Case Report

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Website: www.afrjpaedsurg.org

DOI: 10.4103/0189-6725.172579

Quick Response Code:

Laparoscopic excision of an extra-biliary gallbladder duplication cyst in a 9-month-old infant

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ABSTRACT

Duplication of the gallbladder is a rare congenital anomaly of the biliary system. We herein present a case of a 9-month-old full-term female with a prenatally identified gallbladder duplication cyst managed via laparoscopic excision.

Key words: Gallbladder duplication, paediatric laparoscopy, prenatal diagnosis

INTRODUCTION

Congenital anomalies of the gallbladder can be differentiated by location, number and form.[1] Anomalies based on number, including agenesis, or multiple gallbladders, are rare events. The reported incidence of congenital duplication of the gallbladder is 1 in 3800, which may constitute an overestimation of the true rarity of the event.[2] In spite of the diagnostic advancement, <150 classified anomalies, all communicating with some part of the extrahepatic biliary tree, have been documented in the literature.[3,4] Many of the reported cases were in the adult population, often discovered at the time of surgery, following a clinical presentation of traditional biliary disease.[3] In the paediatric population, cystic or cyst-like abdominal masses are more likely to undergo open rather than laparoscopic surgery.[5] Herein, we present a case of a gallbladder duplication cyst, with no obvious connection to the extrahepatic biliary tree, managed by laparoscopic excision.

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CASE REPORT

A full-term female neonate with a prenatally identified abdominal cyst was referred for surgical evaluation. The cystic mass was first seen via prenatal ultrasound at 21-week gestation, without further enlargement on subsequent prenatal ultrasounds. Birth was via normal, spontaneous vaginal delivery. No obvious congenital defects were noted on initial physical examination. The mass was not appreciated upon abdominal palpation. An abdominal ultrasound performed on the first day of life revealed a round, hypoechoic and complex cyst abutting the porta hepatis measuring 2.4 cm × 1.8 cm × 2.5 cm. The mass did not appear to have any connection to the liver, gallbladder or other surrounding structures. Liver function tests and a coagulation panel were normal. Alpha-fetoprotein was within the normal limits at 37,036 ng/mL. The differential diagnosis included choledochal cyst versus enteric duplication cyst of foregut origin. The newborn was discharged to home on the third day of life after an uneventful hospital stay with scheduled follow-up.

At the age of 3 months, the infant remained asymptomatic. An abdominal magnetic resonance imaging supported the diagnosis of enteric duplication cyst without communication to the adjacent solid organs or biliary and vascular structures. The cyst had not increased in size. Laboratory evaluation, including a complete blood

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Cite this article as: Lo DD, Firempong AO, Cardona DM, Gulack BC, Adibe OO. Laparoscopic excision of an extra-biliary gallbladder duplication cyst in a 9-month-old infant. Afr J Paediatr Surg 2015;12:291-3.

count, liver function tests and a basic metabolic panel, were all within the normal limits. Alpha-fetoprotein levels had decreased to 122.7 ng/mL. Upon 9-month follow-up, the infant remained asymptomatic with normal blood laboratory values. However, the cyst had enlarged to 3.7 cm × 3.5 cm × 3.5 cm on a follow-up ultrasound, prompting surgical intervention.

Under general anaesthesia, the patient was placed in the supine position on the operating table with the surgeon at the foot of the table. A 5-mm STEP® expandable trocar system (Covidien; Mansfield, MA, USA) was placed into the abdomen through a vertical umbilical incision. Pneumoperitoneum was achieved at a pressure of 12 mmHg. A 5-mm 45 degree camera was then inserted into the abdomen. The liver was retracted cephalad using an extracorporeal 'hitch' stitch through the falciform ligament. A stab incision was made under direct vision in the left lower quadrant for the direct insertion of a 3 mm grasping instrument, and a right lower quadrant incision was made for a 5-mm bladeless port. Upon examination, the cyst appeared to be intimately adhered to liver segment 4 and the inferior vena cava. No connection to the alimentary tract or the porta hepatis was seen, which suggested a cyst of hepatic origin. The true gallbladder was identified and appeared grossly normal, with no connection to the cyst. The cyst was detached from the surrounding structures using electrocautery and blunt dissection, without rupture or vascular injury. The specimen was subsequently removed from the abdomen via an Endo Catch® (Covidien; Mansfield, MA, USA) bag through the umbilicus.

