



2017

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### WMU ScholarWorks Citation

Espinosa, Jairo M.D.; White, Peter; and Leinwand, Michael M.D., "Gallbladder Duplication: Case Report of a Rare Congenital Anomaly Treated by Single-Incision Laparoscopic Cholecystectomy in a Pediatric Patient" (2017). *Research Day*. 33.

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# Gallbladder Duplication: Case Report of a Rare Congenital Anomaly Treated by Single-Incision Laparoscopic Cholecystectomy in a Pediatric Patient



Jairo A. Espinosa MD, Peter White, Michael J. Leinwand MD FACS

## INTRODUCTION

Gallbladder duplication is seen in 0.026% of autopsy patients, with an incidence of 1 in 3,800-5,000 individuals. It is nearly twice as common in females as in males. Review of surgical specimens and limited cadaveric studies form the basis of our understanding of this interesting anomaly. The gallbladder and extra hepatic biliary ducts arise from an out pouching in the ventral wall of the primitive midgut during the 4th week of gestation. An inappropriate bifurcation of this outpouching, or hepatic diverticulum, in the ensuing two weeks results in gallbladder duplication. The degree of duplication is determined by the developmental stage of the fetus at the precise moment of bifurcation. Gallbladder duplication has a variable presentation. About half of the cases are diagnosed with preoperative imaging, and half are discovered incidentally at surgery. Patients often present with typical symptoms of biliary colic, the most common symptom being epigastric or right upper quadrant abdominal pain.

## CASE REPORT

A 14 year-old girl presented to the pediatric surgery clinic with a 4 month history of right upper quadrant abdominal pain, nausea, and low-grade fevers. She had no family history of gallbladder disease or congenital anomalies. On physical exam, her abdomen was soft, non-distended, and mildly tender to palpation in the right upper quadrant. One year previously, she had been evaluated for abdominal pain by Computed Tomography (CT) scan which was consistent with gallbladder duplication (Fig. 1). Ultrasonography (US) done during the current presentation was similar (Fig. 2). Laboratory examination including complete blood count and liver function tests were within normal limits. A single incision laparoscopic cholecystectomy was performed.

### Operative technique

Two low profile 5 mm trocars, a grasper, and a 30 degree laparoscope were introduced into the peritoneum via a minimally invasive transumbilical window. The critical view of safety was obtained. As expected, we encountered two parallel cystic ducts separately attached to the common hepatic duct (Fig. 3). Due to the small caliber of the cystic ducts, a planned intraoperative cholangiogram could not be performed despite many attempts contributing to a prolonged total operative time of 1.8 hours. The cystic ducts and cystic artery were divided between 5 mm clips. The gallbladders were then dissected from the liver using electrocautery and removed via a laparoscopic pouch.

## Clinical and radiographic findings



Figure 1. CT findings showing gallbladder duplication in axial (1) and sagittal (b) views.



Figure 3. Two parallel cystic ducts.

