

Right Lobe Living Donor Hepatectomy in the Setting of Agenesis of Gall Bladder – A Case Report



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Agenesis of Gall Bladder (AGB) is a rare congenital anomaly with only around 500 cases reported so far. The condition may be associated with other biliary anomalies and present diagnostic and technical challenges during hemihepatectomy which can be surmounted with careful planning. Live donor hepatectomy in the setting of AGB has not been reported before. We report a case of AGB in a potential living donor and highlight the technical modifications used to perform a safe right hepatectomy in this donor. (J CLIN EXP HEPATOL 2022;12:1577–1579)

CASE REPORT

A 26-year-old healthy male, came forward as a living donor for his brother suffering from hepatitis B virus-related chronic liver disease complicated with hepatocellular carcinoma. He was physically fit and healthy with a BMI of 19.6 kg/m², occasional smoking habits and had no documented co-morbidities. He was evaluated as per our institute protocol for hemi-liver donation. On screening ultrasound scan (USG) abdomen, gall bladder could not be identified. Agenesis of gall bladder (AGB) was further confirmed in subsequent computed tomography (CT) scan and magnetic resonance imaging scan performed as part of donor workup (Figure 1). On liver volumetry, his whole liver volume was 979 cc, right lobe 512 cc, left lobe 466 cc. He was planned for a right hepatectomy, and the expected remnant was 47%. There were no portal or hepatic vein anomalies on imaging and Magnetic Resonance Cholangio Pancreatography (MRCP) demonstrated type 1 biliary anatomy with absent gall bladder but no evidence of choledochal cyst or bilio-pancreatic ductal anomaly. He proceeded with live donor hepatectomy (LDH). Intraoperatively, there was no recognizable gall bladder fossa or a rudimentary gallbladder. Rouviere sulcus, Rex recess and the hilum with the insertion of the hepatoduodenal ligament were clearly identified on the undersurface of the liver. The bile duct looked normal with no evidence of dilatation (Figure 2).

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Abbreviations: AGB: Agenesis of Gall Bladder; LDH: Live Donor Hepatectomy
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The hepatoduodenal ligament was dissected taking care to avoid excessive handling or retraction of the bile duct. A retractor was used to gently retract the bile duct and the right hepatic artery and right portal vein were mobilized and slung. Both vessels were then occluded and demarcation was noticed between the right and left hemi-livers extending inferiorly upto the hilar structures. Demarcation line was marked with cautery (Figure 3). At the inferior surface, the transection line was marked to the right of demarcation line to avoid exposing the left duct.

Intraoperative cholangiogram, which is standard practice in our unit, was not performed due to the absence of cystic duct and gall bladder and we decided to avoid direct puncture of the bile duct as the quality of MRCP was good. After the completion of parenchymal transection and division of the caudate process, the hilar tissue was encircled with a sling to the right of the location of the expected biliary confluence. The hilar plate tissue was sharply cut until the right hepatic duct was visualized. A small cut was made to incise the duct and the duct was probed using a metallic probe to ensure an adequate stump on the remnant side of the bile duct. The bile duct division was completed and the rest of the hilar plate was also divided, with haemostasis achieved using fine sutures. The hepatic duct stump was closed with continuous 6-0 Polydioxanone (PDS) after the completion of donor hepatectomy and graft recovery. The final graft weight was 579 g.

Post operatively, the donor stayed in ICU for 2 days and was then shifted to the ward. He made a good recovery, drains were removed and discharged on post-operative day (POD) 5. Peak bilirubin during hospital stay was 3.8 mg/dl, and on day 5, bilirubin was 1.7 mg/dl. The recipient recovered well and was discharged on POD 12.

DISCUSSION

AGB is a rare clinical entity with an incidence of 10–65 per 100,000 population.¹ AGB is usually identified during

