

Extraluminal Recanalization of Bile Duct Anastomosis Obstruction after Liver Transplantation

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ABSTRACT

This report describes extraluminal recanalization of bile duct anastomosis obstruction after living donor liver transplantation. The procedure was performed in 5 patients in whom negotiation of the biliary anastomotic obstruction by retrograde endoscopic approach and percutaneous intraluminal recanalization had failed. Extraluminal puncture from the donor bile duct to the recipient side bile duct was made with the stiff back end of a 0.035-inch hydrophilic guide wire. After recanalization, a percutaneous transhepatic biliary drainage catheter was placed through the created tract. In all 5 patients, extraluminal recanalization was achieved without major complication, and endoscopic plastic stents were subsequently placed along the tract.

ABBREVIATIONS

LDLT = living donor liver transplantation, PTBD = percutaneous transhepatic biliary drainage

Bile duct anastomosis stricture is one of the most common and important complications after liver transplantation (1,2). It is mainly caused by fibrotic healing after ischemic insult and bile leakage at the anastomosis site (1–3). In most cases, it is managed by a retrograde endoscopic approach, which is less invasive. However, when this approach fails because the anastomotic strictures are too narrow, complex, or situated within small intrahepatic ducts (4), percutaneous transhepatic biliary drainage (PTBD) and surgical revision, including retransplantation, are alternative options (2). The latter is very rarely performed owing to postsurgical adhesion and lack of a donor liver. Moreover, retrograde extraluminal recanalization by percutaneous transjejunal approach has been reported (5). This study evaluated the feasibility of percutaneous extraluminal recanalization of bile duct anastomosis obstruction after liver transplantation in patients who had failed recanalization with conventional methods.

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MATERIALS AND METHODS

This retrospective study was approved by the institutional review board, and informed consent was waived by the institutional review board owing to the retrospective nature of the study. Between May 2009 and December 2014, 139 recipients of living donor liver transplantation (LDLT) with bile duct anastomosis obstruction, who presented with clinical signs of fever and jaundice, increased liver biochemical parameters including total bilirubin and alkaline phosphatase, and imaging findings of biliary obstruction, were referred for percutaneous management of the stricture because retrograde endoscopic recanalization had failed. Percutaneous intraluminal recanalization was successful in 134 of 139 patients. In 5 patients (3 men and 2 women; mean age 51 y; range, 38–58 y) who were recipients of right adult LDLT end-to-end duct-to-duct anastomosis, extraluminal recanalization was attempted when intraluminal recanalization failed > 3 times. We retrospectively analyzed the medical records and images of the patients.

All 5 patients had an indwelling external PTBD catheter, which had been placed 5–347 days before the procedure. Procedures were performed on an inpatient basis, under moderate sedation using fentanyl 50–100 mcg and midazolam 2.5–5 mg. After obtaining a cholangiogram using the PTBD catheter, puncture was attempted from the distal portion of the donor bile duct to the recipient duct under fluoroscopic guidance with the stiff back end of a 0.035-inch hydrophilic guide wire (Radifocus; Terumo Corp, Tokyo,

