

# Duplication of the Gall Bladder – A Case Report

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**Abstract:** Duplication of the gall bladder is a rare congenital anomaly. Preoperative diagnosis plays a significant role in the management and to avoid unnecessary bile duct injury during surgery. We present a case of true gallbladder duplication found with US and confirmed with magnetic resonance cholangiopancreatography (MRCP).

**Keywords:** Duplication of gall bladder, Ultrasound, MRCP

## 1. Introduction

Gallbladder duplication is a rare congenital malformation, which occurs in about one in 3000–4000 births. It refers to the presence of two chambers that may drain independently or with a common cystic duct into the common bile duct. Congenital anomalies of the gallbladder and anatomical variations of their positions are associated with an increased risk of complications, especially iatrogenic bile duct injuries after laparoscopic cholecystectomy. Preoperative imaging is often helpful for diagnosis, to avoid inadvertent damage to the biliary system, a complicated postoperative course, and repeat surgery are to be prevented. Currently MRCP seems to be the most efficient imaging study in imaging anomalies of the gall bladder. Laparoscopic cholecystectomy is the treatment of choice. We present a case of double gallbladder (Vesica fellea divisa), which is a rare anomaly consisting of two separate cavities draining through a common cystic duct.

## 2. Case Presentation

A 45 years old female abdominal pain associated with vomiting and constipation since 6 months. It was colicky type of pain, intermittent in nature. She also gave history of four episodes of vomiting which was non-bilious and non-blood stained. There was no past history of jaundice and fever. Physical examination showed slight tenderness in the right upper quadrant. Baseline blood investigation showed elevated Serum glutamic oxaloacetic transaminase (SGOT-100 U/L) and Serum glutamic pyruvic transaminase (SGPT-278 U/L) levels. Serum bilirubin levels were normal.

Transabdominal ultrasound (USG) revealed two pear shaped structures in the gall bladder fossa with sludge within one of them (Figure 1). In view of delineate the exact anatomy, MRI of the upper abdomen performed in axial & coronal planes using T1 and T2 weighted fast spin echo, fast STIR & breath hold T1 weighted gradient echo sequences with respiratory gating (Figures 2-6) revealed an approx. 2.6 x 2.6 x 2.8 cm (AP x ML x SI) sized cystic lesion, showing layering of isointense contents on T2 and T1 sequences, most likely s/o sludge within, seen in the medial part of the GB fossa, superior to the gall bladder, abutting the undersurface the right hepatic duct. It was seen abutting the neck and body of the gall bladder, with infero-medial displacement of the cystic duct. Superiorly, it was abutting the inferior surface of the liver (segment V). Gall bladder

itself appeared well distended with T1 hyperintense and T2 isointense sludge within. Low insertion of cystic duct into CBD was noted.

CBD was mildly prominent with smooth tapering at the distal end.

Subsequently the patient was taken up for surgery. Laparoscopic Cholecystectomy was done, one of the gall bladder was removed, the other gall bladder was left in situ as it was adherent to the right hepatic duct. (Figure 7).

**Figure 1:** Transabdominal ultrasound revealed showing two pear shaped structures in the gall bladder fossa with sludge within one of them (arrow).



