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Bile leakage after living donor liver transplantation demonstrated with hepatobiliary scan using ^{99m}Tc-PMT

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Although it is recognized that hepatobiliary scan is of value in assessing postoperative complications of biliary surgery or cadaveric whole liver transplantation, there have been few reports regarding its usefulness following living donor liver transplantation. We performed living donor liver transplantation in a patient with biliary cirrhosis due to hepatolithiasis, using a right lobe graft from her sister. On the 15th postoperative day, bile discharge appeared from the operative wound. The leakage point could not be identified by computed tomography and cholangiography from the biliary drainage catheter. Hepatobiliary scan with Tc-99m Sn-*N*-pyridoxyl-5-methyltryptophan (^{99m}Tc-PMT) demonstrated biliary extravasation from the left side of the anastomosis of the hepatico-jejunostomy, indicating biliary leakage from the anastomosis. Conservative therapy was continued because the radioisotope flowed smoothly into the reconstructed jejunum and the biliary drainage catheter, and the leakage was stopped on the 63th postoperative day. Hepatobiliary scan is useful in determining the therapeutic plan as well as detection of bile leakage and identification of leakage points after living donor liver transplantation.

Keywords: hepatobiliary scan, bile leakage, ^{99m}Tc-PMT, living donor liver transplantation

INTRODUCTION

Living donor liver transplantation (LDLT) has been generally accepted as a procedure useful for overcoming the shortage of donor organs, especially in countries in which cadaveric liver transplantation is severely restricted. However, there are several problems associated with it, including graft size issue[1] and biliary complications, which developed in 34% of recipients of LDLT.[2–4] Biliary complications are rarely a sole cause of allograft loss but often lead to other infectious sequelae. Secondary infection is critical for immune-suppressed patients who have undergone LDLT, especially with a small-for-size graft liver. Therefore, it is important to detect postoperative biliary complications immediately and to differentiate them from other medical complications. However, it is sometimes difficult to accurately diagnose biliary complications because of the complex physiological status after LDLT and operative factors including primary disease, graft size, and method of biliary reconstruction. Although it is recognized that hepatobiliary scan (HBS) is of value in assessing postoperative complications of biliary surgery and cadaveric whole liver transplantation,[5,6] there have been few reports regarding its usefulness following LDLT.[7] In this report, we describe a patient who suffered from bile leakage after LDLT, which was initially demonstrated with HBS.

CASE

A 43-year-old Korean-Japanese woman underwent LDLT with a diagnosis of biliary cirrhosis due to hepatolithiasis using the right hepatic lobe of her elder sister on October 2, 2000. Since she had been suffered from refractory suppurative cholangitis with biliary bronchial fistula,

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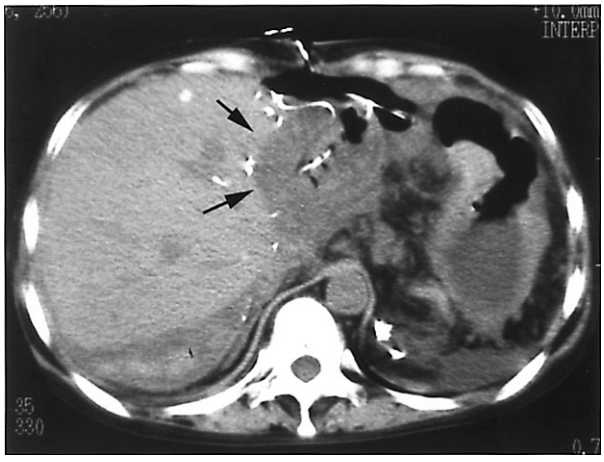

Fig. 1 Computed tomogram shows fluid collection around the reconstructed jejunum (*arrows*).

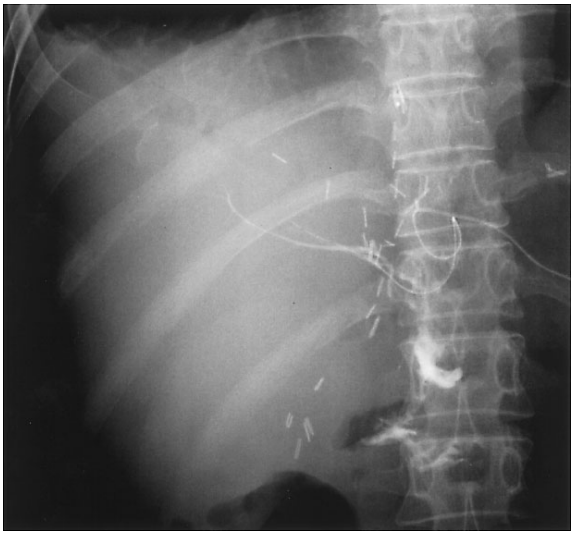

Fig. 2 Cholangiogram from the biliary drainage catheter shows no biliary extravasation, and that the contrast medium flows into the reconstructed jejunum.

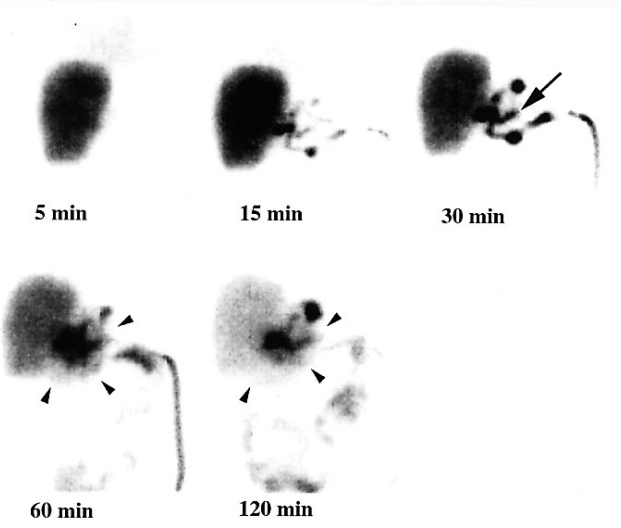

Fig. 3 Hepatobiliary scan on the 25th postoperative day demonstrates normal accumulation of the radioisotope in the graft liver and biliary extravasation (*arrow*) from the left side of the anastomosis of the hepatico-jejunostomy into the abdominal cavity around the liver (*arrowheads*), indicating biliary leakage from the anastomosis. The radioisotope flows smoothly in the jejunum and the biliary drainage catheter.

