Case Report

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Hem-o-lok clip found in the common bile duct 3 years after laparoscopic cholecystectomy and surgical exploration

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Abstract

Endoscopic retrograde cholangiopancreatography (ERCP) with stone extraction is a common and preferred choice for gallstone disease. Laparoscopic common bile duct exploration (LCBDE) and laparoscopic cholecystectomy (LC) are being increasingly used for managing choledocholithiasis and cholecystolithiasis. We report a case of a Hem-o-lok clip that was dropped into the common bile duct (CBD) after LC and surgical common bile duct exploration (CBDE). An 84-year-old man presented with right upper quadrant pain and jaundice for 2 months, and chills and hyperpyrexia for 1 day. The patient had received ERCP and surgical CBDE at a local hospital 3 years previously. The patient first received ERCP and endoscopic nasobiliary drainage (ENBD). When laboratory tests were normal, the patient then received LCBDE. During exploration, stones and a Hem-o-lok clip in the CBD were removed. The patient made good progress after LCBDE + T-tube placement and was discharged from hospital. The findings from this case suggest the following: 1) an appropriate therapy method should be considered for certain gallstone diseases, especially for choledocholithiasis and cholecystolithiasis; and 2) a Hem-o-lok clip should be carefully used during laparoscopic or robot-assisted surgery and the Hem-o-lok clip should not be in close proximity to the incision on the CBD.

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Gallstone disease, endoscopic retrograde cholangiopancreatography, laparoscopic common bile duct exploration, Hem-o-lok clip, cholecystectomy, choledocholithiasis, cholecystolithiasis

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Introduction

Approximately 10% to 15% of the adult population suffers from gallstone disease and cholelithiasis.[1] Endoscopic retrograde cholangiopancreatography (ERCP) with stone extraction is common and preferred for gallstone disease treatment, while surgical common bile duct exploration (CBDE) is considered as a final option.[2] ERCP and surgical CBDE are also common surgical procedures for postoperative recurrence of calculi. Although each of these surgical procedures has some limitations for certain gallstone diseases,[3] ERCP has better feasibility, safety, efficiency and cost-effectiveness compared with CBDE.[4,5] Recently, laparoscopic common bile duct exploration (LCBDE) and laparoscopic cholecystectomy (LC) have been increasingly used for managing choledocholithiasis and cholecystolithiasis. The Hem-o-lok clip is widely used in laparoscopic or robot-assisted surgery of various disciplines, including the urinary system,[6] hepatobiliary system,[7] and gastrointestinal radiography.[8] The Hem-o-lok clip is easy to use and helpful for shortening the operation time and lowering the rate of converting to open surgery. However, there is a risk that the placed clip can migrate postoperation in a few days, leading to hemorrhage and bile leakage, or recurrence of stones in the common bile duct (CBD).[7]

Case report

An 84-year-old man presented to our hospital with right upper quadrant pain and jaundice for 2 months, and chills and hyperpyrexia for 1 day in June 20, 2017. The patient had received ERCP and surgical CBDE at a local hospital 3 years previously. During ERCP, LC was performed first and a Hem-o-lok clip was used to occlude the cystic duct before removal of the gall bladder. However, the stones in the CBD were unable to be removed by choledochoscopy. The endoscopic procedure was then converted to laparotomy. A T-tube was placed after the CBD stones were removed. The T-tube was pulled out 3 months later when cholangiography showed no residual stones in the bile duct.

In our hospital, a physical examination showed abdominal tenderness, jaundice, and fever that reached a maximum temperature of 38°C. Laboratory testing showed the following routine blood parameters: white blood cell count of 12.83×10^9/L (normal range [NR]: $3.5–9.5 \times 10^9$/L) and a neutrophil count of 0.92×10^9/L (NR: $0.4–0.75 \times 10^9$/L), which suggested infection of the bile duct. Liver function parameters were as follows: total bilirubin, 155.1 μmol/L (NR: 6.8–30 μmol/L); direct bilirubin, 98.7 μmol/L (NR: 0–8.6 μmol/L); gamma-glutamyltransferase, 352.6 U/L (NR: 10–60 U/L); total bile acid (TBA), 144.1 μmol/L (NR: 0–10 μmol/L); aspartate aminotransferase, 283.9 U/L (NR: 15–40 U/L); and alanine aminotransferase, 417.2 U/L (NR: 9–50 U/L). Abdominal computed tomography (CT) identified dilation of the CBD up to 1.1 cm in diameter and high-density shadows up to 1.2 cm in length between the upper CBD and the end of the CBD. Obstruction of the biliary