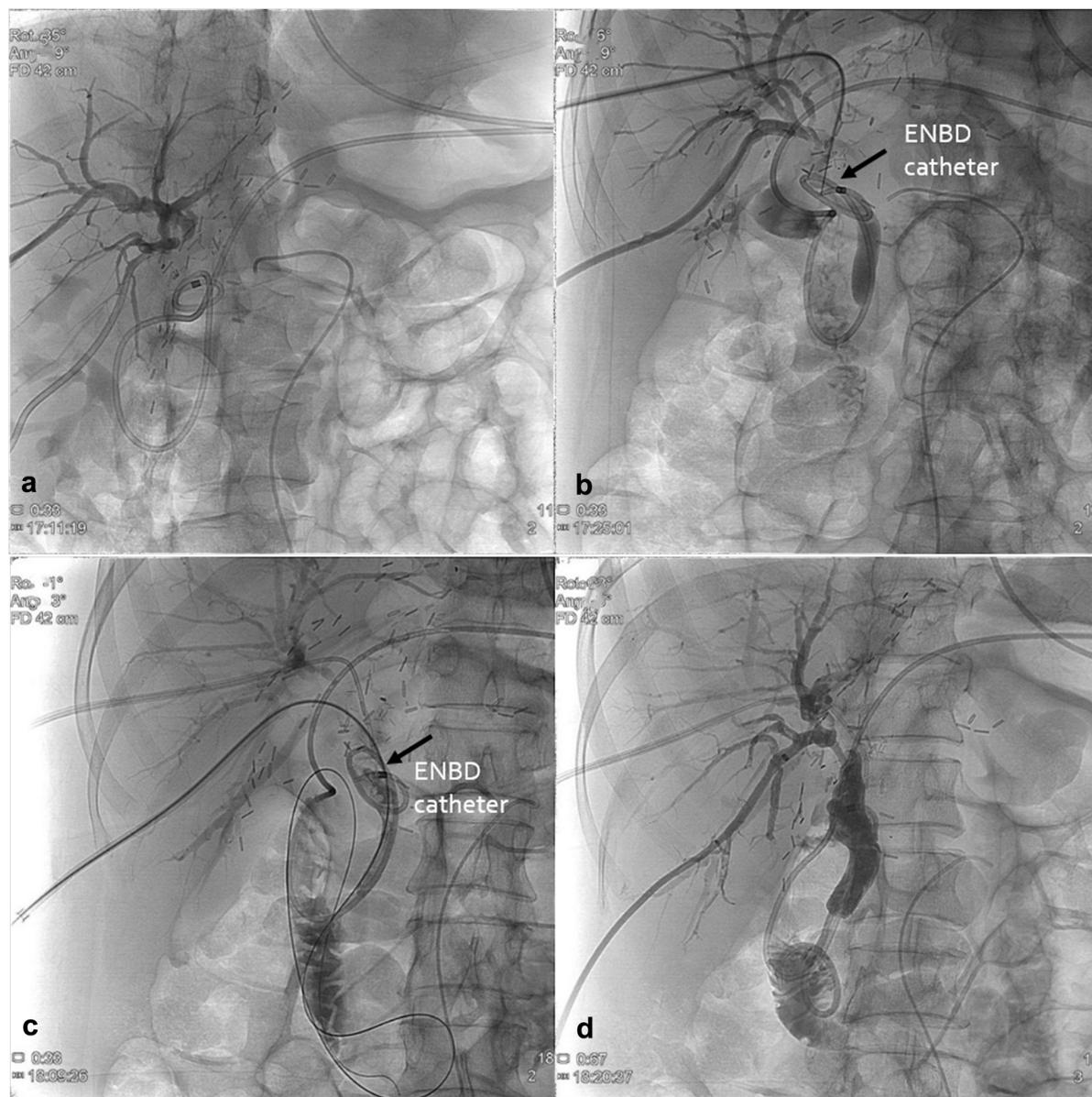


Figure 1. Targeted endoscopic nasobiliary drainage (ENBD) catheter in a 58-year-old woman. **(a)** Cholangiogram via PTBD catheter in anterior duct shows non-opacification of common bile duct distal to the obstruction site. External PTBD catheters were previously placed in the anterior and posterior segmental ducts for recanalization, which had failed 3 times. **(b, c)** Using the stiff back end of a 0.035-inch guide wire and a 5-F Kumpe catheter, puncture was unsuccessful from the anterior duct, but a successful puncture targeting the ENBD catheter (arrow) was made from the posterior duct. **(d)** An internal-external PTBD catheter was placed through the recanalized tracts, and a completion cholangiogram was obtained.

Japan), which was supported by a 5-F Kumpe catheter (Cook Medical, Bloomington, Indiana). The stiff back end of the guide wire was bent in various angles on site using surgical instruments. To ensure the puncture site of the distal duct, various artificial targets in the distal bile duct were used, including endoscopic nasobiliary drainage catheters ($n = 3$) (Fig 1a–d), a drainage catheter via the other segmental duct ($n = 1$) (Fig 2 a–d), and a metallic stent ($n = 1$) (Fig 3 a–d). Following a successful puncture, either a 4-F Cobra catheter (Terumo Corp) or a 5-F Kumpe catheter was inserted along the created tract, and then the guide wire was exchanged to a 0.035-inch stiff

hydrophilic guide wire (Radifocus). The tract was serially dilated with dilators up to 10 F, and then an 8.5-F drainage catheter with side holes (Cook Medical, Bloomington, Indiana, or Sungwon Medical, Chungbuk, Korea) was placed through the recanalized tract. The metallic stent that was placed in 1 patient was endoscopically removed after the procedure.

Technical success was defined as proper placement of an internal-external PTBD catheter between the obstructed donor duct to the distal recipient duct with restoration of contrast flow on completion cholangiogram. Clinical success was defined as removal of PTBD and endoscopic

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