Duplicated Gallbladder in an Elderly Patient with Choledocholithiasis

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Abstract

First described in 1675 by Blasius et al, duplication of the gallbladder represents a rare congenital anomaly that is infrequently encountered. In this congenital morphology, duplication of the gallbladder has been reported to occur in 1 out of 4000 people[1]. However, this incidence, from a study in 1926, is unexpectedly high given the current number of biliary procedures performed annually. While the presence of an accessory gallbladder does not necessarily confer symptomatology, this pathology is frequently discovered incidentally through routine imaging or unrelated surgical procedure. When symptoms are present, they mimic those seen with more common pathologies including cholecystitis, cholelithiasis, choledocholithiasis, or cholangitis.

Here we present an intriguing case of an 89-year-old female who presented with symptoms and imaging consistent with choledocholithiasis. However, upon review of imaging and endoscopic retrograde cholangiopancreatography, the patient was found to have a duplicated gallbladder. Through shared decision making with the patient and her family, she elected for cholecystectomy. She underwent uncomplicated cholecystectomies, which highlighted a rare anatomical variant. Upon laparoscopy, she was noted to have unique and independent cystic ducts which separately drained into the common bile duct. Additionally, she was noted to have a singular cystic artery with innumerable branches supplying both the cephalad and caudal gallbladders. Following successful cholecystectomies, the patient had an unremarkable post-operative course and was doing well at follow-up.

It is known that biliary anatomy is highly variable, posing daily challenges for surgeons worldwide. However, in this uncommon aberrancy, there is no consistent anatomical morphology which further obfuscates surgical planning and treatment. Numerous anatomical classifications have been described, including Boyden's classification which characterizes the pathology based upon cystic ductal drainage[2]. Interestingly, the patient described here was noted to have an "H-Shaped" or "Ductular type" gallbladder duplication. This case highlights a distinct pathology that is rarely described along with our successful surgical management.

Case Report Highlights

An 89-year-old female presented with symptoms of nausea, vomiting and abdominal pain. She was afebrile, hemodynamically stable with a leukocytosis (14,000 K/uL) and elevated CRP (21.0 mg/L).

- CT: biliary anatomical variation, notably a duplicated gallbladder with a singular cystic duct adjoining a dilated common bile duct (CBD) suspicious for choledocholithiasis (**Figure 1A & 1B**)
- Magnetic resonance cholangiopancreatography (MRCP) confirmed the diagnosis (**Figure 2**)
- Endoscopic retrograde cholangiopancreatography (ERCP) was performed, where two pigmented stones were extracted from the distal CBD
- Laparoscopic cholecystectomy:
  → unique and isolated cystic ducts which separately drained each gallbladder into the common bile duct. There was a singular cystic artery with innumerable branches supplying both the cephalad and caudal gallbladders (**Figure 3**).

Images

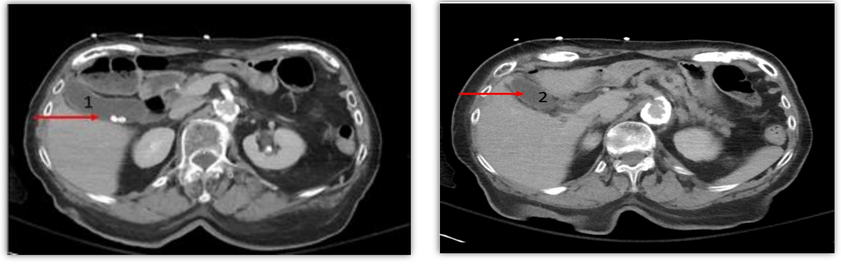


Figure 1A & 1B – CT scan depicting duplication of gallbladder. Figure 1A (left): Red arrow and number 1 demonstrating the caudal gallbladder with cholelithiasis. Figure 1B (right): Red arrow and number 2 demonstrating the cephalad gallbladder.

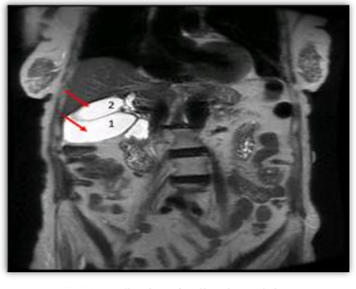


Figure 2 – MRCP confirming duplication of the gallbladder. Red arrows pointing to the gallbladders. Number 1 is the caudal gallbladder; number 2 is the cephalad gallbladder.

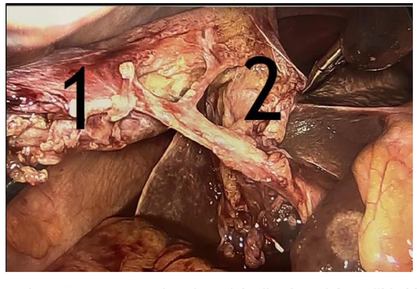


Figure 3 – Intraoperative view of duplication of the gallbladder with a commonly shared cystic artery with multiple branches feeding into each gallbladder. Number 1 is the caudal gallbladder; number 2 is the cephalad gallbladder.

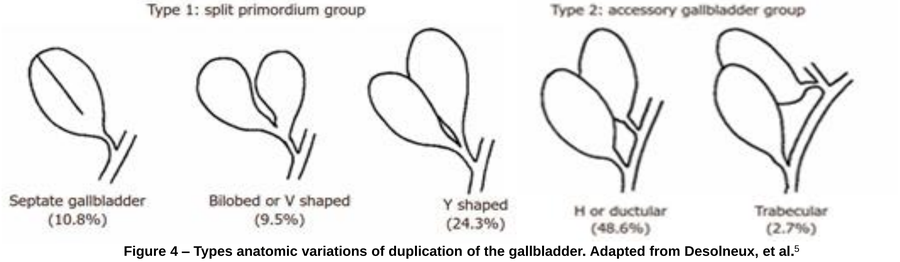


Figure 4 – Types anatomic variations of duplication of the gallbladder. Adapted from Desolneux, et al.[5]

Conclusion

A multitude of diseases can affect the gallbladder. In the case of a duplicated gallbladder, it requires special attention due to the aberrant biliary ductal and arterial anatomy. Preoperative diagnosis and surgical awareness of the anatomic variations of the gallbladder and biliary system are critical for preventing iatrogenic injury. This case further encourages the need for the surgeon to be always aware of aberrant anatomy, not only to the biliary and vascular structures, but also to the gallbladder itself.

Discussion

- Duplication of the gallbladder is a rare congenital anomaly without evidence of predilection[5]
- Gallbladder duplication can develop from two separated origins: 1) a split primordium, when there is only one cystic duct entering the CBD, or 2) as an accessory gallbladder, when two separate primordium arise on the biliary tree[1-3,5]
- Multiple structural variations exist; our case included the most common form, the "H-type" or ductular gallbladder (**Figure 4**) [2,3,5]
- Ultrasonographic evaluation of the gallbladder is the most useful diagnostic tool; however, CT, MRCP or HIDA are useful adjuncts to further appreciate any anatomical variation[3,4,7-9]
- Duplication of the gallbladder provides no additional pathological or carcinogenic concerns; indications and approaches for cholecystectomy are the same for a duplicated gallbladder as for a singular gallbladder[8-10]

References