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Original Research Article

Congenital Bilobed Gallbladder: A Case Report with Review

Keshav Sharma[1], Saurabh Kumar Singh[2], Himani Sandhu[3], Ravi Sinha[4*]

[1]JR-3, Department of Paediatrics, Hind Institute of Medical Sciences, Mau Ataria, U.P.
[2]Assistant Professor, Department of Paediatric, Hind Institute of Medical Sciences, Mau Ataria, U.P.
[3]JR-3, Department of General Surgery, Hind Institute of Medical Sciences, Mau Ataria, U.P.
[4]Associate Professor, Department of General Surgery, Hind Institute of Medical Sciences, Mau Ataria, U.P

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Corresponding Author: Dr. Ravi Sinha
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Abstract:

Gallbladder duplication is a rare congenital anomaly of the biliary tree. This study reported a rare case of duplication anomaly of gallbladder in a female aged 13 years, who presented with right hypochondrial pain for 6 months. Ultrasound findings suggested multiple stones in gallbladder and peroperatively she was found to have bilobed gallbladder. This case emphasized the need for complete removal of both gallbladders during laparoscopic cholecystectomy as the preoperative recognition decreases the risk of complications during laparoscopic cholecystectomy. The aim of this report was also to review the literature of previous cases to contrasted with the present one.

Keywords: Congenital Malformations, Gallbladder Disease, Cholangitis, Laparoscopic Surgery.

Introduction

Gallbladder duplication is a rare congenital anomaly that occurs in only one of 4000 births. BG is a subset of HarlaftisType1 gallbladder duplication (Type1b) and is the rarest of the Type1 duplications. The first BG described in English medical literature was in 1914 by Deaverand Ashhurst [2].Since then, many cases were discussed in medical literature. Of those, a few cases of them had symptomatic gallbladder disease and employed the use of laparoscopic cholecystectomy [3,4].

Bilobed gallbladders are a physiological anomaly rather than pathology, and there is not sufficient evidence to state that BGs are more prone to pathology [5]. Anomalies of the gallbladder and the biliary tree may lead to misidentification of structures which increases the risk of complications during cholecystectomy, both laparoscopic and open[6]. In this era of laparoscopic cholecystectomy, unrecognized variations in anatomy predispose patients to iatrogenic bile duct injuries and other complications [7]. Although very few are reported in the published literature, these anomalies may be associated with complications like calculous cholecystitis and choledocholithiasis [8].

Preoperative documentation of these malformations is very important to avoid catastrophic intraoperative problems. Judicious use of diagnostic imaging modalities may provide an accurate diagnosis which will avoid iatrogenic injuries and ensure successful operative outcomes [8–10]. In cases diagnosed intraoperatively, maneuvers such as an intraoperative cholangiography may avoid bile duct injuries [11].

However, preoperative recognition of these anomalies, while difficult, is still preferred to avoid intraoperative problems. Laparoscopic cholecystectomy is still the treatment of choice when gallstone diseases arise [12-16].

Congenital malformations and anatomical variations of the gallbladder can present a clinical challenge due to difficulties with diagnosis and identification. They can be classified mainly as duplicated gallbladder (split-primordium) or accessory gallbladder, based on the number of associated cystic ducts and how the corresponding cystic duct connects to the common bile duct [17,18]. Therefore Anatomy, Physiology, Embryology of GB should be in knowledge. The Harlaftis classification divides gallbladder duplication into four types as delineated below [19, 20].

1. Type 1 is characterized by a common cystic duct and is due to late division of the pars cystica

- septated gallbladder
- septated gallbladder and cystic duct

- V-shaped double gallbladder
- Y-shaped double gallbladder: second most common [4]

2. Type 2 is characterized by double cystic ducts and is due to early division of the pars cystica or pars hepatic

- ductular type (H-shaped): most common [4]
- right trabecular type
- left trabecular type
- duodenal type

3. Type 3 is characterized by triple gallbladders

- Y+Y shaped
- Y+H shaped
- H+H shaped
- trabceular type

4. Type 4 is characteristic by no cystic duct

- undrained duplicated gallbladder
- The Boyden classification divides gallbladder duplication into three groups [8]:
- bilobed, incomplete gallbladder division with one common cystic duct
- Complete gallbladder duplication with separate cystic ducts that lead to a common hepatic duct.
- Complete gallbladder duplication with a common cystic duct entering the common hepatic duct.

Embryology: [22-27]

When the human embryo is 2.5 mm in size, a bifid bud forms along the anterior margin of the primitive foregut and proliferates laterally into the septum transversum. The more cephalad of these two diverticula is responsible for the formation of the liver and intrahepatic bile ducts, whereas the caudal diverticulum develops into the gallbladder and extrahepatic biliary tree. At the 5-mm stage of development, the originally hollow primordium of the gallbladder and common bile duct becomes occluded with endodermal cells but is soon revacuolated. If recanalization is incomplete, a compartmentalized multiseptate gallbladder results. A single, transversely oriented septum results in the Phrygian cap deformity, whereas longitudinal septa produce a bifid or triple gallbladder.

