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Laparoscopic repair for choledochal cyst: lessons learned from 190 cases

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Abstract

Objective: The aim of this study is to report the technical details, early outcomes, and lessons learned from laparoscopic repair of 190 cases of choledochal cyst.

Method: The operation was performed using 4 ports. The cystic duct was identified and divided. The liver was elevated by 2 stay-sutures: one on the round ligament and the other on the distal cystic duct. The choledochal cyst was isolated and removed completely, and then biliary-digestive continuity was reestablished.

Results: From January 2007 to April 2009, 190 patients were operated on. There were 144 girls and 46 boys. Ages ranged from 2 months to 16 years (mean, 46.9 ± 29.3 months). Cyst diameter ranged from 10 to 184 mm. A total of 106 patients were classified as Todani type I cysts, and 84 were type IV. Cystic excision and hepaticoduodenostomy were performed in 133 patients and hepaticojejunostomy in 57 patients. The operating time varied from 70 to 505 minutes (mean, 186 minutes). Conversion to open surgery was required in 2 patients. Intraoperative blood transfusion was required in 4 patients. There were no perioperative deaths. Postoperative anastomotic leakage occurred in 7 patients, resolving spontaneously in 6 and requiring a second operation in 1. Postoperative hospital stay ranged from 5 to 27 days (mean, 7.2 ± 3.3 days). Follow-up occurred between 1 and 24 months postdischarge (mean, 9 ± 2.2 months) and was obtained in 161 patients (84.7%). Of these patients, cholangitis occurred in 4 patients (2.4%).

Conclusion: Laparoscopic repair is a safe and effective procedure for choledochal cyst.

Complete cyst excision and Roux-en-Y hepaticojejunostomy have become a standard procedure in open surgery for choledochal cyst for many years [1-9]. Laparoscopic cyst resection and hepaticojejunostomy for choledochal cyst were first described by Farello et al in 1995 [10]. In 2003, Tan et al [11] reported laparoscopic cyst excision and hepaticoduodenostomy for choledochal cyst.

The laparoscopic approach for choledochal cyst has become more popular recently [12-25]; however, most reported series described a small number of patients [10-12,14-20,22,23,25].

Since January 2007, we have routinely performed laparoscopic surgery for choledochal cyst. The aim of this report is to present technical details, early outcomes, and lessons learned from laparoscopic repair of 190 cases of choledochal cyst.

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1. Patients and methods

Patients included all children who underwent laparoscopic repair for choledochal cyst from January 1, 2007, to April 8, 2009. The operation was carried out by the same surgical team. Patients with type I of biliary atresia were excluded from this report. The operation was not indicated for patients with previous biliary tract operations or those with a perforated cyst.

2. Operative techniques

From January 2007 to November 2008, laparoscopic cyst excision and hepaticoduodenostomy were performed in all patients. From December 2008 to April 2009, a randomization between hepaticoduodenostomy and hepaticojejunostomy after cyst excision was performed.

2.1. Technique of complete cyst excision and hepaticoduodenostomy

A nasogastric tube, rectal tube, and Foley urinary catheter were used to decompress the stomach, the colon, and bladder, respectively.

The patient was placed in a 30° head up supine position, and the surgeon stood at the lower end of the operating table. A 10-mm trocar was inserted through the umbilicus for the telescope. Three additional 5-mm trocars (or 3-mm trocar for small infants) were placed for instruments: one at the right flank, one at the left flank, and the final one in the left hypochondrium (Fig. 1). A carbon dioxide pneumoperitoneum was maintained at a pressure of 8 to 12 mm Hg. The liver was secured to the abdominal wall by a stay-suture placed at the round ligament. The cystic artery was identified, clipped, and divided. The cystic duct was also isolated, clipped, and divided. A second traction suture was placed at the distal cystic duct to elevate the liver and enlarge the liver hilum.

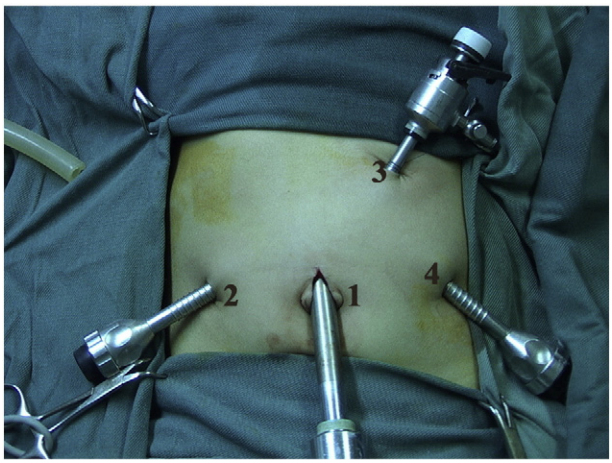

Fig. 1 Trocar positions

The midportion of the cyst was dissected circumferentially. Separation of the left and posterior wall of the cyst from the hepatic artery and portal vein was carried out meticulously until a dissector could be passed through the space between the posterior wall of the cyst and portal vein going from left to right. The cyst was then divided at this site.

The duodenum was retracted downward using an intestinal grasper through the fourth trocar site. The lower part of the cyst was detached from the pancreatic tissue down to the common biliopancreatic duct using a 3-mm dissector for cautery and dissection. The distal part of the cyst was irrigated to wash out biliary debris and then opened longitudinally both on the anterior and posterior walls to inspect the orifice of the common biliopancreatic duct. The distal choledochus was then clipped and divided at this level. The upper part of the cyst was further dissected up to the common hepatic duct and then divided from it. The choledochal cyst was initially divided under the level of the cystic duct, and after identifying the orifice of the common hepatic duct, definitive incision was performed. The common hepatic duct and hepatic ducts were irrigated with normal saline to wash out biliary debris and stones.

With large cysts, the dissection was started at the distal portion. The common biliopancreatic duct was identified. The cyst was divided above the biliopancreatic duct. The cystic stump was inspected from inside to identify the orifice of the common biliopancreatic duct. The cystic stump was then clipped and transected at this level. The cyst was then dissected to the common hepatic duct and divided from it. When the cyst was intensely inflamed and extensive pericystic adhesions were present, the front wall of the cyst was first opened and separation of the back wall of the cyst from the portal vein was carried out carefully while viewing the cyst internally and externally. After dividing the midportion of the cyst, the lower and upper part of the cyst were removed as described above.

The duodenum was mobilized, and a hepaticoduodenostomy was constructed 2.0 cm from the pylorus using 2 running sutures of 5/0 PDS. Since July 2008 5/0 PDS interrupted sutures were used when the diameter of the common hepatic duct was less than 1.0 cm. Sutures were inserted from the left to right with 3 mm instruments.

A cholecystectomy was then carried out. Different parts of the cyst and gallbladder were removed through the umbilicus. A subhepatic drain was inserted.

2.2. Technique of complete cyst excision and hepaticojejunostomy

The patient and trocars were positioned the same as for complete cyst excision and hepaticoduodenostomy. The ligament of Treitz was identified by laparoscopy. A 5/0 silk stay-suture was placed 30.0 cm distal to the ligament of