoto 1, Masahiro Abe 2, Seiya Ueda 2, Kei Ishimaru 3, Satoshi Furuta 4 and Kenji Nakamura 5

Abstract

Percutaneous transhepatic gallbladder drainage (PT GBD) is an alternative to emergency laparoscopic cholecystectomy in high-risk patients with acute cholecystitis. Severe complications of this procedure are rare, except for drainage tube-related complications. A case of thoracic empyema, which is a rare complication of PT GBD, is reported; penetration of the pleural cavity seemed to be the cause of the thoracic empyema.

Key words: percutaneous transhepatic gallbladder drainage, percutaneous cholecystostomy, thoracic empyema


Introduction

Percutaneous cholecystostomy (PC) or percutaneous transhepatic gallbladder drainage (PT GBD) is an alternative treatment for acute cholecystitis in patients who are deemed to be at high surgical risk (1). The perioperative mortality rate of early laparoscopic cholecystectomy is about 1% in low-risk patients (2, 3), but in patients who are elderly or who have severe comorbidities, the morbidity rises to 41%, and perioperative mortality increases to 18% (1). PT GBD is a safer, minimally invasive procedure for high-risk patients who do not respond to conservative treatment. Major complications are rare with this procedure, with the exception of drainage tube-related complications. The most frequent complication is the dislodgement of the tube (4). Peritonitis due to bile leakage has been reported, but thoracic empyema with PC is rare. We report a unique complication of PC.

Case Report

A 71-year-old woman was admitted to a hospital complaining of epigastralgia and back pain of approximately 60 hours in duration. Her vital signs were as follows: temperature, 38.4°C; heart rate, 78 beats per minute; blood pressure, 120/80 mmHg; respiratory rate, 20 breaths per minute; and pulse oximetry, 97% with ambient air. Her body mass index was 24 kg/m². She had leukocytosis (21,940/μL) and an elevated serum C-reactive protein level of 18.51 mg/dL. Computed tomography (CT) showed a distended gallbladder with an impacted gall stone in the neck of the gallbladder (Fig. 1).

Because an emergency operation within 72 hours of the onset of symptoms was impossible, she was treated overnight with the administration of sefozopran, but her pain did not improve, and her leukocyte count increased to 26,100/μL. On the next day, a 7-Fr pig-tail catheter was inserted under ultrasonographic guidance (Fig. 2). Her right diaphragm was elevated due to obesity. The catheter was inserted through the sixth right intercostal space. The drainage was successful. There were improvements in her fever and leukocytosis, with her leukocyte count decreasing to 12,260/μL, but a right-sided pleural effusion was demonstrated on a chest X-ray the following day.

1Department of Surgery, National Hospital Organization Ehime Medical Center, Japan, 2Department of Respiratory Medicine, National Hospital Organization Ehime Medical Center, Japan, 3Division of Gastrointestinal Surgery and Surgical Oncology, Ehime University, Japan, 4Department of Gastroenterology, National Hospital Organization Ehime Medical Center, Japan and 5Department of Thoracic Surgery, Taijukai Foundation, Kaisei Hospital, Japan

Received for publication February 3, 2015; Accepted for publication April 14, 2015
Correspondence to Dr. Shungo Yukumi, onsen2323@gmail.com
The effusion did not improve with conservative treatment, and 4 days after the PTGBD, it appeared as a loculated effusion on CT (Fig. 3a). The penetration of the thoracic cavity could not be determined on this CT (Fig. 3b). An early-stage thoracic empyema or parapneumonial effusion was diagnosed and a chest tube was inserted. Intrapleural fibrinolytic therapy with urokinase was initiated to avoid surgical debridement. This was continued for 4 days, but it failed to improve the effusion. *Rautoultella ornithinolytica* and *Escherichia coli* were cultured from the bile, but they were not cultured from the pleural effusion.

Video-assisted thoracoscopic surgery (VATS) debridement was performed on the 11th day after admission. The operation was performed under general anesthesia and one-lung ventilation. Three trocars were placed for the thoracoscope and instruments. There were loculated cavities filled with serous effusion and gelatinous debris. Some cavities were filled with pus, though bacterial culture was negative. The formation of a hematoma around the chest tube was observed. These were disrupted and removed to the best extent possible. The drainage catheter for the gallbladder was penetrating the right pleural cavity and the diaphragm (Fig. 4).

Since the inflammatory change was much stronger around the catheter and the diaphragm, it was thought that infection had propagated through it. Mechanical ventilation was required until the fourth postoperative day because of hypoxia from atelectasis of the right lower lobe. The patient was discharged after laparoscopic cholecystectomy.

**Discussion**

In the treatment of acute cholecystitis, conservative treatment with antibiotics tends to result in treatment failure in patients over 70 years of age, with diabetes mellitus, a leukocyte count above 15,000 cells/μL, tachycardia, or a distended gallbladder of over 5 cm in diameter (5). When conservative treatment fails, surgery or emergency drainage is needed.

Early laparoscopic cholecystectomy is accepted as a surgical procedure for acute cholecystitis, and its performance within 72 hours from the onset of symptoms has recently been recommended. However, when local inflammation is severe, early gallbladder drainage is indicated by the Tokyo Guidelines for acute cholangitis and acute cholecystitis (6).

Acute drainage, as is achieved with PTGBD, is an alternative treatment for patients who cannot tolerate an emer-
gency surgical procedure due to severe underlying disease. PTGBD is a safe procedure, however, since it is chosen when emergency cholecystectomy is risky, the mortality rate is high (approximately 15%) (1, 7). Most mortality in PTGBD derives from the comorbid conditions (4). The complication rate of PTGBD is in the range of 0-12.5% (7). Major complications are rare with PTGBD, while the rates of minor complications have been reported to range from 4-13% (8). Common complications are catheter dislodgement and minor hemorrhage (4). Though biliary peritonitis caused by the dislodgement of the catheter is reported to occur in 2.5% of patients (8), catheter-induced thoracic empyema seems to be a rare complication in PTGBD.

A bilopleural fistula was reported by Lee et al. as a rare complication of PTGBD (9). They considered that infected bile due to bile stasis must have entered the pleural cavity along the catheter pathway. In the present case, although bile was not found in the pleural cavity, and the same bacteria were not present in the gallbladder and pleural cavity, the passage of the catheter must have triggered the infection in the pleural cavity. The mechanism of this complication is likely due to penetration of the diaphragm through the liver, which must have created a micro communication between the distended gallbladder (with high pressure) and the pleural cavity (with negative pressure). In the PTGBD procedure, the puncture tends to be made from a lower intercostal space; because of this, the penetration of the pleural cavity by the drainage catheter must not be rare, although its incidence rate is unknown because there are no previous reports of thoracic empyema as a complication of PTGBD. To avoid this complication, the puncture must be made (to the extent that is possible) in the inferior part of the chest wall. Though very rare, thoracic empyema may occur as a complication of PTGBD.

The authors state that they have no Conflict of Interest (COI).

References