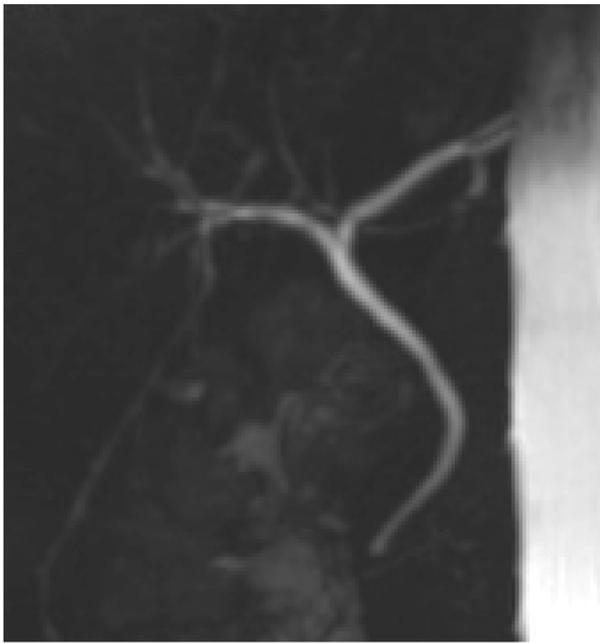


Figure 1 MRCP showing normal bile duct anatomy with agenesis of gall bladder.

evaluation for abdominal pain. Frequently, the ultrasound is interpreted as a contracted gall bladder and the patient undergoes attempted cholecystectomy when the true finding is recognized.² Other anomalies associated with AGB maybe seen in 10% of individuals and include biliary atresia, choledochal cysts or ABPDJ. The challenge is in diagnosing it preoperatively, so that unnecessary surgery can be avoided.

To the best of our knowledge, this is the first report of using a liver graft from a live donor with AGB. Special care needs to be taken at all stages of assessment and surgery to ensure safe donor and recipient procedures.

Planning starts with initial CT and volumetric analysis. When volumetry is performed semi-automatically, the technician marks the transection line to the right of MHV and this line is extended to the GB fossa. In the case of AGB, this landmark is not available and hence the transection plane has to be extended to the surface at the point where the GB fossa is expected. Miscalculation in volumetry at this point can detrimentally affect donor and recipient outcomes in case of marginal remnant or graft volumes. It is hence important for the surgical team to be involved in the volumetry and guide the technical team.

Intraoperatively, in standard right LDH, the gallbladder is taken down from GB fossa and cystic duct cannulated with 6Fr feeding tube for intraoperative cholangiogram as an initial step. Even in centres where a routine intraoperative cholangiogram is not performed, the cystic duct stump is used as means to retract the bile duct to the left to expose the right hepatic artery and portal vein. This option is not available in the setting of AGB. Handling the CBD directly for retraction can risk injury especially when the CBD is thin-walled. The bile duct should hence be retracted gently without holding it initially and then use a vein retractor to improve access to the posterior vascular structures. The line of transection is marked after temporary occlusion of the right hepatic artery and right portal vein. In routine RL donation, the demarcation line passes through the middle of GB fossa towards biliary

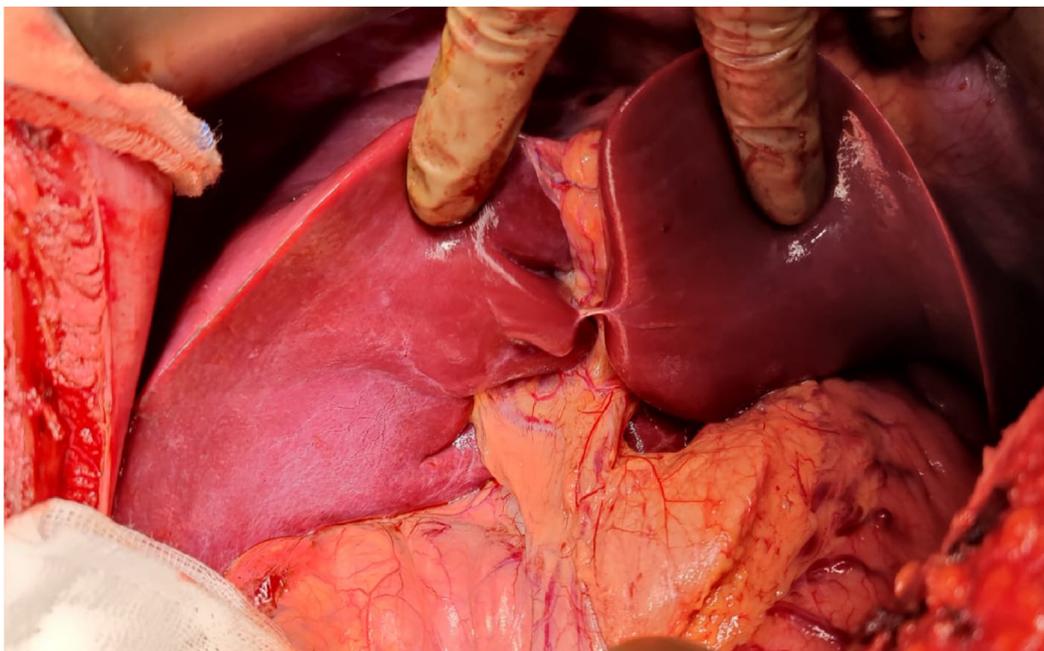


Figure 2 Intraoperative picture showing inferior surface of liver-without any gall bladder.

