Case Report

Laparoscopically Assisted Extrahepatic Cyst Excision and Left Hemihepatectomy for a Type IV-A Choledochal Cyst

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Abstract

Some studies have reported on laparoscopic excision for treating the choledochal cyst, yet there are no reports on laparoscopic surgery for treating type IV-A choledochal cysts that require a liver resection. In this paper, we report on a case of laparoscopic cyst excision combined with left hemihepatectomy and laparoscopy-assisted Roux-en-Y hepaticojejunostomy for treating a type IV-A choledochal cyst. A 51-year-old female was admitted with symptoms of jaundice and cholangitis. Percutaneous transhepatic biliary drainage (PTBD) was done preoperatively for controlling the cholangitis. The imaging studies revealed a type IV-A choledochal cyst with an associated stricture of the left main intrahepatic duct. After the resolution of the cholangitis, total laparoscopic cyst excision and left hemihepatectomy were performed by using the four-port technique, and then a Roux-en-Y hepaticojejunostomy was done by a laparoscopy-assisted method. The total operation time was 420 minutes. The estimated blood loss was 300 mL, and no perioperative transfusion was needed. The tubogram, which was performed through the PTBD on postoperative day 5, showed good patency of the biliointestinal anastomosis and no biliary leakage. The patient was discharged at postoperative day 7 without any complications. This case shows the feasibility of performing laparoscopic surgery for treating a type IV-A choledochal cyst that requires a liver resection. We believe that laparoscopic cyst excision with a liver resection can be one of the treatment options for selected patients with type IV-A choledochal cysts.

Introduction

SINCE THE INTRODUCTION of the laparoscopic cholecystectomy, the improvements of the laparoscopic technique and instruments have facilitated adopting laparoscopy into many fields of surgery. The laparoscopic approach has been applied to biliary surgery for performing various operative procedures, including cholecystolithotomy, biliary reconstruction (e.g., cholecystojejunostomy, choledochoenterostomy, choledochocholangiostomy, and choledochocholedochostomy), and choledochal cyst excision.1–7 Farello et al.8 in 1995 first described performing a laparoscopic cholecystectomy with Roux-en-Y hepaticojejunostomy for a type I choledochal cyst. Although this procedure has been documented by only a few reports, the recent reports on the laparoscopic approach for treating the choledochal cyst have shown its technical feasibility and the results have been very encouraging.7,9

However, the reports on laparoscopic surgery for the choledochal cyst have been limited to type I and II cysts. There has been no report on laparoscopic surgery for a type IV-A cyst that requires a liver resection. In this paper, we report on a case of laparoscopic extrahepatic cyst excision combined with the left hemihepatectomy for treating a type IV-A choledochal cyst. Liver resection was performed to eliminate the intrahepatic ductal stricture, which may lead to intrahepatic complications, such as hepatolithiasis, cholangitis, and malignancy.10–14 To the best of our knowledge, this is the first reported case of an extrahepatic cyst excision combined with a liver resection for treating a type IV-A choledochal cyst that was performed laparoscopically.

Case Report

A 51-year-old female was admitted with symptoms of jaundice and cholangitis. The laboratory findings at admission were as follows: the total bilirubin level was 3.2 mg/dL,
the alkaline phosphatase level was 554 IU/L, the serum amylase level was 498 U/L, and the CA19-9 level was 14 U/mL. Preoperative abdominal computed tomography (CT) showed a fusiform dilatation of the extrahepatic and intrahepatic bile ducts. Percutaneous transhepatic biliary drainage (PTBD) was performed to control the cholangitis. The cholangiography, which was done through the PTBD, revealed a type IV-A choledochal cyst with a fusiform dilatation of the extrahepatic and left intrahepatic ducts, and this was associated with the stricture of the left main duct (Fig. 1). Yet, any anomalous pancreatobiliary duct junction was not identified. Laparoscopic extrahepatic cyst excision and left hemihepatectomy were planned after the resolution of the cholangitis.

Operative procedure

After the induction of general anesthesia, the patient was placed in a supine position with a 30-degree reverse Trendelenburg adjustment. The first (11-mm) trocar was inserted into the subumbilical port after creating the pneumoperitoneum. The second (11-mm), the third (12-mm), and the fourth (5-mm) trocars were inserted at the midline of the subxiphoid area, at the midclavicular line 5 cm below the right costal margin, and at the anterior axillary line below the right costal margin, respectively (Fig. 2). The operator stood at the left side of the patient during the excision of the extrahepatic choledochal cyst.

