

Gallbladder duplication masquerading as a dilated common bile duct with choledocholithiasis

S Mewa Kinoo,^{1,2} R Naidoo,^{1,2} K Maharaj,¹ B Singh^{1,2}

¹King Edward VIII Academic Hospital, Durban, South Africa

²Department of Surgery, Nelson R Mandela School of Medicine, University of KwaZulu-Natal, Durban, South Africa

Corresponding author: B Singh (singhb3@ukzn.ac.za)

A duplicate gall bladder was diagnosed at laparoscopy, having been erroneously diagnosed on ultrasonography as a dilated common bile duct with choledocholithiasis. Gallbladder duplication is a congenital abnormality with a rare incidence, occurring in approximately 1 in 4 000 births and 0.020% in all large autopsy series. This report highlights its existence to improve awareness and lessen the potential for biliary injury.

S Afr J Surg 2016;54(2)

Gallbladder duplication is a congenital abnormality with a rare incidence, and is reported to occur in approximately 1 in 4 000 births. It was reported twice (0.02%) in 9 921 autopsy cases, and thrice (0.03%) in a survey of 9 970 radiographical cases.¹

The value of ultrasonography in the diagnosis of gall bladders is universally acclaimed. Notwithstanding this, the appearance of a duplicate gallbladder has often been mistaken for a folded gallbladder, pericholecystic fluid, choledochal cyst and gallbladder diverticulum, among other abnormalities. Indeed, the diagnosis of a duplicated gallbladder is invariably made at surgery.

In this report, a duplicate gall bladder was diagnosed at laparoscopy, having been erroneously diagnosed on ultrasonography as a dilated common bile duct with choledocholithiasis.

Case study

A 69-year-old female patient presented to our institution with a one-week history of colicky right upper quadrant pain with associated nausea. She was otherwise healthy, without any co-morbid ailments. On examination, she was comfortable, afebrile and without jaundice. The abdominal examination revealed mild tenderness in the right hypochondrium. A clinical diagnosis of biliary colic was made. A biochemical evaluation revealed a normal bilirubin level with mild elevation in the ductal enzymes.

An abdominal ultrasound showed the gall bladder to be normal with choledocholithiasis, in a dilated common

bile duct measuring 1.9 cm. The endoscopic retrograde cholangiogram (ERC) undertaken was reported as normal. Notwithstanding the apparent diagnostic dilemma, the patient was booked for laparoscopic cholecystectomy and common bile duct exploration. Computed tomography and magnetic resonance imaging scans were unavailable.

Two distinctly separate gall bladders were evident at laparoscopy. One gall bladder was in the normal location, and the second (duplicate) gall bladder was positioned flopped over the common bile duct, mimicking a dilated common bile duct. Each gallbladder had its own cystic duct and cystic artery. The “normally” located gallbladder cystic duct entered the common bile duct, whereas the duplicate gallbladder cystic duct entered the right hepatic duct (Figure 1). Both gallbladders were removed laparoscopically. While the normal gallbladder contained only bile, the duplicate gallbladder was multiseptate and contained multiple calculi (Figure 2).

Histology confirmed two separate gall bladders, both with features of chronic cholecystitis. In addition, the duplicate gallbladder demonstrated pyloric metaplasia and hyperplasia of the muscularis propria. The patient made an uneventful recovery, was discharged the following morning and was well at a follow-up review a fortnight later.

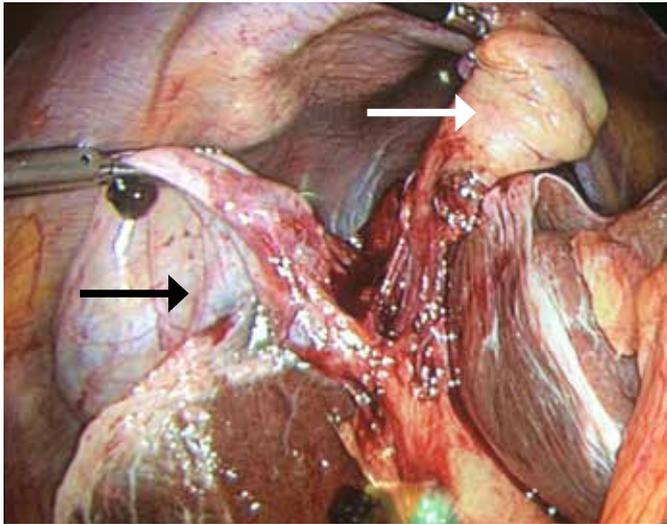


Figure 1: An intraoperative image of the gallbladder duplication

The black arrow depicts the normal gallbladder, with the cystic duct entering the common bile duct. The white arrow depicts the duplicate gallbladder, with the cystic duct entering the right hepatic duct.

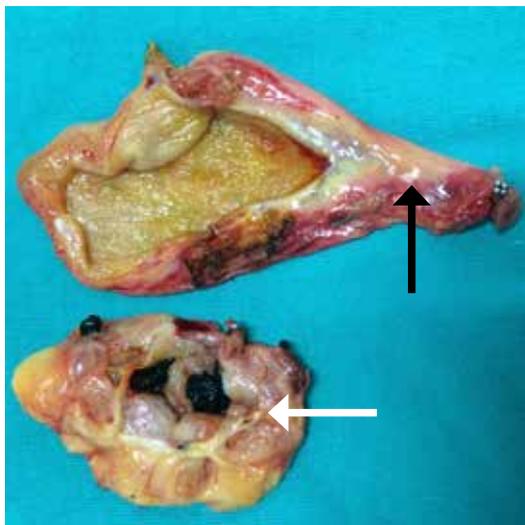


Figure 2: The resected gallbladder specimens

The black arrow indicates the normal gallbladder, with bile and no stones. The white arrow indicates the duplicate gallbladder, with septations and stones.