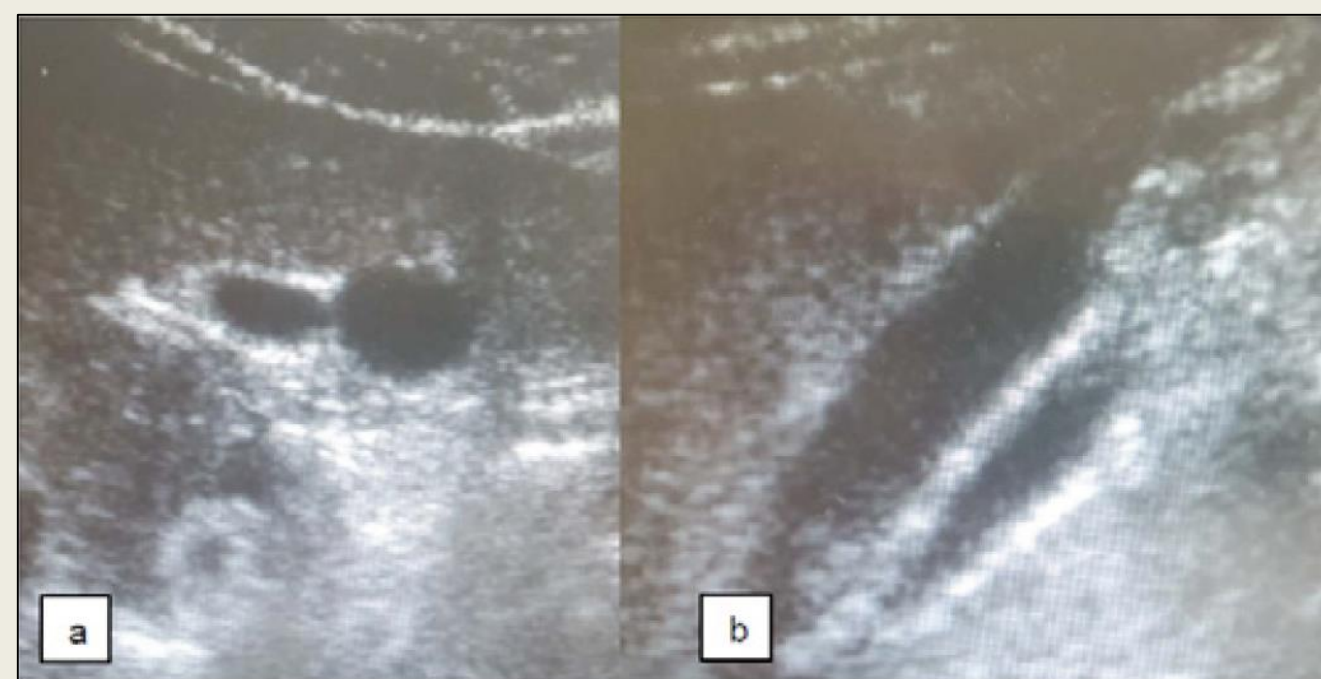


Figure 2. US showing gallbladder duplication in transverse (a) and longitudinal (b) views.



Figure 4. Gross pathological photo of the gallbladder duplication.