Figure 2: T2 coronal image

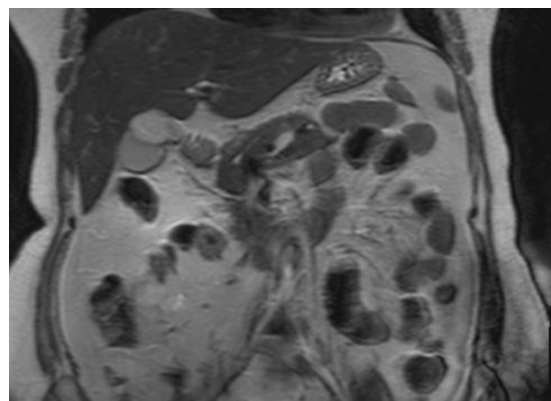


Figure 3: T2 axial image

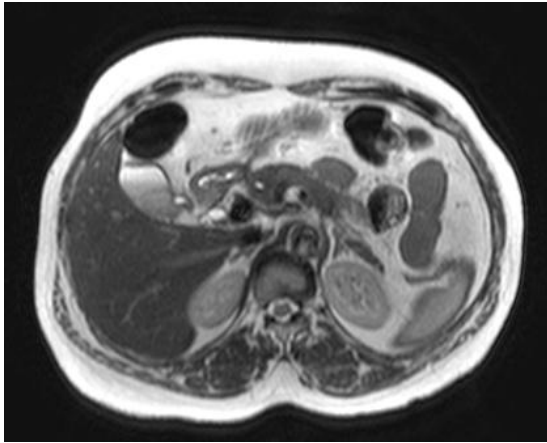


Figure 4: T2 axial image

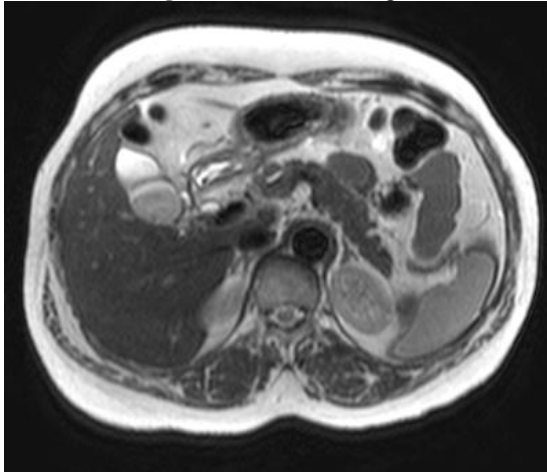


Figure 5: T2 coronal fat-suppressed image

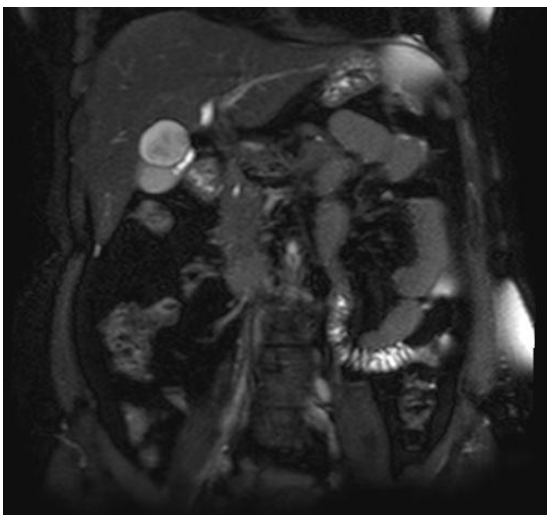
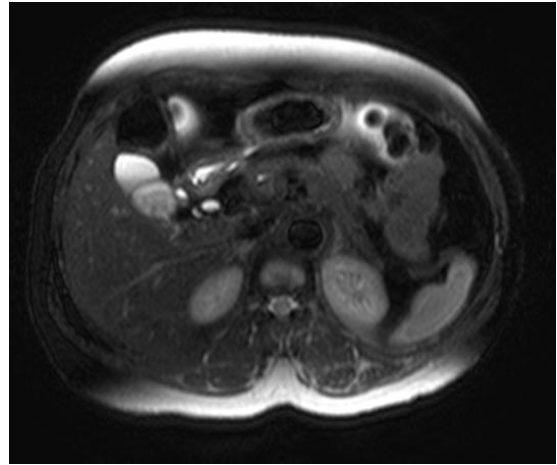


Figure 6: T2 axial Fat-suppressed image



Figures 2-6: A cystic lesion, showing layering of T2 and T1 isointense contents, most likely s/o sludge within, is noted in the medial part of the GB fossa, superior to the GB, abutting the undersurface the right hepatic duct.



Figure 7: Resected specimen of gall bladder. The other duplicated GB was not removed as it was adherent to the right hepatic duct as was seen on MRI.

### 3. Discussion




Duplication of the gall bladder is a rare congenital anomaly, occurring in about one per 3,000-4,000 births[1]. Double gallbladder derives from the distal portion of hepatic diverticulum. An abnormal differentiation of the primordial gallbladder during the 4th and 5th week of gestation may lead to multiple gallbladders. The first reported human case was noted in a sacrificial victim of Emperor Augustus in 31 BC [2]. However, it was not formally classified until 1929 by Dr. Boyden at Harvard University. It is essential to diagnose this pre-operatively because of associated anatomical variations of cystic duct and hepatic artery, this congenital anomaly is important to know for surgeons.

