Journal of Rural Medicine

Case report

Peroral cholangioscopy for the evaluation of bile duct stricture in hepatocellular carcinoma on a preoperative examination

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Abstract

Objective: Bile duct tumor thrombosis in hepatocellular carcinoma (HCC) is a relatively rare event with a poor prognosis. Furthermore, bile duct tumor thrombus in HCC may be misdiagnosed when only imaging modalities are used. The efficiency of peroral cholangioscopy (POCS) in evaluating bile duct lesions has been reported.

Patients: We present three cases of HCC with bile duct strictures in which POCS was performed as a preoperative evaluation.

Results: In these three cases, diagnosing whether the lesion was a bile duct tumor thrombus on CT and endoscopic retrograde cholangiopancreatography was difficult. We performed POCS in three cases and were able to diagnose the presence of bile duct tumor thrombus of HCC, including differentiation from extrinsic compression of the bile duct.

Conclusion: POCS for HCC with bile duct features is useful for the preoperative diagnosis of bile duct tumor thrombus, especially in cases where the surgical procedure depends on the presence of bile duct tumor thrombus.

Key words: bile duct tumor thrombus, endoscopic retrograde cholangiography, hepatocellular carcinoma, peroral cholangioscopy, preoperative diagnosis

(J Rural Med 2024; 19(1): 44–48)

Introduction

Bile duct tumor thrombus of hepatocellular carcinoma (HCC) is a relatively rare event[1]. HCC with bile duct invasion has been associated with poor prognosis and surgical resection has been reported to improve the prognosis of HCC patients with bile duct invasion[2]. Therefore, appropriate preoperative evaluation of bile duct invasion is important when deciding surgical indications and procedures.

Recently, the efficiency of peroral cholangioscopy (POCS) in diagnosing and treating bile duct lesions has been reported[3, 4]. The POCS has mainly been used for diagnosing primary biliary tract lesions and has rarely been used for evaluating HCC. Herein, we report three cases of HCC with bile duct strictures in which POCS was performed as a preoperative evaluation.

Received: July 3, 2023
Accepted: August 22, 2023
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Case Report

Case 1

A 59-year-old man was referred to our hospital for a detailed examination of a liver tumor in the left lobe. Computed tomography (CT) revealed a hypovascular tumor with dilatation of the intrahepatic bile duct in the left lobe of the liver (Figure 1a). The alpha-fetoprotein (AFP) level was elevated to 15.2 ng/mL, and the protein level induced by vitamin K absence or antagonist II (PIVKA-II) was elevated to 2,988 mAU/mL. Endoscopic retrograde cholangiography (ERC) showed a contrast defect in the hilar bile duct (Figure 1b). Subsequent POCS (Spy Glass DS II; Boston Scientific Corporation, Natick, MA, USA) revealed a round mass with a smooth surface extending from the bile duct segment 2 (B2) to the common bile duct (Figure 1c). A tumor biopsy under POCS was performed, but only necrotic debris was observed. Although the CT findings were atypical, the liv-