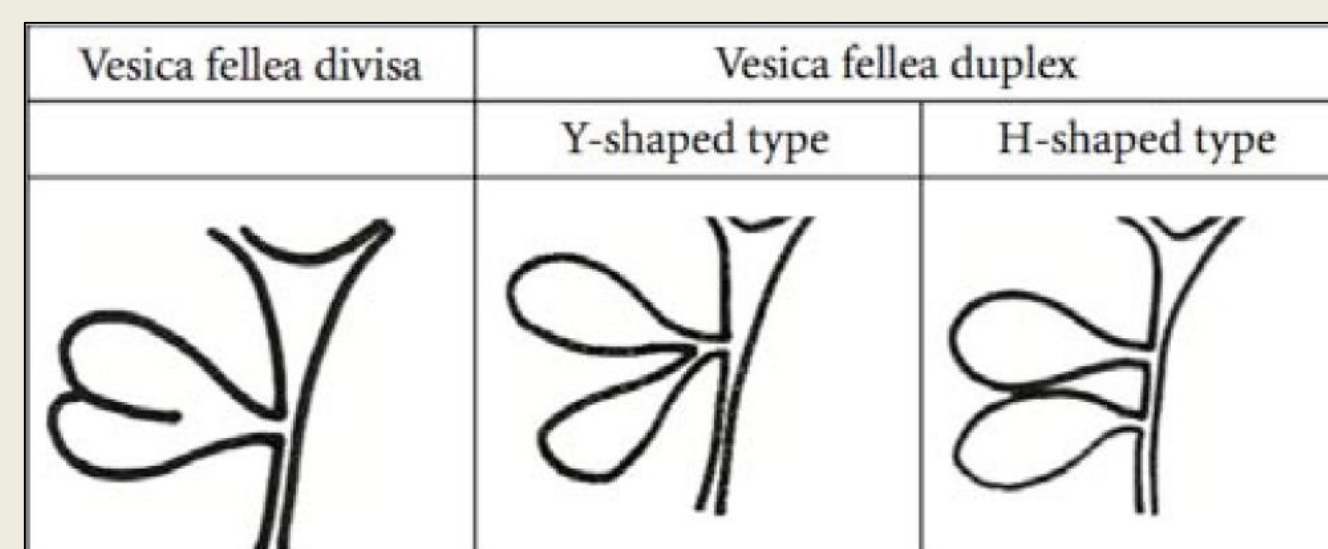


Figure 5. Boyden's classification system

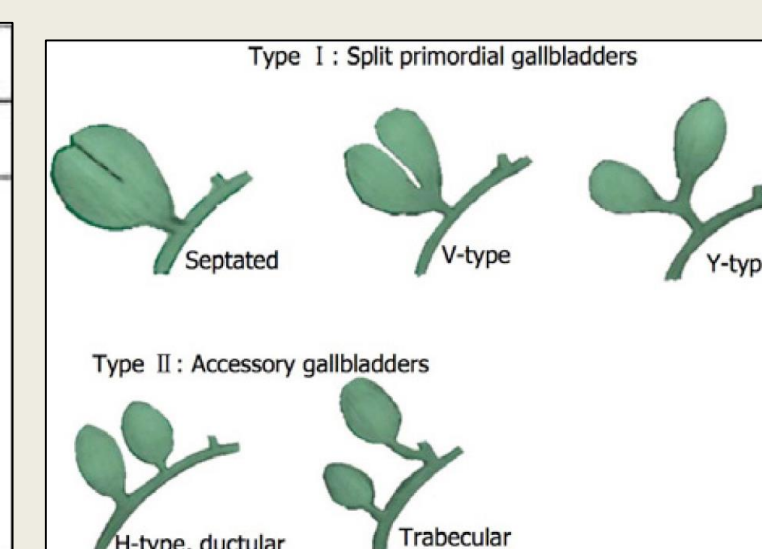


Figure 6. Harlaftis classification system

## CASE REPORT (cont'd)

### Pathology

Gross pathology displayed two adjacent gallbladders separated by a thin septum with separate cystic ducts (Fig. 4). On histology, no inflammatory infiltrate or cholesterosis was present, and the muscularis of both gallbladders was not hypertrophied or inflamed.

### Management

The postoperative course was remarkable, and the patient was discharged home on the first postoperative day. She was without symptoms at the 1 month follow-up visit.

## DISCUSSION

- Gallbladder Duplication is a rare but potential finding in the pediatric population.
- Folded gallbladder (also known as a Phrygian cap), choledochal cyst, pericholecystic fluid, intra-peritoneal fibrous bands, focal adenomyomatosis, and gallbladder diverticula should be considered in the clinical differential of duplicate gallbladder.
- Many imaging modalities are useful in the diagnosis of gallbladder duplication. US is often the initial study in the evaluation of right upper quadrant abdominal pain. CT imaging offers additional details rapidly with the tradeoff of irradiation. Magnetic resonance cholangiopancreatography (MRCP) is replacing endoscopic retrograde cholangiopancreatography (ERCP) as the gold standard for diagnosis as it provides excellent anatomical characterization of the biliary tree with the added advantage of being less invasive and radiation free.
- Boyden's first classified gallbladder duplication (Fig. 5) but the Harlaftis system (Fig. 6), which is based on morphology and embryology, is the most widely cited today.
- Laparoscopic cholecystectomy has long been considered the gold standard treatment for gallbladder disease. As of August 2016, only one case report has been published documenting treatment of gallbladder duplication by single incision laparoscopic surgery (SILS). This is the first case report of SILS cholecystectomy for gallbladder duplication in a pediatric patient.

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## ACKNOWLEDGEMENTS

We are grateful to Karla K. Dunning, MD and Nathan A Knash, PA for their pathological expertise and photographs.