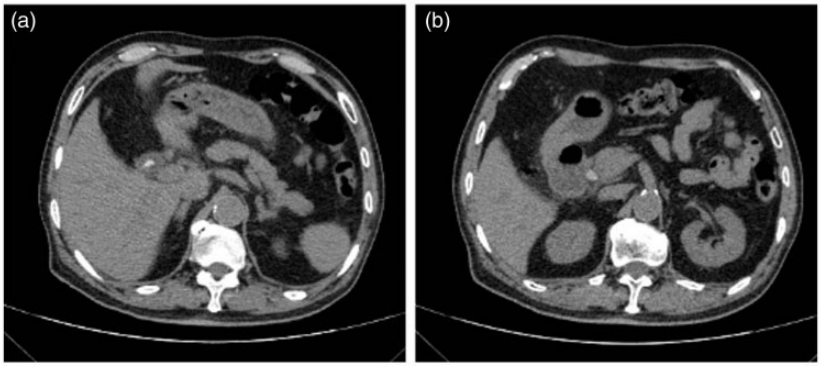

Figure 1. (a) Computed tomography shows dilation of the common bile duct (1.1 cm in width) and a calcified shadow (1.2 cm in length) in the upper common bile duct. (b) Computed tomography shows a calcified shadow (0.3 cm in length) in the end of the common bile duct.

tract was the suggested diagnosis on CT (Figure 1).

The patient received ERCP and endoscopic nasobiliary drainage (ENBD) on June 21, 2017. ERCP showed an irregular filling defect in the upper CBD. Part of the stones was extracted, but most of the occlusion material in the upper CBD was unable to be removed. Nasobiliary drainage was performed, with approximately 200 mL every 24 hours (Figure 2). All of the laboratory test results to normal at the third day after ERCP + ENBD. The patient also received LCBDE on June 21, 2017. During the exploration, two stones approximately 0.6×0.5 cm in size and white foreign matter identified as a Hem-o-lok clip were found in the CBD. The two stones and the Hem-o-lok clip, as well as a suture, were removed (Figure 3). A T-tube was placed after bile duct washing. The patient made good progress after LCBDE + T-tube biliary drainage, and was discharged from hospital on July 3, 2017. Three months later, the patient had completely recovered and the T-tube was removed after no stones were detected by a CT scan (Figure 3).

The patient provided consent for sample collection. The First Hospital of Jilin University Ethics Committee approved this study.

Discussion

The cure rate and morbidity rate of endoscopic gallstone therapy are 88% to 97% and 7% to 19%, respectively,[9,10] similar to surgical gallstone therapy. Common postoperative complications of endoscopic treatment include biliary fistula, biloma, cholangitis, and abdominal hematoma formation.[10] The rates of postoperative complications caused by T-tube placement and primary suture are 16% and 5%, respectively.[4] The rate of residual stones in endoscopic treatment is approximately 2.6% to 8%, which is similar to that of surgery.[11] According to a study by Zinsser et al.,[12] the rate of success was 82.8% for diagnostic ERCP, 96.6% for endoscopic sphincterotomy, 76.8% for extraction of stones in the common bile tract, and 87.5% for drainage in bile tract obstruction. Feng et al.[13] showed that the best option for patients with extrahepatic bile duct stones was LC + LCBDE + ENBD, which had the merits of a faster recovery, shorter hospital

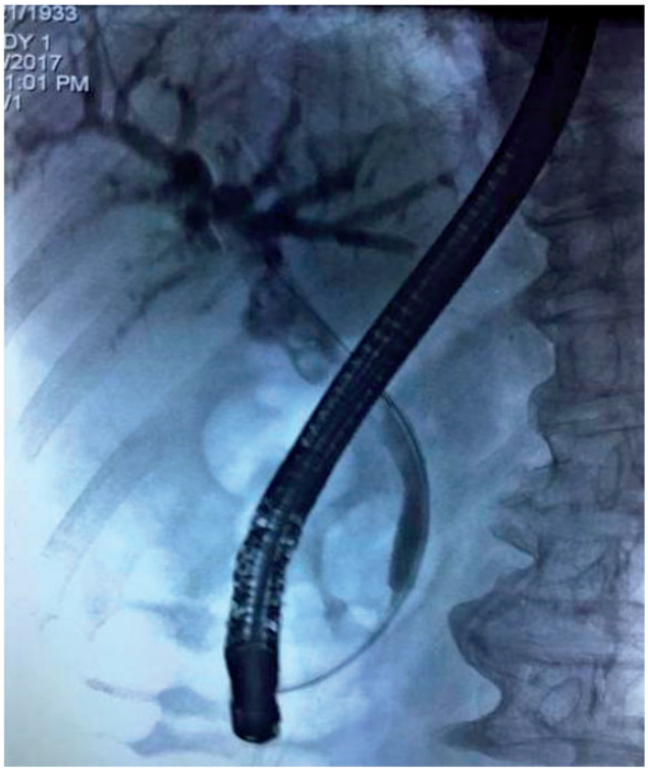

Figure 2. Endoscopic retrograde cholangiopancreatography shows an irregular filling defect in the upper common bile duct after extracting a stone in the end of the common bile duct. A nasobiliary duct was then placed in the common bile duct.

stay, and lower cost compared with other procedures.

