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# Laparoscopic double cholecystectomy for duplicated gallbladder: A case report

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ABSTRACT

*INTRODUCTION:* Duplication of the gallbladder (GB) is a very rare surgical encounter affecting 1 in 4000–5000 population that often eludes detection on preoperative ultrasonography, and might increase operative difficulty and risk. The H-type anomaly is the most common whereby each GB drains into the common bile duct via a separate cystic duct.

*PRESENTATION OF CASE:* We report a young female patient with symptomatic gallstones who was incidentally found to have abnormal biliary anatomy on a CT colonography and an H-type duplication of the GB on MRCP. A challenging laparoscopic double cholecystectomy was performed uneventfully.

*DISCUSSION:* Gallbladder duplication can be classified as a type-I anomaly (partiality split primordial gallbladder), a type-II anomaly (two separate gallbladders, each with their own cystic duct) or a rare type-III anomaly (triple gallbladders draining by 1–3 separate cystic ducts).

Such anatomical variations are associated with increased operative difficulty and risks, including conversion to open cholecystectomy and common bile duct injury.

*CONCLUSION:* A young female patient was pre-operatively diagnosed with a Harlaftis's type-II GB anomaly. Each gallbladder was drained by a distinct cystic duct (H-type anomaly). A laparoscopic cholecystectomy was performed with no complications afterwards. Awareness of this rare anomaly might require intraoperative cholangiography when initially suspected during a cholecystectomy to facilitate anatomical recognition and avoid missing a symptomatic pathologic GB and the need for a repeat cholecystectomy.



## 1. Introduction

Variations in biliary anatomy are frequently encountered. Of these, a double gallbladder (GB), with or without duplication of cystic duct is a very rare surgical encounter, with an incidence of approximately 1 in 4000–5000 population [1]. Duplication of the GB is rarely detected preoperatively, can lead to difficulties during surgery with increased likelihood of conversion to open surgery and complications. When symptomatic these are associated with gallstone disease and cholecystitis, but rarely may harbour a carcinoma. We report an uneventful laparoscopic cholecystectomy for an H-type duplication of the GB in a young female patient who presented with biliary colic. This work has been reported in line with the SCARE criteria [2].

## 2. Case report

A 39-year-old Asian female with known symptomatic gallstones was referred with a 2-month history of recurrent right upper abdominal pain that required Emergency Department admissions on two previous occasions, and an ultrasound of abdomen that showed multiple stones in a thin-walled GB with no biliary dilatation and no other abnormalities. There was a past medical history of spinal tuberculosis and caesarean section. Preoperative liver function tests were normal.

She also gave a 6-month history of constipation with associated weight loss and lower abdominal pain. We, therefore, arranged a non-contrast virtual computed tomography (CT) colonoscopy and this showed a structurally normal colon and confirmed calcified gallstones within the GB. However, the CT also demonstrated an unusual globular dense material within an unusual tubular structure located above and medial to the native GB with cross sectional dimensions of 37 mm × 11 mm. A subsequent magnetic resonance cholangiopancreatography (MRCP) demonstrated two separate thin-walled non-inflamed GBs with stones, which on T1

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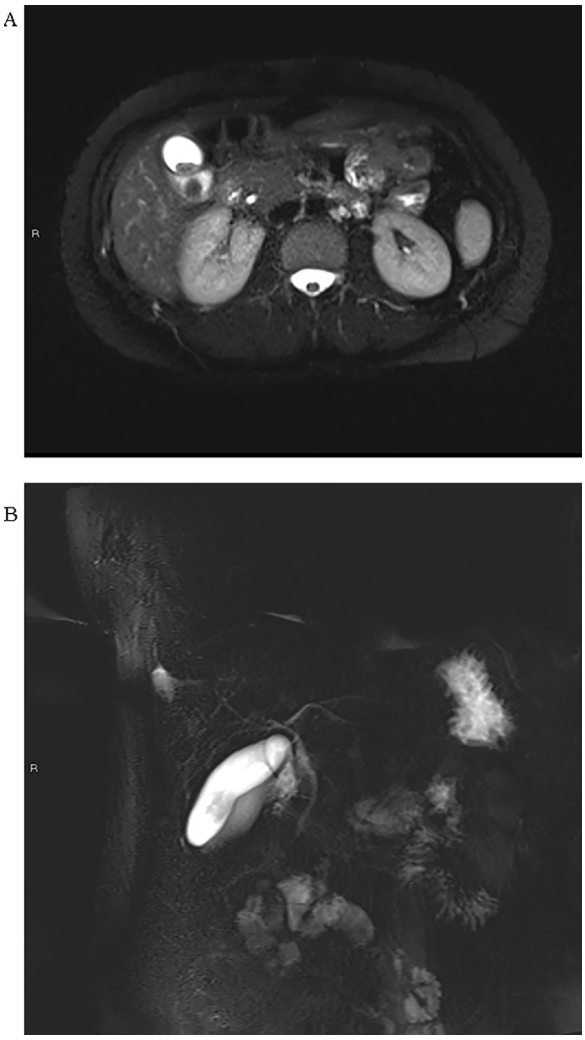


**Fig. 1.** (A, B) Cross-sectional and MRCP images showing two separate thin-walled non-inflamed GBs with stones, which on T1 contained bile of varied density and signal characteristics between the two GBs.

contained bile of varied density and signal characteristics between the two GBs (Fig. 1A & B), and with two distinct cystic ducts linking each GB separately to the biliary tree.

