

Detection of bile leakage into the thoracic cavity by hepatobiliary scintigraphy

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We report early detection of bile leakage into the thoracic cavity by hepatobiliary scintigraphy in a rare case of spontaneous withdrawal of the catheter for percutaneous transhepatic cholangiographic drainage (PTCD). An 81-year-old man with inoperable carcinoma of the common bile duct was readmitted with a 38°C fever and suspected bile leakage from the hepatic biliary tree following withdrawal of the catheter for PTCD. While plain X-ray immediately after readmission revealed no abnormality in the chest or abdomen, hepatobiliary scintigraphy revealed not only bile leakage into the right thoracic cavity but also the site of laceration. We conclude that hepatobiliary scintigraphy is a simple, non-invasive procedure useful in the early detection and localization of bile leakage following spontaneous withdrawal of the catheter for PTCD.

Key words: hepatobiliary scintigraphy, Tc-99m PMT, bile leakage into thoracic cavity, spontaneous withdrawal of catheter for PTCD

INTRODUCTION

PERCUTANEOUS TRANSHEPATIC CHOLANGIOGRAPHY followed by external biliary drainage (PTCD) has been widely used for the alleviation of jaundice in patients with obstructive jaundice, although complications associated with PTCD have also been noted by several authors during the initial investigation of its use.¹⁻⁵ However, the complication of biliary leakage into the thoracic cavity from an hepatic biliary tree laceration due to spontaneous withdrawal of the catheter for PTCD is very rare.

This paper describes simple and early detection of biliary leakage into the right thoracic cavity due to spontaneous withdrawal of the catheter for PTCD by means of nuclear medicine techniques.

CASE REPORT

An 81-year-old man was admitted to the City General

Hospital for obstructive jaundice due to inoperable carcinoma of the common bile duct. The patient underwent PTCD, and alleviation of jaundice and improvement in his general condition were noted thereafter. One month after PTCD, the patient was discharged from the hospital with an indwelling catheter for external biliary drainage. Three days after he left the hospital, the catheter was spontaneously completely withdrawn from the hepatic bile duct. Five days later, he was readmitted to our hospital with a 38°C fever and suspected bile leakage from the hepatic biliary tree due to biliary laceration. He underwent plain X-ray examination immediately after readmission, but no abnormality in the chest or abdomen was observed. The patient then underwent hepatobiliary imaging with technetium-99m N-pyridoxyl-5-methyltryptophan (Tc-99m PMT, Nihon Medi-Physics, Co., Takarazuka, Hyogo, Japan). 148 MBq (4 mCi) of Tc-99m PMT was administered intravenously by bolus injection. The instrument used was a gamma camera with a low energy high resolution collimator. Anterior views were recorded every 5 minutes for 20 minutes, and at 30, 40, 60, and 100 minutes. In addition, delayed images at up to 180 minutes were also obtained. Serial images showed a normal hepatic uptake of Tc-99m PMT,

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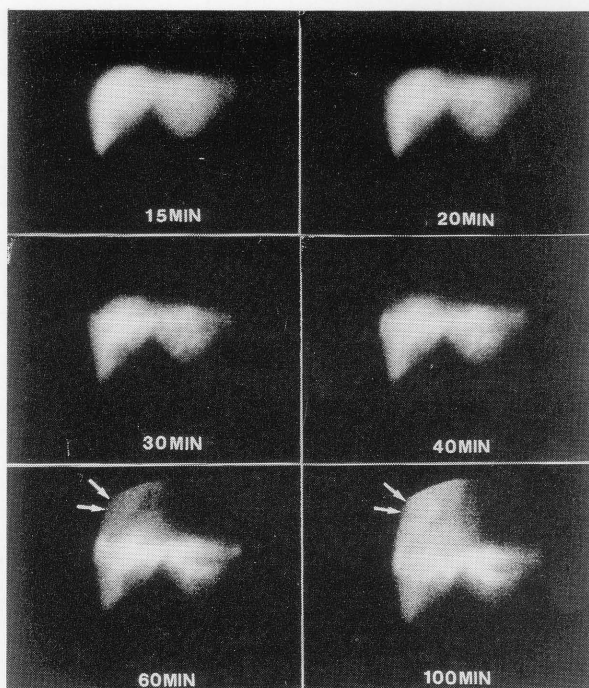


Fig. 1 Anterior hepatobiliary images obtained with Tc-99m PTM. Bile leakage into the right thoracic cavity was noted at 60 and 100 minutes (arrow). The common bile duct, gallbladder and small intestine were not seen.

but the common bile duct, gallbladder and excretion into the small intestine were not seen (Fig. 1). However, significant Tc-99m PMT activity in the right thoracic cavity was detected 60 minutes after Tc-99m PMT injection (Fig. 1). This activity progressively increased and revealed the site of laceration on the delayed images (Fig. 2). Diagnosis of biliary leakage into the right thoracic cavity from the laceration of the superior anterior branch of right hepatic biliary duct due to spontaneous withdrawal of the catheter for PTCD was made on the basis of cholescintigraphic findings.

