

Laparoscopic Management of Gallbladder Duplication: A Case Report and Review of Literature

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ABSTRACT

Gallbladder duplication is an unusual congenital biliary anomaly, and its laparoscopic management has rarely been described. This is a report of a gallbladder duplication successfully treated with laparoscopic cholecystectomies. Previous cases are summarized, and recommendations for optimal laparoscopic management are presented.

Keywords: Laparoscopy, Gallbladder duplication, cholecystectomy.

INTRODUCTION

Congenital duplication of the gallbladder is rare. Since the presence of a double gallbladder was first reported in 31 BC by Pliny, 213 cases of true duplication of the gallbladder have been described.¹ Boyden, in 1926, estimated the incidence of gallbladder duplication to be approximately 1 in 3000 to 4000, in a review from 10 institutions and approximately 19000 cadavers and patients. In his review, only five cases of gallbladder duplication were observed. Two previous articles have addressed the efficacy of laparoscopic cholecystectomy in the presence of gallbladder duplication.^{2,3} We present the second case of unsuspected accessory duplication of the gallbladder successfully treated by laparoscopic cholecystectomy.

CASE REPORT

A 52-year-old woman was seen after several attacks of epigastric and right upper quadrant abdominal pain with radiation to the right upper back. The patient had a long-standing history of cholelithiasis documented by sonography. A recent scintiscan had revealed normal visualization of the liver, gallbladder, bile duct and duodenum. Her past medical history was notable for right breast cancer and subsequent TRAM flap reconstruction, appendectomy and hysterectomy. Physical examination revealed surgical changes with no scleral icterus, organomegaly or Murphy's sign. Laparoscopic cholecystectomy for chronic cholecystitis was planned.

Laparoscopy was performed using an open technique and placement of a Hasson introducer at the umbilical site. After pneumoperitoneum was established, three additional ports were inserted, one in the left epigastrium and two in the right upper quadrant. Pericholecystic adhesions of the omentum were identified. The gallbladder fundus was retracted in a cephalad manner and the infundibulum in a lateral direction, exposing the triangle of Calot. Adhesions were lysed with gentle traction. The peritoneum of the infundibulum was swept medially, revealing the cystic duct-infundibulum junction to view. When a satisfactory length of the cystic duct had been cleared, it was clipped and transected. The cystic artery was identified in its normal location, and

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Figure 1. Gross specimen with accessory gallbladder in foreground.

behind it a saccular structure was seen. The artery was gradually dissected free, clipped and transected. The saccular structure was adherent to the hepatic bed and the hepatic aspect of the gallbladder. Using scissor dissection, the plane between the two structures was developed. A small entry was created into the saccular structure with the release of a small amount of thick, whitish fluid. No bile was seen. The gallbladder was excised using cautery in the standard manner. As the dissection proceeded, the teardrop shape of the organ suggested gallbladder duplication rather than a choledochal cyst or bile duct diverticulum. A narrow cystic duct was identified, clipped and transected. No associated artery was seen. The remainder of the operation was routine. The patient was discharged as an outpatient, and her recovery was uneventful. Gross specimen is shown in **Figure 1**. Pathology demonstrated chronic cholecystitis with cholelithiasis in the primary gallbladder and showed no histological abnormality in the accessory gallbladder. Gallbladder duplication can be distinguished histologically from a choledochal cyst by the presence of a muscular wall with epithelial lining.

DISCUSSION

True duplication of the gallbladder results from the division of a single gallbladder primordium during the fifth or sixth week of embryonic development. Two subtypes are recognized as true gallbladder duplications. The gallbladders may share a common cystic duct, the "Y type," or may be divided by an internal or external septum, the "V type."^{1,3-6}

Accessory duplication of the gallbladder arises from two distinct gallbladder primordia. This results in three subtypes. The first is the "H-shaped" or ductular type, also the most common, in which two separate gallbladders and two separate cystic ducts join the common bile duct. The second is the duodenal type in which the two cystic ducts enter the duodenum directly. The last is the trabecular type in which the accessory cystic duct enters the right intrahepatic system (**Figure 2**). The position of the duplicate gallbladder may be subhepatic, intrahepatic, within the gastrohepatic ligament or within the gallbladder fossa.^{3,7} True and accessory gallbladder duplication occur in approximately equal numbers and with an even male to female ratio.¹ Given the higher frequency of symptomatic cholelithiasis in women, duplication is seen more often clinically in women.

No specific symptoms can alert the clinician to the presence of gallbladder duplication.^{1,6} Disease may be present in one or both gallbladders. Previous cases have shown variations in disease between the separate gallbladders. In one case of triple duplication by Roeder et al, each organ contained a different histopathological pattern. One gallbladder contained cholelithiasis and cholecystitis, the second gallbladder contained a papillary adenocarcinoma, and the third intrahepatic gallbladder was presumed to contain no disease.