Anatomic variants of gallbladder duplication are still differentiated according to Boyden's classification as follows (Figure 4) [1, 3]:

- 1) Vesica fellea divisa (bilobed or bifid gallbladder, double gallbladder with a common neck),
- 2) Vesica fellea duplex (double gallbladder with two cystic ducts),
  - a) Y-shaped type (the two cystic ducts uniting before entering the common bile duct),

b) H-shaped type (ductular type, the two cystic ducts entering separately into the biliary tree).

**Table 1:** Boyden classification of gall bladder duplication

Vesica fella divisa	Vesica fella duplex	
	Y-shaped type	H-shaped type
		

Most duplicated gallbladders usually lie adjacent to each other and share a common peritoneal coat. Occasionally, one could be entirely intrahepatic or sub-hepatic. True gallbladder duplications show variations such as a common cystic duct and arterial supply or can have separate cystic ducts and blood supply [4]

Differential diagnosis includes gallbladder diverticula, gallbladder fold, Phrygian cap, choledochal cyst, pericholecystic fluid, focal adenomyomatosis, and intraperitoneal fibrous bands. [5]

The incidence and nature of clinical problems associated with duplicated gallbladder are similar to those encountered in the single viscus, including acute or chronic cholecystitis, cholelithiasis, empyema, torsion, cholecystocolic fistula, lump in the abdomen, and carcinoma. There are no specific symptoms attributable to a double gallbladder.

Ultrasound, CT scan, MRCP, scintigraphy and oral cholecystography help in identifying GB anomalies but they do have their limitations and are not 100% sensitive in identifying biliary ductal anomalies. ERCP also acts as an adjunct procedure in establishing the diagnosis.

Ultrasound is generally the initial imaging modality in patients with right upper quadrant pain. US may diagnose gallbladder duplication if the viscera are located separately. US may demonstrate wall thickness, lumen pathology and the number of the gallbladders but is unable to define always the exact anatomy of the biliary tree. Some criteria have been defined to diagnose gallbladder duplication on US examination in limited case reports. Although US findings may suggest a double gallbladder, the cystic duct is usually not identified and it is often impossible, as in our case, to distinguish bilobed gallbladder from a true duplication by US.

Helical contrast enhanced CT abdomen (CECT) can be used to differentiate GB abnormalities from duodenal pathologies. However, it is seldom used due to poor visualization of intrahepatic biliary radicles (IHBR) and advanced techniques in MRI. CECT may be helpful in demonstrating other vascular anomalies associated with duplication. [5].

MR Cholangiography has proved to be a valid, noninvasive imaging technique for the evaluation of patients with suspected anomalies of the gallbladder after initial scanning with US. MRCP is often used for noninvasive work-up of patients with biliary disease for evaluation of bile duct anatomy before cholecystectomy. By demonstrating aberrant anatomy before surgery, the risk of bile duct injury can be reduced, especially during laparoscopic cholecystectomy,

which is associated with double the risk of bile duct injury compared with that of open cholecystectomy. MRCP is becoming the initial imaging tool for the biliary system, with ERCP reserved for therapeutic indications. MRCP is noninvasive, cheaper, uses no radiation, requires no anesthesia and less operator dependent; allows better visualization of biliary ducts when combined with conventional T1- and T2-weighted sequences. MRCP is excellent at distinguishing biliary anatomy and has the advantage of being less invasive without exposing the patient to radiation [5, 7-8]

Duplication of the gallbladder has also been detected by percutaneous transhepatic cholangiography, oral cholecystography and scintigraphy. But these procedures are not routinely used in patients with biliary disease.

Concomitance with other congenital anomalies, such as an anomalous right hepatic artery, has been described and may lead to intraoperative injury [5]. Attention is being focused on the need of complete evaluation during surgery by intraoperative cholangiography to prevent inadvertent injury to the biliary system [2]. Duplication of the gallbladder is a rare congenital abnormality, which requires special attention to the biliary ductal and arterial anatomy.

Laparoscopic cholecystectomy has long been considered the gold standard treatment for gallbladder disease.

It is important to recognize gallbladder duplication due to the clinical, surgical, and imaging difficulties. Accurate pre-operative diagnosis of this anomaly becomes important to prevent possible surgical complications and repeated surgery.

#### 4. Conclusion

In our case MRCP clinched the diagnosis of duplicated GB (TYPE 2a) with additional information provided was of second GB abutting right hepatic duct, which made surgeons aware what to expect at surgery as not do aggressive dissection.

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