The lumen of the common bile duct is reestablished at the 7.5-mm stage and the gallbladder and duodenal lumen somewhat later. Bile is secreted by the 12th week. At the 10- to 15-mm stage (6-7 weeks), the gallbladder has formed and is connected to the duodenum by a canalized choledochocystic duct. This duct originates from the lateral aspect of the primitive foregut and eventually terminates on the medial or posteromedial aspect of the descending portion of the duodenum after the foregut completes its 270-degree rotation. The formation of the intrahepatic ducts is preceded by the development of the portal and hepatic veins and the formation of the hepatocytes and Kupffer cells. The intrahepatic ducts by the 18-mm stage consist only of a blindly ending solid core of cells that extends from the junction of the cystic and common ducts toward the liver hilum. At the point of contact between this blindly ending ductal anlage and the hepatocytes, the intrahepatic ducts develop along the framework of the previously formed portal vein branches similar to vines on a trellis. Significant variation in the configuration of the intrahepatic ducts can be accounted for by the unpredictable manner in which they wind around pre-existing portal veins.

Agenesis of the Gallbladder: Agenesis of the gallbladder is caused by failure of development of the caudal division of the primitive hepatic diverticulum or failure of vacuolization after the solid phase of embryonic development. Atresia or hypoplasia of the gallbladder also represents aborted development of the organ. Other congenital anomalies are present in two thirds of these patients, including congenital heart lesions, polysplenia, imperforate anus, absence of one or more bones, and rectovaginal fistula. There appears to be a genetic input as well because several families with multiple individuals having agenesis have been identified. This malformation is reported in 0.013% to 0.155% of autopsy series, but many of these cases are in stillborn and young infants. The surgical incidence of gallbladder agenesis is approximately 0.02%. Nearly two thirds of adult patients with agenesis of the gallbladder have biliary tract symptoms, and extrahepatic biliary calculi are reported in 25% to 50% of these patients. Preoperative diagnosis of gallbladder agenesis is difficult, and the absence of the gallbladder is often an intraoperative finding. Ultrasound or computed tomography (CT) may suggest the diagnosis, but this disorder is usually diagnosed at surgery when the gallbladder is not found at cholangiography. Intraoperative ultrasound may be helpful in establishing the diagnosis and excluding a completely intrahepatic gallbladder. Agenesis of the gallbladder is a rare cause of false-positive hepatobiliary scintiscans.

Duplication of the Gallbladder: This anomaly is caused by incomplete revacuolization of the primitive gallbladder, resulting in a persistent longitudinal septum that divides the gallbladder lengthwise. Another possible mechanism is the occurrence of separate cystic buds. To establish the diagnosis, two separate gallbladder cavities, each with its own cystic duct, must be present. These duplicated cystic ducts may enter the common duct separately or form a Y configuration before a common entrance. Most reported cases of gallbladder duplication have a clinical picture of cholecystitis with cholelithiasis in at least one of

the gallbladders. Sometimes one of the gallbladders appears normal on oral cholecystography, whereas the second, diseased, nonvisualized, and unsuspected gallbladder produces symptoms. A number of entities can mimic the double gallbladder at sonography: folded gallbladder, bilobed gallbladder, choledochal cyst, pericholecystic fluid, gallbladder diverticulum, vascular band across the gallbladder, and focal adenomyomatosis. Complications associated with double gallbladder include torsion and the development of papilloma, carcinoma, common duct obstruction, and secondary biliary cirrhosis. Treatment of this disorder consists of removal of both gallbladders. Triple and quadruple gallbladders have also been reported. Diverticular gallbladders without cystic ducts are classified as accessory gallbladders.

Anomalies of Gallbladder Shape:

Phrygian Cap: Phrygian cap is the most common abnormality of gallbladder shape, occurring in 1% to 6% of the population. It is named after the headgear worn by ancient Greek slaves as a sign of liberation. This deformity is characterized by a fold or septum of the gallbladder between the body and fundus. Two variations of this anomaly have been described. In the retroserosal or concealed type, the gallbladder is smoothly invested by peritoneum, and the mucosal fold that projects into the lumen may not be visible externally. In the serosal or visible type, the peritoneum follows the bend in the fundus, then reflects on itself as the fundus overlies the body. This anomaly is of no clinical significance unless it is mistaken for a layer of stones or hyperplastic cholecystosis.

Multiseptate Gallbladder: The multiseptate gallbladder is a solitary gallbladder characterized by multiple septa of various sizes internally and a faintly bosselated surface externally. The gallbladder is usually normal in size and position, and the chambers communicate with one another by one or more orifices from fundus to cystic duct. These septations lead to stasis of bile and gallstone formation. On ultrasound studies, multiple communicating septations and locules are seen bridging the gallbladder lumen. Oral cholecystography reveals the "honeycomb" multicystic character of the gallbladder. The sonographic differential diagnoses are desquamated gallbladder mucosa and hyperplastic cholecystoses.

Diverticula Gallbladder: Diverticula are rare and usually clinically silent. They can occur anywhere in the gallbladder and are usually single and vary greatly in size. Congenital diverticula are true diverticula and contain all the mural layers, as opposed to the pseudodiverticula of adenomyomatosis, which have little or no smooth muscle in their walls. Acquired traction diverticula from adjacent adhesions or duodenal disease must also be excluded.

