Y-Shaped Vesica Fellea Duplex Gallbladder Causing Acute Biliary Pancreatitis

Eyard Gadour 1, Zeinab Hassan 2, Abdalla Hassan 1

1. Gastroenterology and Hepatology, University Hospitals of Morecambe Bay National Health Service Foundation Trust, Lancaster, GBR 2. Faculty of Medicine, The National Ribat University, Khartoum, SDN

Corresponding author: Eyard Gadour, eyadgadour@doctors.org.uk

Abstract

Gallbladder duplication refers to the splitting of “gallbladder primordium” during the early embryonic development in the fifth or early sixth week. Although it is a very rare congenital abnormality and most of the patients will be asymptomatic, yet the symptomatic cases present with abdominal complaints like nausea vomiting, abdominal pain leads to cholecystitis, cholangitis, biliary colic, or pancreatitis. Herein, we present a case report of duplication of the gallbladder, which was difficult to diagnose on radiology. We report a case of a 35-year-old female who was admitted with acute gallstone pancreatitis. The diagnosis was made by magnetic resonance cholangiopancreatography (MRCP) and blood tests. She underwent an inpatient endoscopic retrograde cholangiopancreatography (ERCP) which cleared the bile duct and confirmed the diagnosis of the duplex gallbladder. The patient was then discharged home and an outpatient cholecystectomy is being planned. The duplex gallbladder may possibly be associated with other anomalies of the bile duct system. Biliary pancreatitis has been associated with such abnormality. Accurate diagnosis is crucial to achieving due to the possibility that gallbladder can be missed in imaging testing. Cholecystectomy required extreme care because these anomalies can lead to critical injuries of the bile duct and vascular system.

Categories: Gastroenterology, General Surgery, Anatomy

Keywords: duplex gallbladder, acute pancreatitis, gall stone

Introduction

The duplex gall bladder is an exceptionally rare congenital anomaly, with an incidence of one in 4000 births and seen more commonly in females with a male/female ratio of 1:2 [1,2]. There are very few symptomatic cases reported in the scientific literature [3]. Herein, we present the first case of Y-shaped vesica fellea duplex gallbladder causing acute biliary pancreatitis.

Case Presentation

A 35-year-old normally fit and well female was presented to the acute surgical unit with severe right upper quadrant pain and tenderness for six days which was associated with nausea and vomiting. Clinically she was stable with right hypochondrial and epigastric tenderness. Her biochemical profile showed mild leucocytosis, a white cell count of 11.1, and high C-reactive protein. Her amylase level was significantly elevated to 2552 Int unit/L (normal range 22-80 Int unit/L). Conjugated bilirubin level was mildly raised at 27 mmol/L with alkaline phosphates (ALP) level at 149 U/L. Magnetic resonance cholangiopancreatography (MRCP) showed acute calicular cholecystitis in a Y-shaped vesica fellea duplex gallbladder with stones in the common bile duct (CBD) and acute pancreatitis (Figures 1 and 2). An inpatient urgent ERCP was performed within 72 hours of admission. Endoscopic retrograde cholangiopancreatography (ERCP) confirmed multiple gallbladder stones in both gallbladders as well as CBD (Figures 3 and 4). Ampullary sphincterotomy was performed and CBD stone extraction was conducted with balloon trawling. Complete clearance of CBD was achieved (Figure 5). Patient received appropriate medical treatment and safely discharged home pending an outpatient laparoscopic cholecystectomy as an outpatient.

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FIGURE 1: Magnetic resonance cholangiopancreatography shows duplex gallbladder (1 and 2) with acute pancreatitis (3).

FIGURE 2: Magnetic resonance cholangiopancreatography shows Y-shaped common bile duct.
FIGURE 3: Endoscopic retrograde cholangiopancreatography shows multiple stones in both gallbladders (1 and 2) and common bile duct stones (arrowed).

FIGURE 4: Common bile duct shows Y-shaped common bile duct with multiple stones in both gallbladders and common bile duct.
FIGURE 5: Endoscopic retrograde cholangiopancreatography cholangiogram shows complete clearance of common bile duct.

Discussion

Gallbladder duplication refers to the splitting of "gallbladder primordium" during the early embryonic development in the fifth or early sixth week. There are very few symptomatic cases reported in the scientific literature [3]. Different classifications have been suggested according to the differential anatomic presentation and embryological development [3].

According to Boyden’s classification in 1929, based on 20 reported cases from 1674 to 1929 (Figure 6). The duplex gall bladder was categorized as a bilobed gallbladder with two types according to its cystic duct connection [4]. The first group categorized bi-lobed gallbladder with a single cystic duct called vesica fellea divisa and the second group includes true gallbladder duplication cases called vesica fellea duplex [2,4].

FIGURE 6: Boyden’s classification.