Although gallbladder duplication may be documented by ultrasonography, other conditions such as a folded gallbladder, Phrygian cap, gallbladder diverticulum or vascular band, choledochal cyst, and focal adenomyomatosis may mimic gallbladder duplication.⁸ Goiney et al suggested a more sensitive ultrasonographic sign of gallbladder duplication. This sign consisted of isolated contraction of the nondiseased gallbladder with absent contraction of the diseased gallbladder. Scintigraphy may also be falsely negative in cystic duct obstruction of an accessory or double gallbladder.⁹ Endoscopic retrograde cholangiography (ERCP) is the most accurate test in dis-

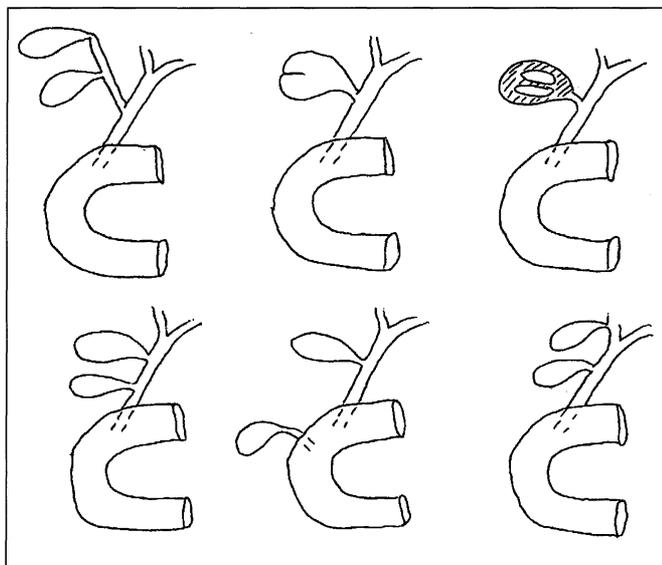


Figure 2. The classification of gallbladder duplication: A) Y shaped, B) V shaped (external), C) V shaped (internal), D) H type, E) duodenal type, F) trabecular.

playing the biliary tract anatomy of gallbladder duplication.^{3,9,10} If duplication is suspected, ERCP has been recommended to define the biliary tract anatomy clearly before surgical intervention.^{3,7}

The presence of multiple gallbladders may be easily missed at operation.^{1,6} Therefore, the physician should consider the possibility of gallbladder duplication in a patient with persistent symptomatic cholelithiasis or the presence of a subhepatic fluid collection following cholecystectomy.⁶ The failure to recognize the presence of a double gallbladder at the initial operation can require reoperation.¹

Few reports have addressed the successful excision of gallbladder duplication laparoscopically. It was previously recommended that in suspected duplication, open cholecystectomy should be performed to expose the biliary anatomy accurately.⁶ However, it is our opinion that duplicated gallbladders can be safely removed laparoscopically if the gallbladder infundibulum-cystic duct junctions are clearly identified. Two previous case reports describe successful laparoscopic excision in the presence of gallbladder duplication. Miyajima et al presented a case where the presence of duplication was demonstrated by ERCP to be a "V shaped" type with an

internal septum prior to surgical intervention. At surgery, the gallbladder was removed intact without difficulty. Garcia et al described a case of unsuspected gallbladder duplication, which was diagnosed at the time of laparoscopy. The initial gallbladder was taken down in a standard fashion, exposing the presence of an accessory gallbladder. The biliary anatomy was defined with direct puncture of the accessory gallbladder and trans-cystic cholangiogram of the primary gallbladder. A partial cholecystectomy was performed in the accessory gallbladder, and a routine cholecystectomy was performed in the primary gallbladder. In our case, the infundibulum-cystic duct junctions were identified on both the accessory gallbladder and the primary gallbladder on laparoscopic examination, and radiographic demonstration of the biliary anatomy was not required for safe dissection.

In this case, the diagnosis of duplicated gallbladder had not been made preoperatively despite the fact that both ultrasonography and scintiscans had been performed. With no preoperative assessment of the bile duct anatomy by ERCP, and with the diagnosis of gallbladder duplication made intraoperatively, when is it safe to proceed with laparoscopic cholecystectomy? That was done in this case with the first, and largest, gallbladder, making its resection nearly routine. The second gallbladder was adherent to both the liver and first gallbladder, but, with gentle exposure, the planes of dissection were readily apparent. Entry into the thin-walled gallbladder suggested that any connection to the bile ducts would be minimal, as no bile was evident. As dissection developed the junction between the infundibulum and cystic duct of the second gallbladder, it revealed the cystic duct to be diminutive. Cystic duct transection was safe following identification of the junction, regardless of the proximal anatomy of the cystic ducts and common bile duct(s). The diagnosis of gallbladder duplication is often made intraoperatively, and safe, definitive surgical management can be performed laparoscopically without intraoperative cholangiography when the junction of the cystic ducts to the gallbladders can be identified and dissected prior to clipping and transection. Otherwise, intraoperative cholangiography must be performed with consideration of open cholecystectomy.

CONCLUSION

There are few reported cases of laparoscopic cholecystectomy with gallbladder duplication. In the presence of gallbladder duplication, both organs should be removed. This can safely be accomplished laparoscopically without cholangiogram if the infundibulum-cystic duct junction can be clearly identified in both gallbladders. It is not necessary to radiographically demonstrate the anatomy of the cystic duct-common bile duct junction to remove either organ. The surgeon should be aware of this entity in the symptomatic "post cholecystectomy" patient.¹¹

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