Abnormalities of Gallbladder Position:

Wandering Gallbladder: When the gallbladder has an unusually long mesentery, it can "wander" or "float." The gallbladder may "disappear" into the pelvis on upright radiographs or wander in front of the spine or to the left of the abdomen. Rarely, the gallbladder can herniate through the foramen of Winslow into the lesser sac. In these cases, cholecystography reveals an unusual angulation of the gallbladder, which lies parallel and adjacent to the duodenal bulb with its fundus pointing to the left upper quadrant. The herniation can be intermittent and may be responsible for abdominal pain. It is best seen by a barium meal in conjunction with oral cholecystography. Cross-sectional imaging may not be specific, showing only a cystic structure in the lesser sac.

Gallbladder Torsion: Three unusual anatomic situations give rise to torsion of the gallbladder, and they all produce twisting of an unusually mobile gallbladder on a pedicle: (1) a gallbladder that is completely free of mesenteric or peritoneal investments except for its cystic duct and artery, (2) a long gallbladder mesentery sufficient to allow twisting, and (3) the presence of large stones in the gallbladder fundus that cause lengthening and torsion of the gallbladder mesentery. Kyphosis, vigorous gallbladder peristalsis, and atherosclerosis have also been implicated as other predisposing or contributing factors. The mesentery is sufficiently long to permit torsion in 4.5% of the population. Most cases of gallbladder torsion occur in women (female-to-male ratio of 3 : 1).

The usual preoperative diagnosis is acute cholecystitis. The presence of fever is variable, leukocytosis is common, and one third of patients have a right upper quadrant mass. Gangrene develops in more than 50% of cases and is extremely common when the pain has been present for more than 48 hours. On cross-sectional imaging, the gallbladder is distended and may have an unusual location and show mural thickening. The diagnosis is seldom made preoperatively, however.

Ectopic Gallbladder: The gallbladder can be located in a variety of anomalous positions. In patients with an intrahepatic gallbladder, the gallbladder is completely surrounded by hepatic parenchyma. The intrahepatic gallbladder usually presents little difficulty in imaging, but it may complicate the clinical diagnosis of acute cholecystitis because of a paucity of peritoneal signs resulting from the long distance between the gallbladder and peritoneum. This anomaly also makes cholecystectomy more difficult. On sulfur colloid scans, the intrahepatic gallbladder presents

as a cold hepatic defect. The gallbladder has also been reported in the following positions: suprahepatic, retrohepatic (Fig. 76-1), supradiaphragmatic, and retroperitoneal. In patients with cirrhosis, small or absent right lobes, or chronic obstructive pulmonary disease, the gallbladder together with the colon is often interposed between the liver and the diaphragm. Left-sided gallbladders may occur in situs inversus or as an isolated finding. They can also lie in the falciform ligament, transverse mesocolon, and anterior abdominal wall.

Abnormalities in Gallbladder Size:

Cholecystomegaly: Enlargement of the gallbladder has been reported in a number of disorders including diabetes (because of an autonomic neuropathy) and after truncal and selective vagotomy. The gallbladder also becomes larger than normal during pregnancy, in patients with sickle hemoglobinopathy, and in extremely obese people.

Microgallbladder: In patients with cystic fibrosis, the gallbladder is typically small, trabeculated, contracted, and poorly functioning. It often contains echogenic bile, sludge, and cholesterol gallstones.

These changes are presumably due to the thick, tenacious bile that is characteristic of this disease.

Iliary Tract Anomalies: Anomalies of the biliary system are found in 2.4% of autopsies, 28% of surgical dissections, and 5% to 13% of operative cholangiograms. The most common anomaly is an aberrant intrahepatic duct draining a circumscribed portion of the liver, such as an anterior or posterior segment right lobe duct that drains into the left main rather than the right main hepatic duct.

The aberrant duct can join the common hepatic duct, common bile duct, or cystic duct or insert into a low right hepatic duct. Rarely, it may run through the gallbladder fossa or into the gallbladder, predisposing it to injury at cholecystectomy. The hepatic ducts may join either higher or lower than normal. Surgical difficulties may arise when the cystic duct enters into a low inserting right hepatic duct or when the right hepatic duct enters into the cystic duct before joining the left hepatic duct. Duplications of the cystic duct and common bile duct are rare. Anomalies of cystic duct insertion occur as well

Anatomic variants in the cystic duct: Congenital tracheobiliary fistula is a rare disorder that is manifested with respiratory distress and cough with bilious sputum. The fistula begins near the carina, traverses the diaphragm, and usually communicates with the left hepatic duct.

Pneumobilia may be seen on plain radiography, and the diagnosis is confirmed with biliary scintigraphy. Choledochal cysts, choledochoceles, and Caroli's disease are a part of a spectrum of biliary anomalies that produce dilation of the biliary tree [28,29].

