Transplant International

LETTER TO THE EDITOR

Unusual biliary collaterals inside a transplanted liver

doi:10.1111/j.1432-2277.2009.00909.x

A 65-year-old woman underwent living donor liver transplantation (LDLT) for hepatitis C cirrhosis using a left lobe graft with the caudate lobe from her 40-year-old son. Although the intraoperative cholangiogram showed a single left hepatic duct (Fig. 1), the graft was found to have two bile duct orifices at backtable. Because one of them, considered to be a caudate branch, was approximately 1 mm in diameter, it was closed off. Biliary reconstruction was performed in an end-to-end manner between the other bile duct and the recipient's common bile duct (CBD) using a biliary stent tube. Although the dilated intrahepatic duct had been recognized by routine postoperative ultrasound immediately after LDLT, the patient's serum bilirubin level increased briefly in the first week after LDLT and then gradually decreased, approaching normal levels (Fig. 2). Magnetic resonance cholangiography showed a sudden interruption of the intrahepatic duct at the hilum of the graft (Fig. 3). Thereafter, percutaneous transhepatic biliary drainage (PTCD) was performed which revealed unusual collaterals between the obstructed bile duct and the bile duct that had been connected to the CBD (Fig. 4). Because the obstructed bile duct drained two-thirds of the graft while a normal bilirubin level was maintained, the patient consequently

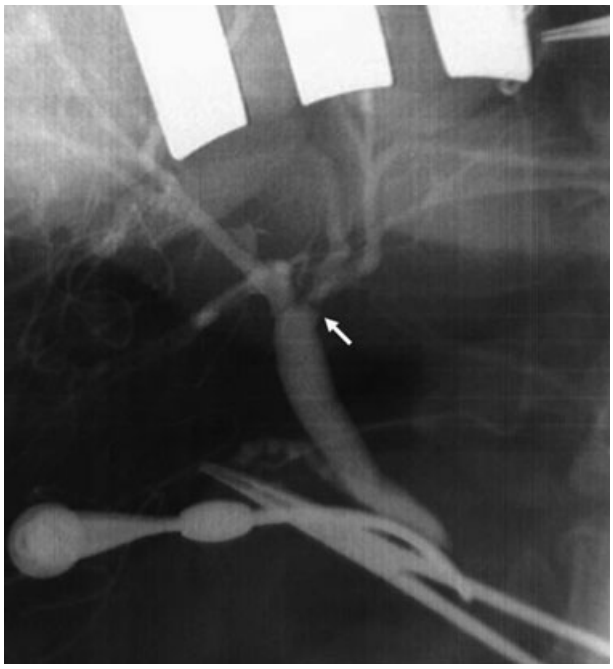

Figure 1 Intraoperative cholangiogram of the donor. The white arrow indicates the cutting line of the left hepatic duct.

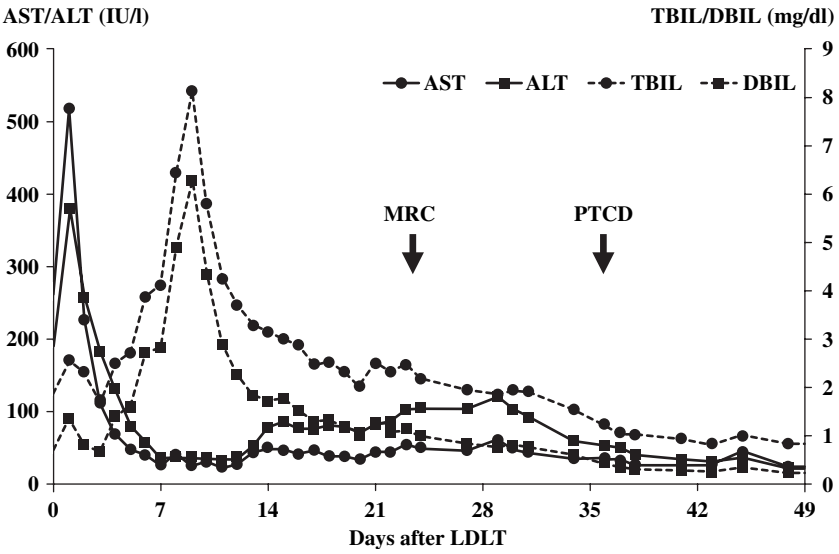

Figure 2 Laboratory data of liver function tests. AST, aspartate aminotransferase; ALT, alanine transaminase; TBIL, total bilirubin; DBIL, direct bilirubin; MRC, magnetic resonance cholangiography.

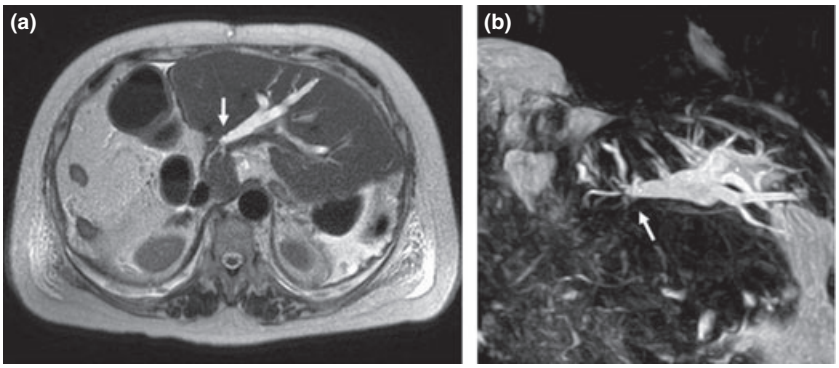

Figure 3 (a, b) Magnetic resonance cholangiography before percutaneous transhepatic biliary drainage shows a sudden interruption of the intrahepatic bile duct at the hilum of the graft (arrows). The dilated bile duct was observed in a wide area of the graft.