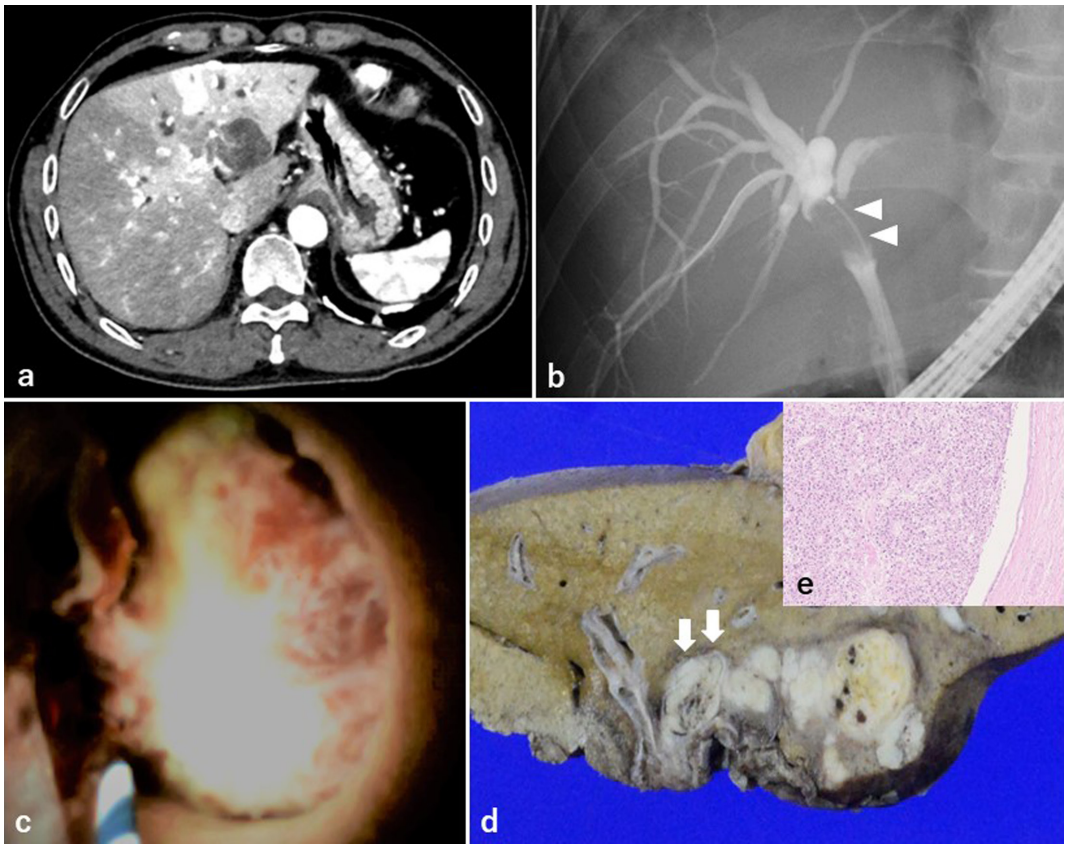

Figure 1 Case 1. (a) Computed tomography (CT) showed a hypovascular tumor with dilatation of the intrahepatic bile duct in the left lobe of the liver. (b) Endoscopic retrograde cholangiography (ERC) showed a contrast defect in the hilar bile duct (arrowheads). (c) Peroral cholangioscopy (POCS) displayed a round mass with a smooth surface from the bile duct of segment 2 (B2) to the common bile duct. (d) The surgical specimen revealed bile duct tumor thrombus of hepatocellular carcinoma (HCC) extending into the common bile duct (arrow). (e) The histopathological findings indicated bile duct tumor thrombus of HCC without a capsule.

er tumor was diagnosed as HCC based on high AFP and PIVKAII levels. A definitive diagnosis of bile duct tumor thrombus in HCC was made based on POCS findings, although a histopathological diagnosis was not established. Furthermore, an extended left hepatectomy was performed, and the surgical specimen showed a bile duct tumor thrombus extending into the common bile duct (Figure 1d and 1e).

Case 2

An 83-year-old woman was suspected to have a liver mass on abdominal ultrasonography. CT revealed that the tumor was enhanced during the early vascular phase (Figure 2a). Additionally, laboratory tests showed aspartate aminotransferase 99 U/L; alanine aminotransferase 223 U/L; alkaline phosphatase 364 U/L; and gamma-glutamyl transferase 2,183 U/L. The AFP level was within the normal range, whereas the PIVKA-II level was elevated to 6,309 mAU/mL. Furthermore, ERC revealed choledocholithiasis and stone removal was performed. Cholangiography performed after stone removal revealed a filling defect in the right hepatic duct (Figure 2b). Notably, a subsequent POCS revealed a round mass within the right hepatic duct (Figure 2c). A tumor biopsy under POCS was performed; however, necrotic tissue was obtained, and a histopathological diagnosis was not established. A definitive diagnosis of bile duct tumor thrombus in HCC was confirmed based on POCS imaging findings. Right hepatectomy was then performed, and the surgical specimen revealed a bile duct tumor thrombus within the right hepatic duct (Figure 2d and 2e).

Case 3

A 78-year-old man was referred to our hospital for treatment of a liver tumor. CT revealed a tumor mildly enhanced in the early vascular phase in liver segment 4, with dilatation of the intrahepatic bile duct in the left lobe of the liver (Figure 3a). ERC showed a filling defect in the left hepatic duct (Figure 3b). Subsequent POCS revealed a normal bile duct epithelium that was compressed from outside the left hepatic duct (Figure 3c). Moreover, the absence of bile duct tumor thrombus in HCC was confirmed using POCS imag-