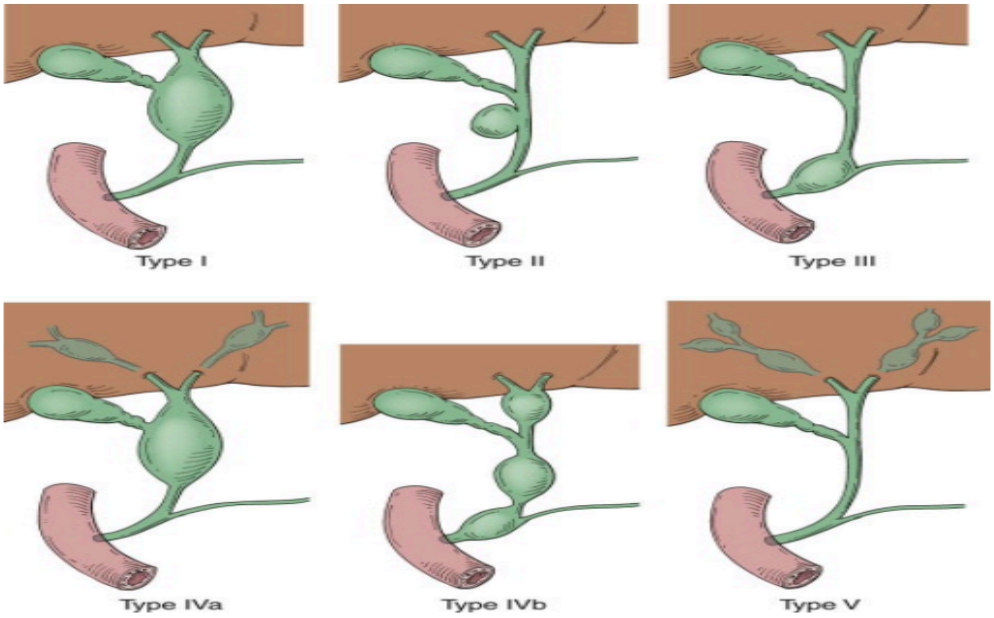

Figure 1: Anomalies and Anatomic Variants of the Gallbladder and Biliary Tract [30]

The prevalence of bilobed/ Duplication of Gallbladder is almost equal between the two genders, however due to higher occurrence of gallbladder disease in women the reported cases of duplication are higher in females than in males [30,-38]. Clinical consideration of a duplicated

gallbladder in a symptomatic patient played a crucial role in planning surgery and to prevent possible surgical complications and repeated laparotomies [37,39]. Many literature has been documented on bilobed/ Duplication of Gallbladder with clinical surgical management as delineated below.[Table-1, Table-2 & 3]

This case study was carried out with a patient of gallbladder disease presented with cholelithiasis and choledocholithiasis who was also found to have a duplicated gallbladder after having been worked up. The study was also reviewed the literature of previous cases and compared with the present one to draw a conclusive clinical management strategy against complex bilobed/ Duplication of Gallbladder, diseases.

Case Reports: Presented herein, the case of a 13 year old female, who presented with abdominal pain for last six months. There was history of yellowish discoloration of urine and pale Colored stools. Per abdomen examination revealed soft abdomen with mild tenderness in right hypochondrium. Her hematological/ biochemical parameters revealed abnormal liver function tests revealing elevated bilirubin (total – 4.46 mg/dl, direct bilirubin – 412 mg/dl)and raised alkaline phosphatase – 788 U/L) [Table-1] . All other investigations were remarkable. A transabdominal ultrasound and MRCP were suggestive of a gallbladder duplication with the larger gallbladder filled with cholelithiasis [Figure-2, 3, and 4].

Laparoscopic cholecystectomy was performed in the Department of General Surgery, Hind Institute of Medical Sciences, Sitapur, UP, India. The gallbladder was found to be chronically inflamed and to contain multiple stones. The stomach, duodenum, pancreas, liver, spleen, and large and small intestine were normal

Pathologic examination revealed chronic cholecystitis with slight thickening of the walls of the gallbladder. Multiple (seven) faceted stones, each 0.8 cm. in diameter, were localized to a subserosal sac, 1.8 cm. in diameter, adjacent to the fundus.

The mucosa-lined sac communicated with the major lumen through a fundic ostium 0.1 cm. in diameter. Evidence of cholesterosis was present in the main portion of the gallbladder but not in the sac. Muscularis was demonstrated microscopically in the wall of both the gallbladder and the diverticulum. Rokitansky sinuses were also seen in both locations.

