Choledochal cyst: Early experience by laparoscopic approach

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A B S T R A C T

The management of choledochal cysts has evolved during the last 3 decades. Laparoscopic surgery has revolutionized the treatment of choledochal cyst (CC). We report our case, 2-year old female, in which total excision of cyst and Roux-en-Y hepaticoenterostomy is done by laparoscopic approach. In the hands of experts, laparoscopic excision of the CC is safe and effective approach. This is our first experience and our outcome has been good to a follow-up of 6 months. In our opinion, laparoscopic surgery is a safe treatment of choledochal cyst with less postoperative morbidity, a shorter length of stay and a lower blood loss when compared with open approach. Laparoscopic surgery may become the first choice procedure for choledochal cyst.

Choledochal cyst (CC) is a fairly uncommon anomaly in which dilatations occur throughout the biliary tree. The management of choledochal cysts has evolved during the last 3 decades. Laparoscopic excision of choledochal cysts has increasingly gained acceptance and applicability since its first description by Farello [1–3]. The potential advantages of laparoscopic cyst excision and Roux-en-Y hepaticojejunostomy (LH) include shorter recovery time, magnified view and improved cosmesis. Many reports confirm that laparoscopic approach is also feasible and safe in children with long operative time and technique difficulties. Although the feasibility of laparoscopic resection of CC in early infancy is still unclear and needs further evaluation of the policy of surgical treatment timing in CC [3,4]. We report a case of 2-year-old girl with choledochal cyst (CC) of the common bile duct.

1. Case report

A 2-year-old girl was admitted to our institute for repeated attack of pain over the right upper abdomen for last one month, anorexia and slight fever. The child was admitted and investigated. Laboratory studies showed only a slight increase in liver enzymes but bilirubin was in the range. On physical examination there was no hepato-splenomegaly, no abdominal mass but positive Murphy. Epigastric tenderness was a prominent feature. Abdominal ultrasound showed a dilatation of common bile duct (CBD) suggesting choledochal cyst (Fig. 1). Magnetic cholangio resonance confirmed the diagnosis (Fig. 2). According to the Todani classification we identified the CC as a type 1. The mini-invasive laparoscopic approach was done.

1.1. Surgical technique

The patient was placed in the supine position. One trocar 12 mm for the camera through the umbilicus with open technique and four...
additional 5 mm ports were inserted: 2 were positioned at the right and left of the camera (below and above the umbilical line transverse respectively), 1 under the xiphoid, and 1 in the right iliac fossa (Fig. 3). The peritoneum was inflated with CO2 gas maintain a pressure of 8–10 mm Hg. On exploration, the CBD was found to be dilated with a maximum diameter of about 3 cm. After dissection, choledochotomy with colecystectomy was done. The jejunal gut is protruded through the umbilicus about 40 cm from Treitz and was cut and distally the jejunojejunostomy was performed extracorporally at 80 cm from Treitz. After that the proximal end of the jejunal was passed retrocolic and hepaticojejunostomy Roux-en-Y was performed intracorporeally (Fig. 4). Subsequently it was put in the peritoneum and checked for torsion of the bowel. The mesenteric defect was closed and surgical drainage was inserted. No blood loss. The naso-gastric tube was removed in 2nd days, the drainage in 5th days and the length fasting was 7 days.

No early and late post-operative complication. Six months follow up are in the norm with no dilatation at ultrasonography, normal bilirubin and liver profile.

2. Discussion

The exact cause of choledochal cyst remains obscure. Many authors believe that they are congenital because most of cysts are diagnosed in infants and children. However, because approximately 20% are diagnosed in adults, including elderly patients, several theories have been postulated, as weakness of the wall of the bile duct; obstruction of the distal choledochus; combination of obstruction and weakness; reflux of pancreatic enzymes into the CBD secondary to an anomaly of the pancreaticobiliary junction. All of these theories are applicable to choledochal cyst type I, III and IV anomalies, but they cannot be used to explain type II and V in which the CBD is normal. Perhaps genetic factors play a role. Despite this, the two most accept theories are still reflux of pancreatic enzyme into the CBD secondary to an anomalous pancreaticobiliary junction and obstruction of the distal CBD [3,5].

With the use of prenatal ultrasonography, an increasing number of choledochal cysts have been reported in the fetus. Incomplete gastric obstruction by a large cyst is one of the typical clinical manifestations in newborns and young infants [6]. The earliest reported choledochal cyst was detected in a fetus of 15 weeks, which may correspond to the timing of the formation of pancreatic enzyme.

Most centers prefer to excise the cyst shortly after birth, in the neonatal period, in fact surgical excision in this period has been shown to be technically feasible and well tolerated by patients [6–10]. By the means of early surgery some authors perform either open or laparoscopic approach during neonatal period. It has been thought that neonatal surgery on a thin-walled choledochal cyst can be technically difficult and may lead to further anastomotic complications such as bile leakage or stricture [7,11–13]. Also for the mini-invasive surgery at neonatal period in literature, there are very few reviews in which some authors talk about this approach in fact most of patients have an age ranging from 12 months to 5 years and more. Neonatal laparoscopic surgery for CC is thought to be technically difficult and has potential risks, so they suggest that it is as safe as open surgery and has favorable outcomes after adequate experience have been achieved in laparoscopic CC excision [10].

Laparoscopic approach to CC was first described by Farelo et al. in a 6 years old child [14]. Since then, several authors highlighted the advantages of laparoscopic surgery in CC such as a magnified view, ease of identification and dissection of critical structures, particularly, in the main bile duct. They also emphasized the technical challenge of the hepaticojejunostomy as the most difficult and time-consuming step. The overall results of these data suggest that laparoscopic approach in the treatment of CC is feasible and safe with limited complications [10,11].

Also the technique of Roux-en-Y anastomosis under laparoscopy has been a matter of discussion. Although, some authors suggested using an EndoGIA but it is not feasible in children. Le et al. performed jejunojenuonostomy intracorporally and found that fully laparoscopic approach is exceedingly challenging and time-consuming.
We prefer the exteriorization of small bowel from the umbilical trocar incision commonly used to perform a jejunojejunostomy but intracorporeal hepaticojejunostomy Roux-en-Y anastomosis [10]. In contrast to the timing of surgery, currently with the technical advantages of minimally invasive surgery for pediatric CC the robotic surgical approach represents further progress. Probably the technical refinement and further miniaturization of robotic systems in the future would reduce the limiting effect of patient size in pediatric CC surgery [15,16].

3. Conclusion

Laparoscopic choledochal cyst excision is safe and feasible with many benefits of minimal access approach such as magnified view with more precise dissection and anastomosis, minimal tissue injury resulting in less blood loss, less post-operative pain, and adhesions with excellent cosmetic outcomes. Surgery should be performed early in order to prevent complications, in particularly malignancy and outcomes are better in pediatric patients. Long follow up is necessary to determine the advantages of laparoscopic approach in long term, especially in decreasing number of bowel adhesions. However, laparoscopic CC surgery requires great degree of technical skills and dexterity with experience in both biliary and advanced laparoscopic surgery to achieve excellent outcomes.

References