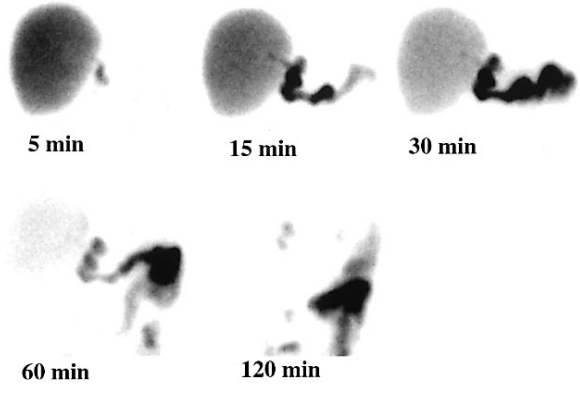

Fig. 4 Hepatobiliary scan on the 99th postoperative day shows smooth excretion of the isotope into the reconstructed jejunum without any biliary extravasation.

inflammatory changes around the hepatic hilum were severe and hard granulation was fixed around the liver. The common bile duct was transected and anastomosis between the right hepatic duct (graft liver) and the jejunum (recipient) was performed in Roux-en-Y fashion (end-to-side anastomosis with interrupted suture using 4-0 PDS). A biliary drainage catheter was placed at the anastomosis of the hepatico-jejunostomy and was conducted outside through the anal side of the reconstructed jejunum. The volume of bile discharge from the biliary drainage catheter gradually increased, and there were no signs of bile leakage in the first two weeks after operation. On the 15th postoperative day (POD), bile discharge suddenly appeared from the operative wound associated with intermittent fever over 38°C. Computed tomograms revealed a fluid collection around the reconstructed jejunum (Fig. 1). Cholangiograms from the biliary drainage catheter demonstrated no biliary extravasation and the contrast medium flowed smoothly into the reconstructed jejunum (Fig. 2). HBS on the 25th POD demonstrated normal accumulation of the radioisotope in the graft liver and extravasation of the radioisotope from the left side of the anastomosis of the hepatico-jejunostomy into the abdominal cavity around the liver within 60 minutes after the injection of Tc-99m Sn-*N*-pyridoxyl-5-methyltryptophan (PMT), indicating bile leakage from the anastomosis (Fig. 3). In addition to intravenous adminis-

tration of an antiviral drug for concomitant cytomegalo virus infection, conservative therapies including intravenous administration of antibiotics and continuous drainage were performed because HBS also demonstrated smooth flow of the radioisotope into the reconstructed jejunum and biliary drainage catheter. The leakage stopped without additional surgery by the 63th POD, and HBS on the 99th POD revealed smooth excretion of the radioisotope to the reconstructed jejunum without any biliary extravasation (Fig. 4).

DISCUSSION

Because LDLT requires surgical techniques and yields a postoperative anatomy different form those of cadaveric whole liver transplantation, its pattern of postoperative complications may be somewhat different from that of cadaveric whole liver transplantation.[8] In cadaveric liver transplantation, bile leakage can be easily assessed with T-tube cholangiography or endoscopic retrograde cholangiography because postoperative biliary complications after cadaveric liver transplantation commonly occur at extrahepatic sites such as anastomotic sites of choledocho-choledochostomy or choledocho-jejunostomy.[5] However, a T-tube is not usually inserted into the hepatico-jejunostomy during LDLT, and endoscopic retrograde cholangiography cannot be performed in LDLT because of the hepatico-jejunostomy. Percutaneous transhepatic cholangiography is an invasive method and is often difficult to perform in patients without dilatation of the intrahepatic bile ducts. The ability of computed tomography is limited to differentiate fluid collections including abscess, hematoma, loculated ascites, and biloma around the graft. HBS is a useful examination for diagnosis of cholestasis, acute cholecystitis, infantile jaundice, congenital jaundice, congenital cystic dilatation of the common bile duct, and bile leakage.[9–11] In our patient, bile leakage was not detected and the leakage point was not identified by computed tomography and cholangiography from the biliary drainage catheter. Althogh it is unclear why the leakage point did not show by the catheter cholangiography, it might be considered due to the location of the catheter that disturbed a visualization of the bile duct itself, or insufficient volume of the contrast medium. On the other hand, HBS demonstrated not only bile leakage but the leakage point as well. Therefore, HBS was thought to be useful for diagnosis of biliary complications of LDLT.

When bile leakage continues to be uncontrollable, immediate drainage or biliary decompression is required to prevent peritonitis and sepsis.[2] We did not perform such emergent surgery in our patient because HBS demonstrated smooth flow of the radioisotope into the reconstructed jejunum and the biliary drainage catheter and the leakage stopped with conservative therapy alone. Thus, HBS was useful for determing the therapeutic plan as well as detection of bile leakage and its leakage point. HBS is a noninvasive and informative procedure for detection of bile leakage after LDLT, and should be tried when bile leakage is suspected after LDLT.

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