Discussion

The gallbladder develops during the fifth to sixth week of gestation, when the connection between the hepatic diverticulum and the foregut (duodenum) narrows, forming the bile duct. A small ventral outgrowth (primordium) is formed by the bile duct. This primordium gives rise to the gallbladder and the cystic duct. Gallbladder duplication occurs due to splitting of the primordium, and accessory gallbladders

occur due to the development of an extra primordium of the bile duct.²

Duplicate gallbladders were originally classified by Boyden¹ in 1926, subsequently by Gross³ in 1936, and then in 1977 by Harlaftis et al.⁴ Although the classification by Harlaftis is widely accepted, it was recently modified by Causeya et al.⁵

Harlaftis classified duplicate gallbladders into two main groups, based upon embryogenesis. The split primordial group (type 1, duplicate gallbladder) refers to when the cystic primordium splits during embryogenesis and both gallbladders share a common cystic duct. Type 1 is subdivided into V-shaped, Y-shaped or septate types.

The separate primordial group (type 2, accessory gallbladder) refers to when there is more than one cystic primordium which arises from the biliary tree, and each gallbladder has its own cystic duct. Type 2 is subdivided into a ductal type or H-type if the cystic duct arises from the common bile duct, or a right trabecular type if the cystic duct arises from the right hepatic duct. The modified Harlaftis classification provides the addition of a triple primordial type to type 1, a left trabecular and triple ductal type to type 2, and the addition of a type 3 (combination type) of duplicate gallbladders.

The terms “duplicate”, “double” and “accessory” gallbladders are loosely applied to describe any form of multiple occurring gallbladders. According to the classification by Harlaftis et al., the correct description of this described case must be accessory gall bladder, i.e. type 2 category, right trabecular subtype.

A review of the literature in 2006 revealed the documentation of 148 cases of double gallbladder classified according to the Harlafatis classification. Of these, 16 cases (10.8%) belonged to type 1 septate subtype, 14 cases (9.5%) to the bilobed or V-shaped subtype, and 36 cases (24.3%) to the Y-shaped subtype. Seventy-two cases (48.6%) belonged to the type 2 H- or ductular subtype, and 4 cases (2.7%) of trabecular subtype connected to the right hepatic duct. None of the cases documented a connection to the left hepatic duct.⁶ Since then, there have been reports of trabecular subtypes arising from the left hepatic duct, subtypes arising from both the left and right hepatic ducts, and the presence of triple gallbladders. In 2010, approximately 210 cases were reported.⁵

The preoperative diagnosis of a duplicate gallbladder is important since this aberrant anatomy presents a risk for common bile duct injuries during cholecystectomy. However, only half of the reported cases of duplicate gallbladders are diagnosed preoperatively.⁷ Although the ERC is the diagnostic modality of choice,⁷ it may not always be sensitive, as evident in our case report. To date, there has been only a single case report of gallbladder cancer in a duplicate gallbladder.⁸ Currently, there is no indication for the prophylactic removal of duplicate gallbladders, unless symptomatic.

Conclusion

Although duplicate gallbladders are a rare occurrence, they pose a diagnostic dilemma when they mimic a dilated common bile duct. In cases of diagnostic dilemma, this anomaly should be considered in the differential diagnosis, and actively sought during surgery to prevent common bile injuries during cholecystectomy, and to save the embarrassment of having to perform a repeat cholecystectomy in symptomatic patients.

Conflict of interest

There was no conflict of interest with respect to this study.

REFERENCES

1. Boyden EA. The accessory gallbladder: an embryological and comparative study of aberrant biliary vesicles occurring in man and the domestic mammals. *Am J Anat.* 1926;38:177–231.
2. Lamah M, Karanjia ND, Dickson GH. Anatomical variations of the extrahepatic biliary tree: review of the world literature. *Clin Anat.* 2001;14(3):167–172.
3. Gross RE. Congenital anomalies of the gallbladder: a review of one hundred and forty-eight cases, with a report of a double gallbladder. *Arch Surg.* 1936;32:131–162.
4. Harlaftis N, Gray SW, Skandalakis JE. Multiple gallbladders. *Surg Gynecol Obst.* 1977;145(6):928–934.
5. Causeya MW, Millera S, Ferneliusb CA. Gallbladder duplication: evaluation, treatment and classification. *J Pediatr Surg.* 2010;45(2):443–446.
6. Singh B, Ramsaroop L, Allopi L, et al. Duplicate gallbladder: an unusual case report. *Surg Radiol Anat.* 2006;28(6):654–657.
7. Kim RD, Zendejas I, Velopulos C, et al. Duplicate gallbladder arising from the left hepatic duct: report of a case. *Surg Today.* 2009;39(6):536–539.
8. Kawanishi M, Kuwada Y, Mitsuoka Y, et al. A case of double gallbladder with Adenocarcinoma arising from the left hepatic duct: a case report and review of the literature. *Gastroenterol Res Pract.* 2010;2010. pii: 721469.