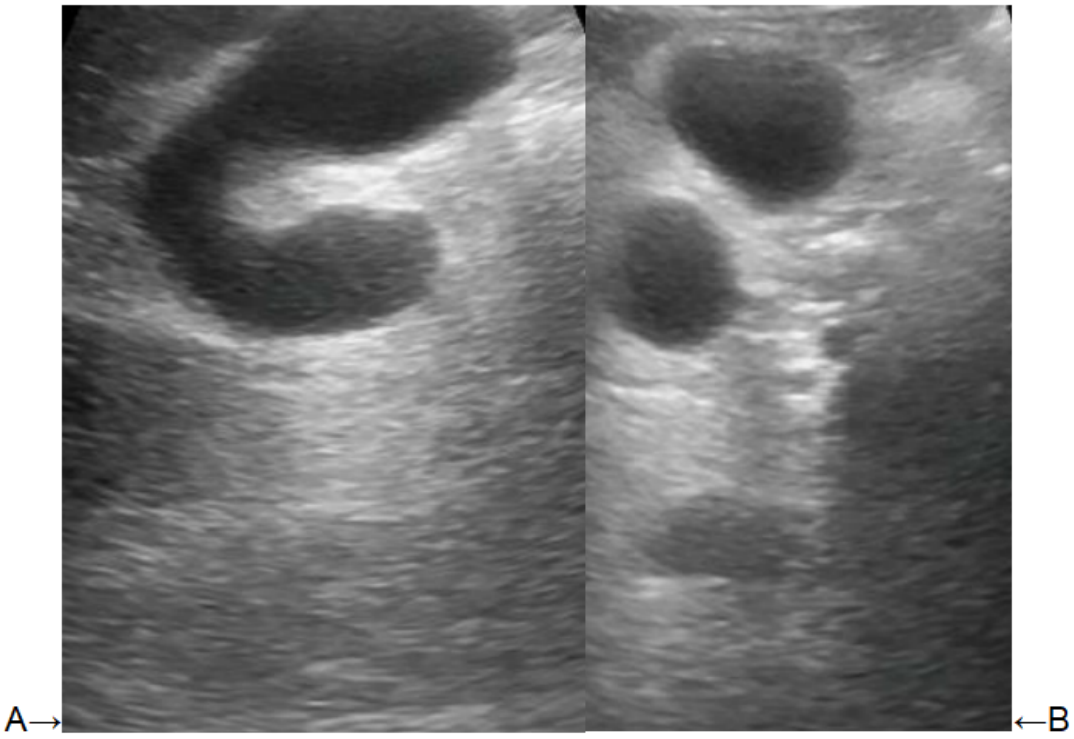

Figure 2: Ultrasound of gallbladder duplication: (A & B)

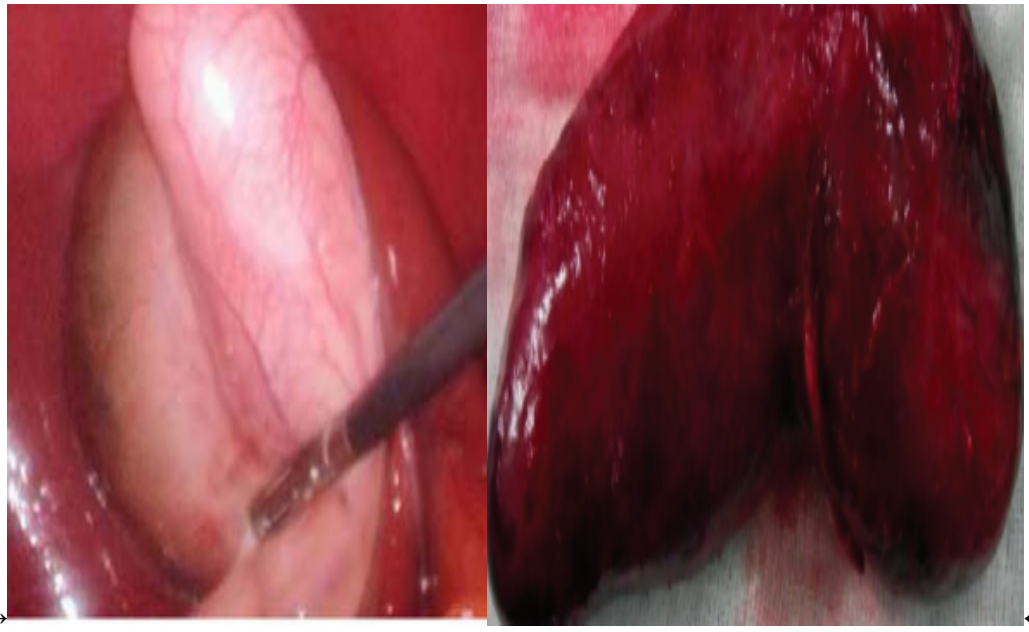

Figure 3: Laparoscopic observation of double gallbladders=A, Post-operative Bilobed Gallbladder=B

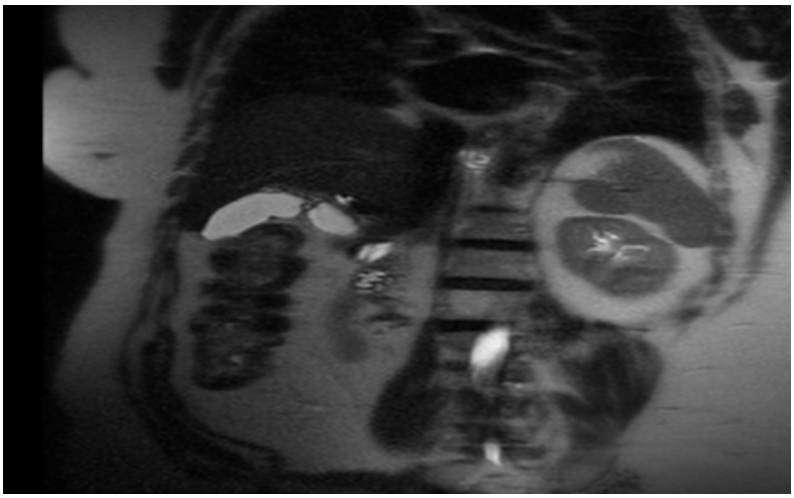

Figure 4: Bilobed or duplicated gallbladder- MR Image:

Table 1: Laboratory Test Reports

Parameters	Value
WBC	12.9 H
Hemoglobin gm	12.1
Hematocrit	39.2
RBC Count	4.67
MCV	84.55
Neutrophils	89 H
Absolute Neutrophil	11.8
Bilirubin Total mg/dl	4.46
Direct Bilirubin mg/dl	4.12
Alkaline Phosphatase U/L	788
Urine PH and Specific Gravity	7.1 and 1.018
Color	Cloudy- yellow
Urine Ketones	1+
Urine Occult Blood	3+
Urine HCG	Negative

On the operative report, the patient underwent a robotic assisted laparoscopic cholecystectomy under general anaesthesia.