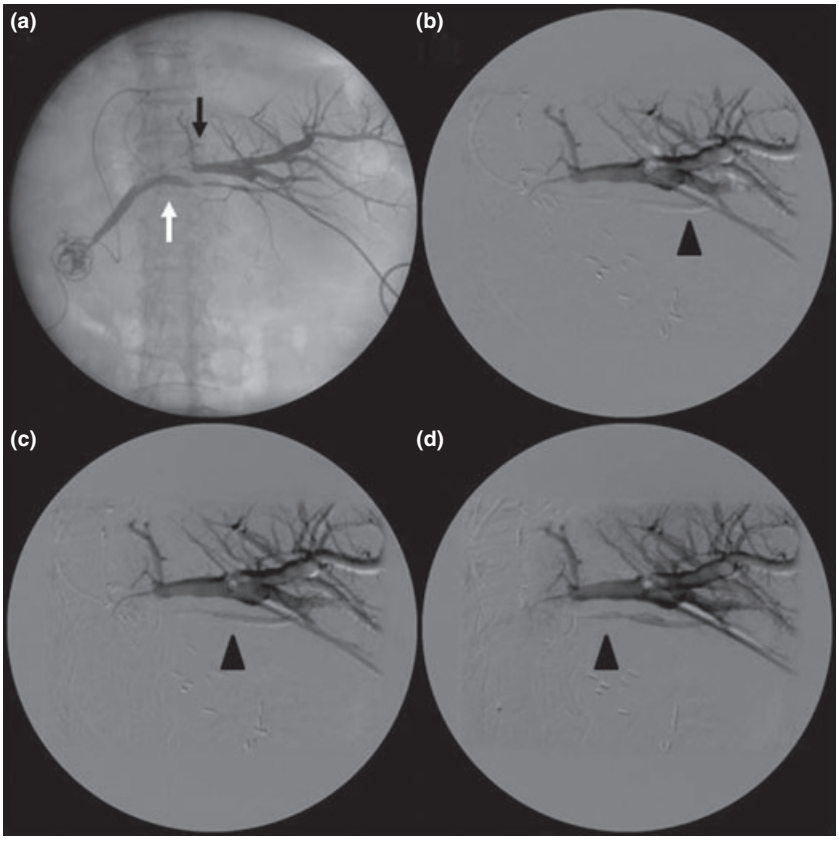

Figure 4 (a) Cholangiograms through the biliary stent tube and the percutaneous transhepatic biliary drainage tube. The white arrow indicates the reconstructed bile duct connecting to the recipient common bile duct, while the black arrow indicates the obstructed bile duct. (b–d) Serial cholangiograms through the percutaneous transhepatic biliary drainage tube. Contrast medium, which was injected only into the obstructed bile duct, gradually silhouetted the outline of the other bile duct via the peripheral area (arrowheads).

underwent a hepatico-jejunostomy of the obstructed bile duct 3 months after LDLT. At present, 6 months after the hepatico-jejunostomy, the patient is doing well without biliary obstruction.

Biliary complications are one of the major complications after LDLT. Most of these cases show severe cholestasis and require urgent biliary drainage [1]. If the obstructed bile duct drains a small area of the liver, the area often becomes atrophic without any further problem. In this case, although the obstructed bile duct drained two-thirds of the graft, the bilirubin level became normal as a result of unusual peripheral communication in the biliary tree.

In terms of the embryology of the bile ducts, normal development of the intrahepatic ducts is precisely tuned by epithelial–mesenchymal interactions, which proceed from the hilum of the liver towards its periphery, along the branches of the developing portal vein [2]. The

anatomy of the intrahepatic ducts, from the hepatic ducts to the smallest ductules, can usually be visualized as a three-dimensional tree-like form by cholangiography. It is sometimes possible to encounter an abnormal fistula between an obstructed biliary tree and adjacent structures, such as a bronchobiliary fistula [3], which often forms due to infectious diseases involving the liver over a long period. In contrast, the case in this study showed biliary collaterals inside the transplanted liver within a month after LDLT. This communication seems less likely to have been formed as a consequence of biliary obstruction in a short period; it seems more likely to have existed congenitally in the biliary tree.

In summary, although we cannot confirm whether this peripheral communication within the intrahepatic biliary tree was congenital or acquired, we believe that this is the first report of this condition. The precise screening of the intrahepatic biliary tree in donors is important to avoid misinterpretation of the anatomy during surgery.

Seisuke Sakamoto,[1] Toshiya Ochiai,[1]
Norio Yoshimura[1] and Shinji Uemoto[2]
1 Department of Surgery,
Graduate school of Medical Sciences,
Kyoto Prefectural University of Medicine,
Kyoto, Japan
2 Department of Surgery,
Graduate School of Medicine, Kyoto University,
Kyoto, Japan

References

1. Egawa H, Inomata Y, Uemoto S, *et al.* Biliary anastomotic complications in 400 living related liver transplantations. *World J Sug* 2001; **25**: 1300.
2. Roskams T, Desmet V. Embryology of extra- and intrahepatic bile ducts, the ductal plate. *Anat Rec (Hoboken)* 2008; **291**: 628.
3. Gugenheim J, Ciardullo M, Traynor O, Bismuth H. Bronchobiliary fistulas in adults. *Ann Surg* 1988; **207**: 90.

