

A case of recurrent cholangitis after bile duct injury during laparoscopic cholecystectomy: Value of scintigraphy with Tc-99m GSA and hepatobiliary scintigraphy for indication of lobectomy

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A 39-year-old woman with acute cholecystitis and gallstones underwent laparoscopic cholecystectomy. She suffered from recurrent episodes of cholangitis due to injury of the major bile ducts during laparoscopic cholecystectomy.

Hepatobiliary scintigraphy with Tc-99m Sn-*N*-pyridoxyl-5-methyltryptophan was performed. Although normal bile excretion was found from the left hepatic duct to the percutaneous transhepatic biliary drainage (PTBD) tube, excretion from the right hepatic lobe was prolonged. Scintigraphy with Tc-99m diethylenetriaminepentaacetic acid-galactosyl human serum albumin demonstrated atrophy of the right hepatic lobe and enlargement of the left hepatic lobe. Cholangiography via the PTBD tube revealed complete obstruction of the left hepatico-jejunal anastomosis and could not enhance the right intrahepatic bile duct. A right hepatic lobectomy was performed because of the atrophy, glissonitis and the absence of an appropriate bile duct for reconstruction. Postoperatively she was active and exhibited no evidence of recurrent cholangitis.

Key words: Tc-99m GSA, laparoscopic cholecystectomy, hepatobiliary scintigraphy

INTRODUCTION

SINCE LAPAROSCOPIC CHOLECYSTECTOMY is associated with less postoperative pain, a shorter hospital stay, and a more rapid recovery than open cholecystectomy, it has rapidly replaced the latter procedure.¹ As the anatomy around the triangle of Calot is sometimes difficult to discern, the incidence of bile duct injuries with laparoscopic cholecystectomy appears to be higher than that with open cholecystectomy.^{2–4} Although best results after bile duct injuries are achieved with immediate repair or biliary-enteric anastomosis,² patients who undergo biliary-enteric anastomosis often suffer recurrent episodes of cholangitis.⁵

We report a patient who required a right hepatic lobectomy for recurrent cholangitis due to injury of the bile duct

during laparoscopic cholecystectomy. Hepatobiliary scintigraphy with Tc-99m Sn-*N*-pyridoxyl-5-methyltryptophan (PMT) and scintigraphy with Tc-99m diethylenetriaminepentaacetic acid-galactosyl human serum albumin (GSA) were useful for demonstrating that right hepatic lobectomy was indicated for this patient.

CASE REPORT

A 39-year-old woman underwent laparoscopic cholecystectomy with a diagnosis of acute cholecystitis and gallstones. Since identification of ductal anatomy around the triangle of Calot was difficult because of acute inflammatory changes, the hilar hepatic ducts were injured. The left main hepatic duct and a small bile duct branch in the gallstone bed were anastomosed to a Roux-en-Y loop of the jejunum. After discharge from our hospital, she suffered from recurrent cholangitis. She was admitted to our hospital for recurrent left upper abdominal pain and high fever (40°C) 13 months postoperatively. On admission, the red blood cell count was $465 \times 10^4/\text{mm}^3$, the white

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blood cell count 4400/mm³, serum albumin concentration 4.2 g/dl, aspartate aminotransferase activity 72 IU/l, alanine aminotransferase activity 83 IU/l, alkaline phosphatase activity 674 IU/l, γ -glutamyl transpeptidase activity 155 IU/l, and the total bilirubin concentration 2.4 mg/dl.

Percutaneous transhepatic biliary drainage (PTBD) was performed through the left lateral hepatic duct for cholangitis. Although the high fever resolved, pain in the upper abdomen recurred. Cholangiography via the PTBD tube revealed obstruction of the left hepatico-jejunal anastomosis and could not enhance the right intrahepatic bile duct (Fig. 1). Hepatobiliary scintigraphy with Tc-99m PMT demonstrated normal accumulation of the isotope in both lobes. Although normal bile excretion was

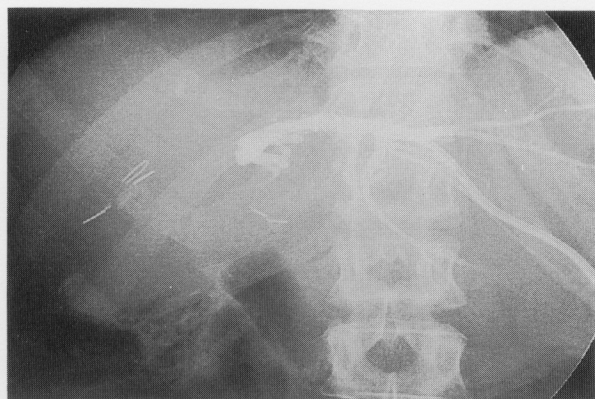


Fig. 1 Cholangiography via the percutaneous transhepatic biliary drainage (PTBD) tube revealed complete obstruction of the left hepatico-jejunal anastomosis and could not enhance the right intrahepatic bile duct.

found from the left hepatic duct to the PTBD tube, excretion from the right hepatic lobe was noticeably prolonged (Fig. 2). Scintigraphy with Tc-99m GSA demonstrated atrophy of the right hepatic lobe and enlargement of the left hepatic lobe, but accumulation in the right hepatic lobe was not decreased (Fig. 3). The recurrent episode of cholangitis caused obstruction of the right intrahepatic bile duct, which resulted in atrophy of the right hepatic lobe. A right hepatic lobectomy was performed because of the absence of an appropriate bile duct for reconstruction, and a new anastomosis was created between the left hepatic bile duct and jejunum. Microscopic examination of resected tissue revealed recurrent glissonitis including infiltration by inflammatory cells and periportal fibrosis. Postoperatively, she was active and exhibited no evidence of recurrent cholangitis.