A routine cholecystectomy procedure (i.e., ligation and severance of the cystic artery and clipping of the cystic duct) was performed, with the gallbladder left in situ to provide a handle to lift away the liver. The distal part of the choledochal cyst was then carefully dissected, with monopolar electocautery and by using a Harmonic Scalpel® (Ethicon, Cincinnati, OH), from the midportion of the cyst to the intrapancreatic portion. After the narrow distal portion of the cyst was identified (Fig. 3), it was then ligated with Hem-o-lok® (Teleflex, Research Triangle Park, NC) clips, and then the cyst was divided. Next, the gallbladder was next dissected from the liver bed. With the distal portion of the choledochal cyst retracted upward, the proximal portion of the cyst was dissected until the hilum was exposed.

The operator then changed his position to the right side of the patient for the performing of the left hemihepatectomy. After dividing the round ligament, the falciform and left triangular ligaments were sharply dissected until the left hepatic vein was exposed. While lifting the left liver, the lesser omentum attached to the left liver was divided by using a Harmonic Scalpel. The accessory left hepatic artery was found and divided after applying endoclips. After the full mobilization of the left liver, the left hepatic artery and left portal vein were individually isolated and divided after applying Hem-o-lok clips. The hepatic parenchyma was transected, along a line demarcated by the ischemia, by using a Harmonic Scalpel in the superficial portion of the parenchyma and by using CUSA (Valleylab, Boulder, CO) in the deep portion. The large branches of the hepatic veins were controlled with endoclips (Fig. 4). The left hepatic vein was divided by using a linear ENDO GIA (Autosuture, Norwalk, CT).

The resected specimen was completely divided (Fig. 5), and then it was put into a vinyl bag. Next, a Roux-en-Y hepaticojejunostomy was performed by employing the laparoscopy-assisted method. After Treitz’s ligament was identified on the laparoscopic view, the upper jejunum, 40 cm distal to Treitz’s ligament, was grasped with an intestinal clamp and exteriorized through a 6-cm incision, which was created by extending an epigastric port. The Roux-en-Y hepaticojejunostomy and jejunoojejunostomy were manually performed through the incision. Two Jackson-Pratt drains were inserted around the hepaticojejunostomy site and the cut surface of the liver, respectively.

Operative results

The operative time was 420 minutes. The estimated blood loss was 300 mL, and the patient required no intra-operative or postoperative transfusion. The cholangiography done through the PTBD at postoperative day 5 showed good patency of the bilioenteric anastomosis and no biliary leakage. Although it appeared there was a narrowing at the hepaticojejunostomy site (Fig. 6), the PTBD catheter was removed.

FIG. 1. The cholangiogram through the percutaneous transhepatic biliary drainage site showing a type IV-A choledochal cyst associated with a stricture of the left main duct.

FIG. 2. Positioning of the trocars. The epigastric port was extended for specimen extraction, and a hepaticojejunostomy was then performed through the extended wound.
soon after the cholangiography was performed because there were no abnormal findings on the liver function tests. The patient was discharged on postoperative day 7 without any postoperative complications. The postoperative pathology revealed no dysplasia or carcinoma in the bile duct. The follow-up abdominal CT done during postoperative month 4 showed no remnant cyst or intrahepatic ductal dilations (Fig. 7). The patient is now doing very well after a 13-month follow-up period.

**Discussion**

According to Todani’s classification, choledochal cysts are classified into five types: type I—a solitary fusiform or saccular extrahepatic cyst; type II—a supraduodenal diverticul-
The laparoscopic approach seems to have several advantages for managing the choledochal cyst. First, the excellent visualization of tiny structures may help precisely dissect a cyst. Second, considering that choledochal cysts are more commonly diagnosed in young women, the cosmetic advantage of laparoscopy can be maximized for these patients. Third, if late postoperative complications occur, such as anastomotic stricture, cholangitis, intrahepatic stones, pancreatitis, and/or malignancy, then a reoperation can be easily performed due to the reduced adhesions, as compared with the open approach. This present case demonstrates that such laparoscopic advantages can be extended, even to a type IV-A cyst that requires a liver resection.

Conclusions

In summary, this case shows that laparoscopic surgery for a type IV-A choledochal cyst that requires a liver resection is feasible, and that this surgery can be safely accomplished. We believe that a laparoscopic cyst excision with a liver resection can provide those selected patients who suffer with type IV-A choledochal cyst with a treatment option, while maintaining the advantages of minimal invasive surgery.

Disclosure Statement

No competing financial interests exist.

References

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