Image reproduced from Boyden [4].

Later, Harlaftis et al. in 1977 classified duplex gallbladder into three categories according to embryogenesis (Figure 7) [5]. Spilt primordial group or type 1 category includes a single cystic duct draining in the CBD. Type 1 is sub-divided into V-shape and Y-shape. Type 1-V shape cases are duplex gallbladder drain into the CBD and Y-shape anomaly includes two individual cystic ducts connected to form a single duct and drain into the CBD. The accessory gallbladder group or type 2 includes cases of more than one cystic duct drain.
into the CBD. These cases are also called Ductular or H type, and right and left trabecular type. Type 3 includes very rare anomalies of the duplex gallbladder which do not relevant to types A and B. The most suitable example of the type 3 group is the triple gallbladder [2,5].

**FIGURE 7: The classification of the duplex gallbladder.**

The image obtained from the classification by Harlaftis et al. [5].

Although, the duplex gallbladder is a very rare condition, yet there are around 57 reported cases so far (Table 1). People with duplex gallbladders can possibly be asymptomatic in case of not providing any hurdle in metabolic processes. The symptomatic cases present with abdominal complaints like nausea vomiting, abdominal pain leading to cholecystitis, cholangitis, biliary colic, or pancreatitis [6]. The preoperative explicit and definite diagnosis is very crucial to avoid any possible surgical surprises and complications [7]. Due to different congenital anomalies, varied anatomical presentation is associated with increased complication risk after surgical procedures like laparoscopic cholecystectomy [7]. Accurate diagnosis is crucial to achieving due to the possibility that gallbladder can be missed in imaging testing [2,8]. MRCP has better diagnostic technology than ultrasound and provided superior diagnostic details. ERCP is another radiological technology that is considered the gold standard in this case [2]. Laparoscopic cholecystectomy is the treatment choice in symptomatic cases. In the case of an incidentally identified duplicated gallbladder, prophylactic cholecystectomy is not recommended [9,10]. Some surgeons also recommend an open surgical procedure in accessory gallbladder anomalies, particularly in type 2 cases [4].
| Authors                      | Year reported | No. of cases/patient characteristics | Type of duplication |
|------------------------------|---------------|--------------------------------------|--------------------|
| Boyden [4]                   | 1926          | 20 cases                             |                    |
| Slaughter and Trout [11]     | 1933          | 12 cases                             |                    |
| Weiss [12]                   | 1935          | 3 cases                              |                    |
| Gross [13]                   | 1936          | 3-year-old male                      | 2                  |
| Wilson [14]                  | 1939          | 55-year-old female                   | 2                  |
| Granone [15]                 | 1984          | 34-year-old female                   | 1                  |
| Udelsman and Sugarbaker [16] | 1985          | 60-year-old female                   | 2                  |
| Haghighi et al. [17]         | 2000          | 68-year-old female                   | 2                  |
| Roldan-Valadez et al. [18]   | 2004          | 44-year-old male                     | 1                  |
| Barut et al. [19]            | 2006          | 55-year-old female                   | 1                  |
| Asbury [20]                  | 2007          | 70-year-old male                     | 1                  |
| Desolneux et al. [21]        | 2009          | 61-year-old male                     | 1                  |
| Causey et al. [22]           | 2010          | 15-year-old female                   | 1                  |
| Hassan et al. [23]           | 2012          | 83-year-old female                   | 2                  |
| Shiba et al. [24]            | 2014          | 38-year-old female                   | 1                  |
| Pillay [25]                  | 2015          | 56-year-old male                     | 1                  |
| Szczzech et al. [26]         | 2015          | 26-year-old female                   | 1                  |
| Goh et al. [6]               | 2015          | 28-year-old male                     | 1                  |
| Gupta et al. [27]            | 2016          | 12-day-old male and 2-day-old male (two cases) | 2 |
| Rajapandian et al. [28]      | 2017          | 28-year-old male                     | 1                  |
| Ghaderi et al. [29]          | 2018          | 38-year-old male                     | 2                  |
| Apolo Romero et al. [30]     | 2018          | 50-year-old female                   | 1                  |
| Boukoucha et al. [30]        | 2020          | 38-year-old female                   | 1                  |
| Singh [1]                    | 2021          | 60-year-old female                   | 1                  |

**TABLE 1: Summary of the duplication of gallbladder cases reported since 1926.**

**Conclusions**

The duplex gallbladder may possibly be associated with other anomalies of the bile duct system. However, the available literature is very limited, and the ambiguity of duplex gallbladder and its association with other congenital anomalies are not clear. ERCP may be considered a confirmatory test if the radiology images are not diagnostic. No published literature yet reported this hypothesis. Cholecystectomy required extreme care because these anomalies can lead to critical injuries of the bile duct and vascular system.

**Additional Information**

**Disclosures**

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