Operative time was approximately 180 min with minimal blood loss. The patient's postoperative course was uneventful and she was discharged on postoperative day 3. Gross specimen is shown in Figure 1. Histopathology demonstrated an intact unilocular cystic structure, with a single muscular layer and simple cuboidal/columnar mucosa, consistent with a duplication cyst of the gallbladder [Figure 2].[6]

DISCUSSION

True duplication of the gallbladder is a rare anomaly. Associated with various configurations, most notably described by Boyden in 1926, gallbladder duplication cysts have been further described in subsequent classifications by Gross and Harlaftis *et al*.[2,3,7] These classifications highlight the relationship of the anomaly to the nascent gallbladder and the cystic duct. This congenital anomaly can develop in numerous locations within the biliary tree and liver, making ductal anatomy important in the diagnosis and surgical management of duplicate gallbladders. Given the unusual anatomy, open cholecystectomy has historically been the surgical approach of choice.[7] However, successful laparoscopic approach has been reported in limited adult cases.[8] Uniquely, in the case of our patient, the duplicated gallbladder was visualised during prenatal ultrasound and did not produce any postnatal clinical sequelae. Moreover, the gallbladder duplication cyst appeared to have originated from the liver itself without connection to the extrahepatic biliary tree, vascular structures or to the normally developed gallbladder. The ability to perform the procedure laparoscopically provides direct visualisation of hepatobiliary anatomy and decreases overall morbidity.

CONCLUSION

Laparoscopic excision of a gallbladder duplication cyst is safe and feasible in the paediatric population

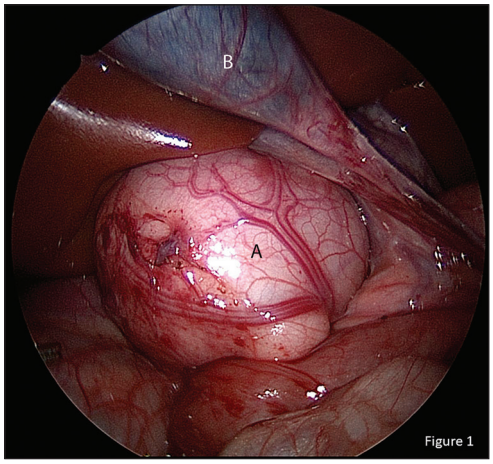

Figure 1: Gross specimen demonstrating the duplication cyst (a) and the unattached gallbladder (b)

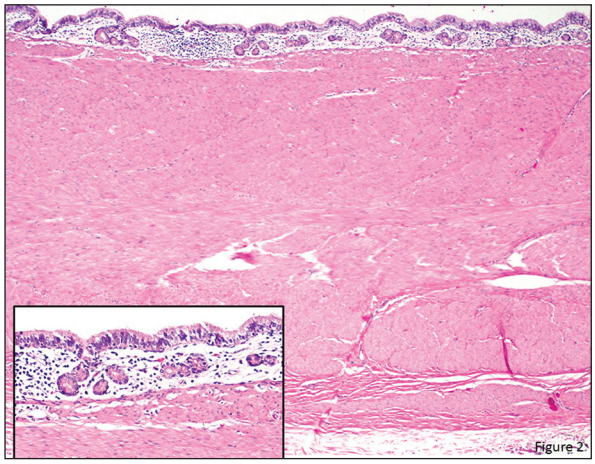

Figure 2: Microscopic examination of the gallbladder wall (H and E, ×100, inset, ×200)

when performed by paediatric surgeons with expertise in minimally invasive surgical techniques and hepatobiliary surgery. Moreover, the lack of biliary connection in our case may represent a new variant in the classification of duplicate gallbladder with obliterated cystic duct.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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