In our case, the patient first received ENBD to alleviate jaundice caused by obstruction of the biliary tract because of an unsuccessful surgery 3 years previously. The patient further received LCBDE, which is an effective procedure after unsuccessful stone removal.[14] During the exploration, two stones and a Hem-o-lok clip were found 0.3 cm below the confluence of the CBD and cystic duct. A possible reason for migration of the Hem-o-lok clip could be that the cystic duct ligation site was close to the incision on the CBD and a rejection response led to this migration. After the T-tube was removed, the Hem-o-lok clip was further squeezed into the entry of the incision on the CBD by surrounding tissue, and then it gradually migrated into the CBD. Migration of Hem-o-lok clips has been previously found at post-nephrectomy and post-prostatectomy.[15–17] Although a Hem-o-lok clip dropping into the CBD has also been found previously[7] in patients with LCBDE, all of the reported cases were 2 to 3 months after the operation. For the first time, we report migration of a Hem-o-lok clip and secondary calculi in the CBD 3 years postoperation, accompanied by biliary tract obstruction that caused jaundice.

Cholestasis, abnormal biliary dynamics, and bile duct infection are the main causes of recurrence of CBD stones.[18,19] In our case, migration of a Hem-o-lok clip into the CBD changed biliary dynamics and

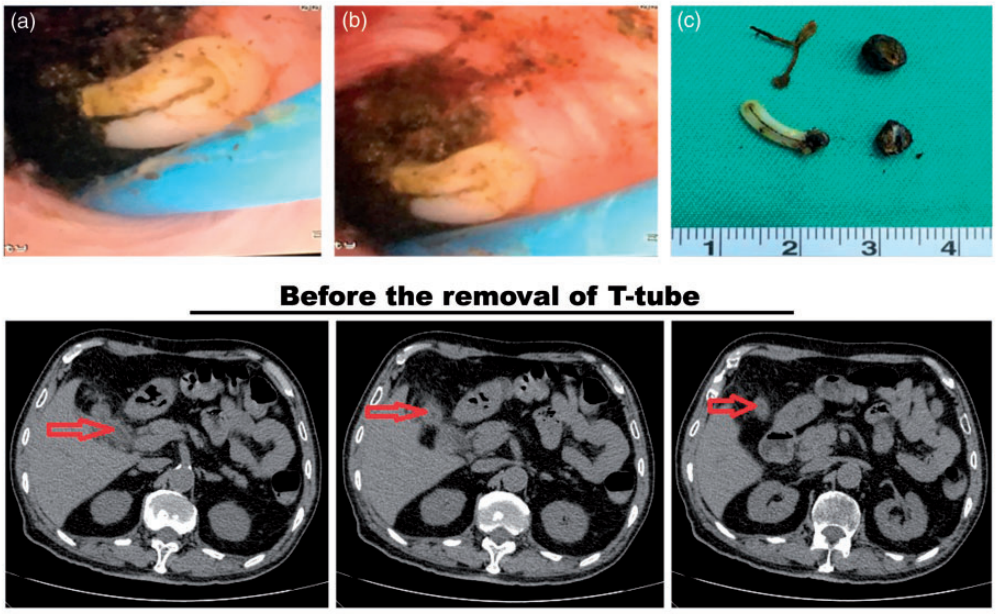

Figure 3. Upper panel (a and b): during laparoscopic common bile duct exploration, two stones (0.6 × 0.5 cm in size) and a Hem-o-lok clip (0.2 × 0.8 cm in size) were found around the nasobiliary duct in the common bile duct. Upper panel (c) Two stones, a Hem-o-lok clip, and a ligature were removed. Lower panel: computed tomographic images show no stones in the common bile duct. Red arrow: location of T-tube placement.

caused stone recurrence. Ursodeoxycholic acid has previously been suggested to be used postoperation to prevent recurrence of CBD stones.[20] T-tube drainage is suggested as an appropriate method for patients who might have bile duct infection and remnant CBD stones.[21,22] In our case, the advanced age, severe inflammation, and history of multiple operations led to the final choice of T-tube placement.

In conclusion, the findings from our case suggest the following: 1) an appropriate therapy method should be considered for certain gallstone diseases, especially for choledocholithiasis and cholecystolithiasis; and 2) a Hem-o-lok clip should be carefully used during laparoscopic or robot-assisted surgery, and the Hem-o-lok clip should not be too close to the incision on the CBD.

Authors' contributions

KK contributed to data collection and analysis, and drafting the manuscript. XL, YH, FL, DS, and YC contributed to interpretation of the data. GW contributed to clinical consultation for the case and organizing the manuscript. GL contributed to revision and editing of the manuscript. YL contributed to English language modification and editing the manuscript.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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