Pathology Reports:

Gallbladder: The specimen is a 10.5 x 4.2 x 3.5 cm bilobed gallbladder with a single cystic duct. The accessory lobe measures 8 x 2.5 x 1 cm. The specimen contains a copious amount of yellow, opaque bile with numerous (>25) yellow, multifaced choleliths ranging from 0.2 to 1.5 cm in size, in both lumens but predominantly within the accessory lobe. A 0.4 cm in thickness septum completely separates the two lobes of the gallbladder. The mucosa of the main lobe appears tan-pink and smooth; however, the mucosa of the accessory lobe is bile-stained green, with diffuse yellow stippling . Representative sections were obtained and the pathology report was consistent with a congenital bilobed gallbladder with acute cholecystitis superimposed on chronic cholecystitis and cholelithiasis

This case report was being presented due to the extremely rare occurrence of a bilobed gallbladder as well as the presence of such pathology with two distinct gross and microscopic mucosal morphologies. In previously reported cases of bilobed gallbladder, the main and accessory lobes have a similar histology [6-21]; however, in this case, the main gallbladder lobe grossly presented as tan and smooth while the accessory lobe was bile-stained with diffuse yellow stippling consistent with cholestasis.

Discussion

Congenital malformations of the gallbladder have been categorized into morphological and positional abnormalities including malformation, deformation, multiple gallbladder, ectopias, intrahepatic position and heterotopic mucosa [39]. Gallbladder duplication is a morphological abnormality[40] It is considered to result from the incorrect differentiation or excessive division of embryonic organs during the 5th and 6th gestational week, when the caudal bud of the hepatic diverticulum splits into separate buds or outpunching's.

The later the single primordium bifurcates, the less complete is the resulting duplication of the gallbladder. As a result, a true duplication of gallbladder takes place earlier in the gestation and involves the existence of an accessory gallbladder and two distinct cystic ducts. The accurate incidence of duplicated gallbladders is difficult to calculate because only symptomatic cases or incidental surgical, radiological and cadaveric findings are registered.[42]

The first reported human case was noted in a sacrificial victim of Emperor Augustus in 31 BC. Sherren, reported the first documented case of double accessory gallbladder in a living human in 1911. [9] Several authors have classified the anatomical variations of duplicated gallbladders. Classification is based on their relation to the cystic duct and mainly is classified into two major groups, as a duplicated (split-primordium) or as an accessory gallbladder, according to the presence or absence of a common cystic duct respectively. Accessory gallbladders are characterized by separate cystic ducts entering the biliary tree and arise from two or more separate cystic primordia forming [43-50]. The most widely accepted classification for double gallbladder is the Boyden's classification [1].

Boyden was first to describe the duplicate gallbladder and its variable anatomy in 1926[1]. Based on their relation to the cystic duct, he described "vesica fellea divisa", (bilobed gallbladder which is drained by a sole cystic duct), and "vesica fellea duplex" (true gallbladder duplication). The latter is sub classified into "Y-shaped type" (two cystic ducts uniting before entering the common bile duct), and "H-shaped or ductular type" (two cystic ducts enter separately into the common bile duct).

In 1936, Gross also described congenital abnormalities of gallbladder and classified them into six types labeled A-F. He also stated that a bilobed gallbladder is an anomaly, but not a true duplication.[12] In 1977, Harlaftis, et al. further modified the classification by describing two main types based on morphology and embryogenesis.[22]In type 1 (split primordium), the duplicate gallbladders have a single cystic duct that enters the common bile duct and is further subdivided into septated, V shaped, or Y shaped. In type 2 (dual primordium), the accessory gallbladders have two or more cystic ducts drain independently into the biliary tree. The organ more proximal to the liver is regarded as the accessory one. This type is subdivided into ductular gallbladder (H type) and trabecular gallbladder. In the ductular type[51-55]the accessory cystic duct connects to the common bile duct. In the trabecular type the accessory cystic duct connects to the left or right hepatic duct. Finally, Harlaftis type III includes any anatomical variation that cannot be classified in either of the two-aforementioned categories. The most common variant found in the literature (48.6% of cases), is the H or ductular type 2 variant, where there are two separate gallbladders and the cystic and accessory cystic ducts enter the common bile duct separately. While gallbladder duplication is typically associated with gallstones and cholecystitis, there are sporadic reports in the literature of other anomalies and diseases, which have been presented with this entity [56-60].