DISCUSSION

The risk factors for bile duct injury at laparoscopic cholecystectomy include acute or severe inflammation, bleeding, obesity and the presence of anatomic anomalies.^{2,3} Deziel et al.⁴ reported a complication rate of 1.2% in 77,604 patients who underwent laparoscopic cholecystectomy. Bile duct and vascular injuries occurred in 0.6% and 0.25% of patients, respectively. In our patient, identification of ductal anatomy around the triangle of Calot was difficult because of acute inflammatory changes. The best results after bile duct injuries are achieved with immediately repair or biliary-enteric anastomosis.² Schimpl et al.⁵ reported that 4 of 7 patients who underwent Roux-en-Y hepaticojejunostomy for biliary reconstruction had recurrent episodes of cholecystitis. In our patient,

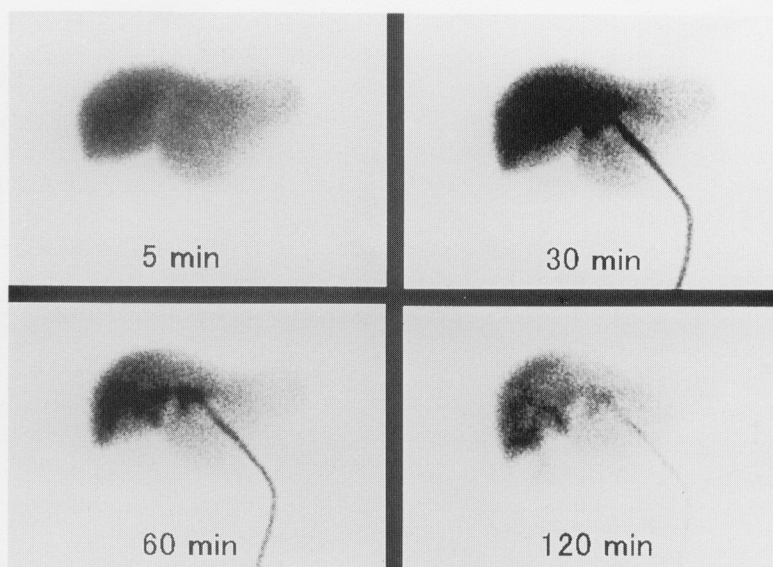


Fig. 2 Hepatobiliary scintigraphy with Tc-99m PMT demonstrated normal accumulation of the radioisotope in both lobes. Although normal bile excretion was found from the left hepatic duct to the PTBD tube, excretion from the right hepatic lobe was markedly prolonged.

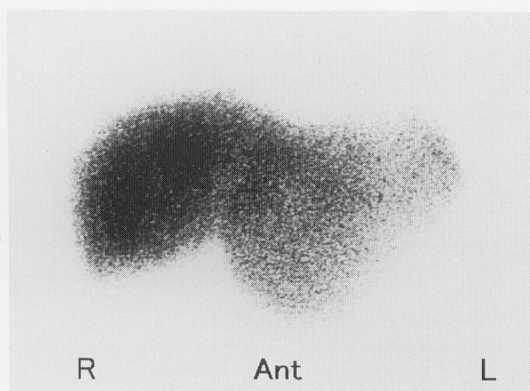


Fig. 3 Scintigraphy with Tc-99m GSA demonstrated atrophy of the right hepatic lobe and enlargement of left hepatic lobe, but accumulation in the right hepatic lobe was not decreased.

the right intrahepatic bile duct had been obstructed from recurrent episodes of cholangitis occurring over a long period of time, and the right hepatic lobe was atrophied. A right hepatic lobectomy was performed because of the atrophy, glissonitis, and the absence of an appropriate bile duct for reconstruction.

Hepatobiliary scintigraphy is useful for diagnosis of cholestasis, acute cholecystitis, infantile jaundice, congenital jaundice, congenital cystic dilatation of the common bile duct, and bile leakage.⁶⁻⁸ Among cases with segmental biliary obstruction with pathology similar to that in our case, Aburano et al.⁹ reported that depiction of the intrahepatic bile duct and excretion were delayed in a case of incomplete obstruction, but the peripheral bile ducts were not depicted in the case of complete obstruction. Wang et al.¹⁰ reported that patients with incomplete obstruction exhibited local residual liver activity. In our case, accumulation in the right hepatic lobe was also normal, but excretion was noticeably delayed.

Tc-99m GSA is an agent developed as a ligand that binds specifically to asialoglycoprotein receptors on the surface of hepatic cells.¹¹ Scintigraphy with Tc-99m GSA can noninvasively evaluate hepatic functional reserve.¹²⁻¹⁵ We therefore perform scintigraphy with Tc-99m GSA to grasp the function of residual liver after hepatectomy.¹⁶ Inoue et al.¹⁷ diagnosed biliary obstruction with Tc-99m GSA and observed decreased accumulation of the radioisotope in the regions where biliary obstruction was detected. In our case, the right hepatic lobe was noticeably atrophied but radioisotope accumulation was not decreased. The reason for this may have been that liver cell function in the right hepatic lobe was still intact, though normal function of the intrahepatic bile duct was no longer present as a result of recurrent cholangitis. Nevertheless, since it was assumed that the liver would in the future undergo extensive necrosis and that the bile duct was not appropriate for reconstruction, right hepatic lobectomy was performed.

Other imaging techniques (magnetic resonance imaging, computed tomography and ultrasonography, etc.) could not evaluate bile duct function. Hepatobiliary scintigraphy could evaluate bile duct function, and was therefore useful in making the decision to perform right hepatic lobectomy.

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