DISCUSSION

While the complications associated with the use of a catheter for PTCD have been reported by several authors,¹⁻⁵ bile leakage into the thoracic cavity from an hepatic biliary tree laceration due to spontaneous withdrawal of the catheter for PTCD is very rare, because such withdrawal is usually caused by insufficient attachment of the catheter to the skin. Bile leakage into the thoracic cavity is generally found to occur after hepatobiliary surgery or in association with blunt abdominal trauma.⁶⁻⁹ It seems that the laceration in this case was extend to the diaphragm conjoined with an enlarged liver, and bile leakage

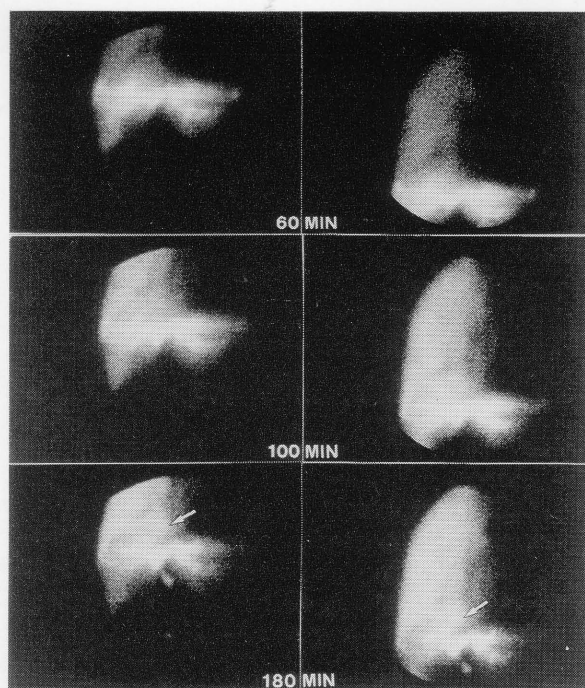


Fig. 2 Anterior hepatobiliary images obtained with Tc-99m PMT. Hepatobiliary scintigraphy revealed not only bile leakage into the right thoracic cavity but also the site of laceration in the superior anterior branch of right hepatic biliary duct (arrow).

into the thoracic cavity progressively increased with respiration of the patient in the supine position for negative pressure in the thoracic cavity together with positive pressure in the intrahepatic biliary duct due to spontaneous withdrawal of the catheter for PTCD. It is well known that a patient with bile leakage into the thoracic cavity due to trauma initially appears to be well, then suddenly develops shock, respiratory distress, and cardiac or respiratory arrest. Therefore, early detection and diagnosis of bile leakage into the thoracic cavity is very important in the treatment of such patients, especially older patients such as in the present report. Several authors have suggested that hepatobiliary scintigraphy is the procedure of choice in diagnosing bile leakage from the extrahepatic biliary system.⁶⁻⁹ In the present case, plain X-ray examination was done immediately after readmission, but revealed no abnormal findings in the chest or abdomen. However, hepatobiliary scintigraphy revealed not only bile leakage into the right thoracic cavity but also the precise location of the laceration. This is the first case report to our knowledge of diagnosis by hepatobiliary scintigraphy of bile leakage into the thoracic cavity from hepatic biliary tree laceration due to spontaneous withdrawal of the catheter for PTCD.

CONCLUSIONS

We conclude that hepatobiliary scintigraphy is a simple and non-invasive procedure useful in the early detection of bile leakage and localization of the site of the laceration, as well as in the assessment of severity.

REFERENCES

1. Zinberg SS, Berk JE, Plasencia H: Percutaneous transhepatic cholangiography, Its use and limitations. *Am J Dig Dis* 10: 154-169, 1965
2. Hines C Jr, Ferrante WA, Davis WD Jr, et al: Percutaneous transhepatic cholangiography, Experience with 102 procedures. *Dig Dis Sco* 17: 868-874, 1972
3. Gothlin J, Tranbers KG: Complications of percutaneous transhepatic cholangiography (PTC). *Am J Roentgenol* 117: 426-431, 1973
4. Hoevels J, Ihse I: Percutaneous transhepatic insertion of a permanent endoprosthesis in obstructive lesions of the extrahepatic bile duct. *Gastrointest Radiol* 4: 367-377, 1979
5. Monden M, Okamura J, Kobayashi N, et al: Hemobilia after percutaneous transhepatic biliary drainage. *Arch Surg* 115: 161-164, 1980
6. Christensen PB, Oester-Joergensen EE, Schoubye J, et al: Scintigraphy with Tc-99m-(2,6-diethylacetanilide)-iminodiacetic acid as a diagnostic test in traumatic lesions of the liver and biliary tract. *Gastrointest Radiol* 6: 43-46, 1981
7. Sty JR, Starshak RJ, Hubbard AM: Radionuclide hepatobiliary imaging in the detection of traumatic biliary tract disease in children. *Pediatr Radiol* 12: 115-118, 1982
8. Zeman RK, Lee CH, Stahl R, et al: Strategy for the use of biliary scintigraphy in non-iatrogenic biliary trauma. *Radiology* 151: 771-777, 1984
9. Salam M, Glowniak JV, Vetto M, et al: Detection of bile leakage from traumatic right hepatic duct laceration with technetium-99m DISDA cholescintigraphy. *Clin Nucl Med* 12: 589-591, 1987