The patient subsequently underwent laparoscopic double cholecystectomy. Extensive right upper quadrant adhesions between the liver and diaphragm, as well as the GB, duodenum and transverse colon were divided. Twin GBs were identified within the GB fossa (Fig. 2), each had its own cystic duct and cystic artery. A stone was identified within the cystic duct of the superior GB (Fig. 3) and was extracted. Both cystic ducts were clipped and divided. The operating time was 145 min. There were no postoperative complications and the patient was discharged on the first postoperative day. Histology showed two thick walled (0.3 mm and 0.4 mm) GBs that contained stones; both had featured of chronic cholecystitis with no evidence of neoplasia. The patient remained symptom-free as far as the upper abdominal pain is concerned at 6 months follow up.

## 3. Discussion

Surgeons need to be aware of the very rare biliary anatomy of a double GB, particularly that this anomaly is often missed on preoperative abdominal ultrasonography as the case was with our patient. Harlaftis's classification of GB duplication [3] and its modification [4] are the most widely adopted and include a ***type-I*** anomaly that describes a split primordial GB where the GB is split either partially (septated), incompletely (V-shaped with the two GBs joined at the neck) or completely (Y-shaped with two cystic ducts joining into a common cystic duct) but drains into the common bile duct via a single cystic duct, a ***type-II***, which is the most common, where there are two separate GBs each with its own cystic duct draining independently either into the common bile duct (H-type) or with one of the cystic ducts draining into the right or left hepatic duct (trabecular type), and a rare ***type-III*** that involves triple GBs draining by 1–3 separate cystic ducts. The accessory GB can be intrahepatic and might masquerade as a cystic mass of the liver with biliary communication mimicking cystic intraductal papillary neoplasm of the bile duct or localised Caroli disease with the diagnosis only revealed on histology of a partial hepatectomy [5].

Such anatomical variations are associated with increased operative difficulty and risks, require an intraoperative cholangiogram if unexpected preoperatively or if the anatomy is unclear [6,7], might require conversion to open cholecystectomy, and potentially increase the risk of a bile duct injury. In the current report, a biliary abnormality was initially suspected incidentally on a CT colonogram but was only fully explained on a preoperative MRCP that revealed two GBs with Harlaftis's type-II anomaly, each with its own cystic duct draining into the common bile duct (H-type anomaly). Although the double cholecystectomy was completed laparoscopically in the hands of an experienced laparoscopic and

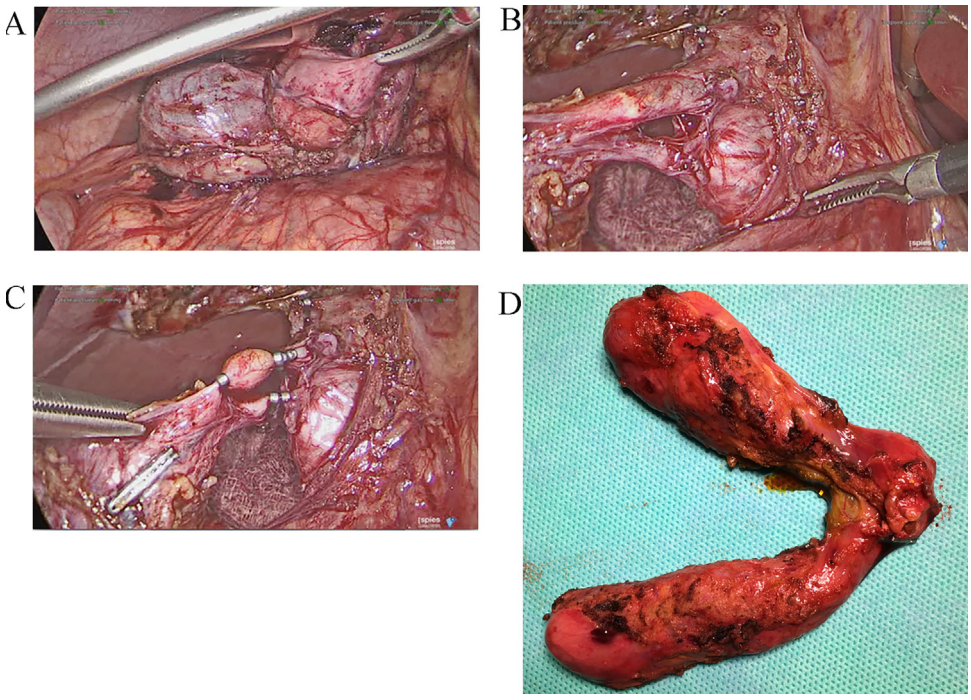


**Fig. 2.** [A] Intraoperative image showing two gallbladders. [B] Intraoperative image showing two cystic ducts, each joining the bile duct separately. A stone can be seen impacted in the superior cystic duct. [C] The two cystic ducts have been double clipped close to their insertion into the bile duct. The superior cystic duct has also been clipped at the gallbladder end and a bulge containing a stone trapped in the cystic duct can been seen between clips. [D] Image of the specimen showing double gallbladders joined at Hartmann's pouch.

hepatobiliary surgeon, the surgery was challenging as illustrated in the extended operative time of 145 min.

Failure to recognise the presence of a double GB in a symptomatic patient has required a repeat cholecystectomy for symptomatic gallstone disease in some instances to remove the missed second GB [8]. However, there is currently no indication for a cholecystectomy in the asymptomatic patient if duplication of the GB was to be detected incidentally during the course of imaging for unrelated conditions.

## Conflicts of interest

None.

## Funding

None.

## Ethical approval

Our institution has exempted this work from ethical approval.

## Consent

Written consent available.

## Author contribution

M Musleh: Writing of paper.

H Burnett: selecting appropriate images, critical analysis/improvement to paper.

B Rajashanker: obtaining and improving images, improvement to paper.

B Ammori: senior sugeon, revising of paper + initiation of project.

## Guarantor

Prof B J Ammori.

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