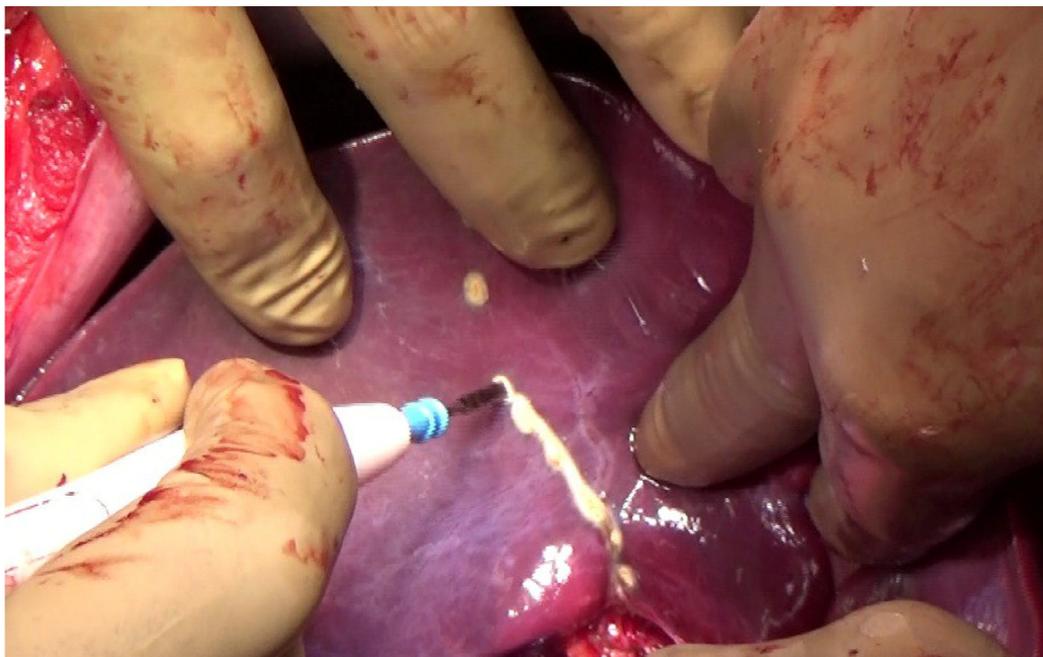


Figure 3 Intraoperative picture showing demarcation line being marked at the inferior surface of liver.

bifurcation but is rarely seen clearly in the fibrotic tissue of the cystic plate. While the demarcation line is clearly seen in AGB due to the absence of the cystic plate, we moved the transection line to the right of the line for safety reasons to ensure safe bile duct division.

A good quality MRCP clearly defining the biliary anatomy is essential in these cases not only to aid bile duct division but also to recognize any associated biliary anomalies. We routinely perform an intraoperative cholangiogram after the completion of transection to identify the site of bile duct division but this was not possible in our case. While cholangiogram by direct CBD puncture is an option, we preferred not to do that due to the small risk of bile leak from the puncture site. Given the standard anatomy of biliary confluence, we were able to divide the bile duct safely without IOC and give healthy bile duct stumps on both sides. This did not affect our routine post-operative care. In the case of variant biliary anatomy, the quality of MRCP becomes even more important. Though Indocyanine Green may be helpful in identifying transection line as well as bile duct division, it was not used in our case, as equipment for doing the same was not available in our centre.

AGB is very rare and we report the first case of LDH in the setting of AGB. Preoperative planning, good quality preoperative biliary imaging and surgical experience is essential to ensure good outcomes for both donor and recipient.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Prasanna Gopal: Writing - Original Draft, **Jacob Nikkhil:** Data Curation, Resources, **Sathish kumar Krishnan:** Visualization, **Selvakumar Malleswaran:** Visualization Supervision, **Rajanikanth Patcha:** Visualization Supervision, **Joy Varghese:** Visualization Supervision **Mettu SrinivasReddy:** Writing - Review & Editing.

CONFLICTS OF INTEREST

None.

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