Concurrent entities that have been reported alongside a duplicated gallbladder are presented in table-2 & 3. In addition to double gallbladders there have been cases of triple gallbladders reported in the literature. There were no specific symptoms or signs associated with duplicate gallbladders [9-11,59]. Higher frequency of pathology (malignant or not) in a duplicated gallbladder comparing to a single gallbladder has not been confirmed [62]. Patients present atypical symptoms for biliary disease or the common pathologies that can occur as a normal, single gallbladder, including acute cholecystitis, cholelithiasis, empyema, torsion, cholecystocolic fistula, lump in the abdomen [12, 63]. Since the most common imaging modality for biliary disease is operator dependent,

(i.e. ultrasound), this disease entity can be misdiagnosed. As a result, many cases will proceed to cholecystectomy without the presence of a double gallbladder being considered. Many clinical studies, however, have demonstrated that congenital anomalies of the gallbladder are associated with an increased risk of complications postoperative and repeated surgery [14,44]. If symptoms appear post cholecystectomy, the clinician has to include a possibly duplicated gallbladder in his diagnostic algorithm, in case a missed second gallbladder has remained inside the abdomen. Therefore, defining ductal anatomy is important to appreciate these anatomic variations of the biliary system and imaging plays a fundamental role in the clinical evaluation for gallstone disease. However, none of the imaging modalities is sensitive enough, in view of the fact that successful imaging diagnosis is noted in slightly more than half of the cases. Abdominal ultrasound (US) is often the first-line imaging modality used in the assessment of a patient with gallbladder disease; however does not always allow a precise diagnosis of gallbladder malformations[61]. Even though it can identify a duplicate gallbladder in the presence of two cystic structures occupying the gallbladder fossa, US is not accurate enough to depict properly the anatomy of the cystic duct(s) and to exclude a wide range of alternative diagnoses [12,63].

The most common entities that may imitate a duplicate gallbladder on US examination are a choledochal cyst, gallbladder diverticulum and a phrygian cap. In a review study of 17 cases reports, abdominal ultrasound confirmed duplicate gallbladder in only 3 cases [14]. ERCP can provide a detailed imaging of ductal anatomy, however it is invasive and carries a risk of serious complications and is not commonly used as a diagnostic tool. In addition, it may not be indicated in every case of cholelithiasis or cholecystitis.

Apparently in our patient ERCP management was imperative as the patient presented with cholangitis. In our case, ERCP showed the gallbladder and a second pear shaped cystic formation filled with contrast, through one common cystic duct. Accordingly, a high index suspicion was maintained for the diagnosis of a duplicate gallbladder. In such cases, while ERCP is reserved for therapeutic indications, an incidental diagnosis of gallbladder malformations can be made. As a result, MRCP is becoming the initial imaging tool for the biliary tract imaging in case of suspected gallbladder duplication during the preoperative managing[1,65].

However, although MRCP and 3D reconstructions may be able to evaluate ductal anatomy without the use of radiation, CT cholangiography should be used where there are any contraindications to MRCP or where it is unable to identify adequately the biliary anatomy [12]. In a study of potential living liver donors, CT cholangiography allowed the visualization of at least the second level branches of the intrahepatic biliary tree in all patients (up to the fourth level in some patients), whereas MRCP only reliably displayed the intrahepatic biliary anatomy up to the bifurcation of the common hepatic duct [21, 51] Surgery should be the treatment of choice only in symptomatic patients. Surgery is not indicated when duplicated gallbladders are discovered incidentally and prophylactic cholecystectomy in an asymptomatic patient with gallbladder duplication is not recommended. Yet, it is recommended to remove both gallbladders in symptomatic patients at one stage to prevent subsequent disease in the remnant gallbladder and repeated surgical procedures. There has been an emphasis on the need for open cholecystectomy to identify and manage the different types of gallbladder duplication in the literature [33, 37].

On the other hand, with the advent of newer imaging modalities and expertise, these rare anomalies can be diagnosed preoperatively and can be successfully treated by laparoscopy with minimal morbidity. Laparoscopic cholecystectomy is the mainstay of treatment, and has been successfully utilized, as it can be found in literature with the first of these procedures reported by Marlinoli and Garcia, et al. in 1993.[4,17] A recent review identified 3 out of 13 laparoscopically managed cases that require conversion to an open cholecystectomy[3]. An important issue performing a laparoscopic procedure is whether and when the procedure should be converted to an open cholecystectomy. This is a judgment call dependent on the experience of the surgeon and the degree of difficulty and suspicion of anatomical variations face during surgery after a fine landmark dissection. In an uncertain situation intraoperative cholangiography and inspection of the gallbladder specimen is indicated to properly evaluate the

anatomy and the necessity for further actions [.18,19, 64,65].

Many researchers have worked on bilobed GB as discussed below.

Table 2: Proved cases of Bilobed Gallbladder- 1957-1914 (RAYMOND E; Congenital Bilobed Gallbladder: A. M. A. Archives of Surgery, 1958,76:

Case	Author	Year	Sex	Age	Signs or Symptoms	Pathological Findings	Type of Anomaly
1	Deaver and Ashhurst[1]	1914	F	55	None; patient died of apoplexy	Stone present in larger lobe; autopsy finding	Cleft
2	Rycroft[2]	1923	F	42	Biliary colic with jaundice for 13 yr.	Stone in one lobe; chronic cholecystitis: surgical finding	Septal
3	Meyer[3]	1926	F	55	Gallstone colic; fever and jaundice	Chronic cholecystitis; stones in each lobe: surgical finding	Cleft
4	Phillips, Isaac, and MacDonald[4]	1931	M	48	Recurrent colic with jaundice and pancreatitis	Chronic cholecystitis: surgical finding	Cleft
5	Phillips, Isaac, and MacDonald[4]	1931	F	56	Recurrent colic with jaundice for 2 yr.	Chronic cholecystitis: surgical finding	Septal
6	Hilt[5]	1937	F	37	Generalized abdominal pain; x-ray showed two bladders	Chronic cholecystitis: surgical finding	Cleft
7	Stolkind[6]	1940	M	53	None; patient died of glioma of brain	None; normal tissue: autopsy finding	Septal
8	Guyton[7]	1946	F	42	Acute pain; nausea and vomiting; x-ray—nonvisualization	Chronic cholecytitis and stones in both lobes: surgical finding	Cleft
9	Anderson and Ross	1957	F	54	Colic, nausea, food intolerance; pain	Chronic cholecystitis in both lobes: surgical finding	Septal

Table 3: Cases of duplicated gallbladder associated with other entities. (Review)

First Author	Year	Gender of Patient & Age	Concurrent entities
Galambos.	1953 (2 cases)		Duodenojejunal diverticulum
Roeder,		Male/36 yrs	(Triple GB) - papillary adenocarcinoma
Granot,	1983	Female/4 yrs	Biliary cirrhosis
Udelsman,	1985	Female/60 yrs	Anteriorly displaced rt. hepatic artery
Martinoli	1993	Male/20 years	Biliary cirrhosis
Cummiskey	1997	Female /39years	chronic calculous cholecystitis
Yoganci	2001	Fears /48years	Biliary cirrhosis
Oyara	2003	Female/49years	chronic calculous cholecystitis
Bailie,	2003	Female/7 years	Heterotopic gastric mucosa
Goel	2003	Female/25 Years	acute cholecystitis
Sasaki,	2005	Male/69 years	Double gallbladder of the duodenal type
Papaziogas	2005	Female /45years	Biliary cirrhosis
Vijayaraghavan	2006	Male /32years	Biliary cirrhosis
Desolneux	2009	Male /61years	chronic calculous cholecystitis
Lefemine,	2009	Male/55 years	Traumatic neuroma
Causey	2010	Female /15years	Biliary cirrhosis
Guajardo–Salinas	2010	Male/21years	Traumatic neuroma
Kawanishi,	2010	Male/75 years	Well differentiated tubular adenocarcinoma
Alam	2011	Female/17 years	chronic calculous cholecystitis
Nguyen VX	2011	Male /73years	Traumatic neuroma
Mulholland	2012	Female/34years	Traumatic neuroma
Kachare,	2013	Female/55 years	Ectopic thyroid
Girish	2013	Male/3-day-old	Duodenal atresia
Barut	2006	Female/55 years	chronic calculous cholecystitis
Menon,	2013	Male/4 years	Duodenal duplication cyst
Ozaki	2014	Female /79years	Traumatic neuroma
Lo DD	2015	Female/ 9month	Traumatic neuroma
Gupta,	2016	Male/2-day-old	Gastro-intestinal atresia

Gupta,	2016	Male/12-day-old	Duodenal atresia
Vezakis	2017	Female/63 years	Acute cholangitis.
Wong C	2018	Female/ 23years	chronic calculous cholecystitis
Kumar M	2018	Female/ 45years	chronic calculous cholecystitis
Kowalchuk RO	2018	Male/ 49years	Duodenal atresia
Painuly	2018	Female/ 61years	Ectopic thyroid
Pera SJ	2019	Female/ 46years	chronic calculous cholecystitis
Jia Z,	2020	Female/45years	Ectopic thyroid
Alsharedah	2020	Female/54years	Duodenal atresia
Zhuang H	2020	Male/ 61years	Ectopic thyroid
Gadour E	2020	Female/35	chronic calculous cholecystitis
Kumar S	2021	Male /6years	chronic calculous cholecystitis
Plewman	2021	Male/28years	chronic calculous cholecystitis
Singh JP	2021	Female /60years	chronic calculous cholecystitis
Gauda	2021	Female/52 Years	chronic calculous cholecystitis
Perez	2021	Female/52 years	Duodenal atresia
Wang TN	2022	Male,/ 63Years	chronic calculous cholecystitis
Hossein-Zadeh	2022	Female/53 years	acute cholecystitis
Reddy	2022	Female/48 Years	Traumatic neuroma
Ye	2023	Male/32years	Traumatic neuroma
Sharma K et al.	2024 Present Study	Female/13 years	chronic cholecystitis

The above review literature and tables were mostly agreeable with the present case report. It was found that the gallbladder in this case was consistent with the "V" type. The stones usually present in the smaller lobe [55, 12, 8, 58] as in this case. Laparoscopic cholecystectomy with intraoperative cholangiography was to be the appropriate treatment.

Conclusion:

A duplicated gallbladder should be an additional consideration when typical gallbladder disease symptoms were present under certain circumstances while uncharacteristic imaging was found, and further diagnostic imaging was important. Concomitant CBD stones were extremely rare in these cases.

Detecting bilobed gall bladder pre-operatively prevented iatrogenic bile duct injury during surgery. MRCP is superior to ultrasound in determining the gallbladder anomalies. Simultaneous identification and removal of both lobes of gallbladder and addressing CBD stones was important to prevent recurrence of cholelithiasis/ choledocholithiasis and reoperation

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