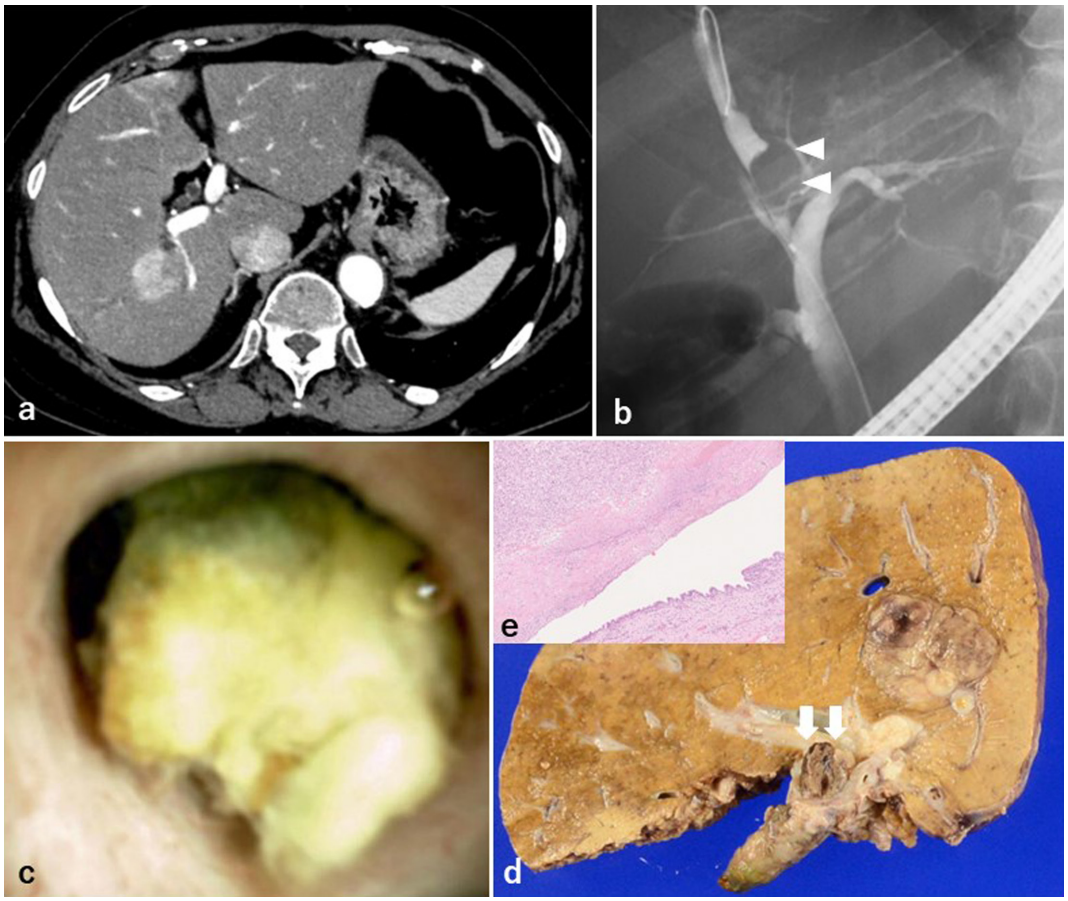

Figure 2 Case 2. (a) CT showed a tumor enhanced in the early vascular phase. (b) ERC revealed a filling defect in part of the right hepatic duct (arrowheads). (c) POCS displayed a round mass within the right hepatic duct. (d) The surgical specimen revealed bile duct tumor thrombus of HCC within the right hepatic duct (arrow). (e) The histopathological findings indicated bile duct tumor thrombus of HCC with a thick capsule.

ing, and a left hepatectomy was performed. According to the surgical specimen, the HCC had not invaded the left hepatic duct (Figure 3d).

Discussion

Bile duct features such as bile duct stricture and dilatation are often observed in intrahepatic cholangiocarcinoma[5]; however, these are relatively rare features of HCC[1]. Furthermore, preoperative diagnosis of bile duct tumor thrombus in HCC remains difficult, and several cases have been misdiagnosed before surgery[6]. Thus, imaging alone may not be sufficient for a definitive preoperative diagnosis of bile duct tumor thrombosis in HCC. Regarding surgical treatment, the extent of liver resection can change with or without bile duct tumor thrombus. Therefore, an accurate preoperative evaluation of bile duct strictures is important. Notably, there have been several reports on the efficacy of POCS in detecting HCC that were not diagnosed by imaging[7–9].

We report three patients who underwent POCS for a detailed evaluation of bile duct strictures before surgery. In cases 1 and 2, POCS revealed a bile duct tumor thrombus in HCC. However, in Case 3, no mass protruding into the lumen was identified, and normal bile ducts that were externally compressed were observed on the POCS. In this case, which was ultimately treated with left hepatectomy, the diagnosis of bile duct tumor thrombus was important for determining the surgical procedure, as left medial segmentectomy was also an option, depending on the degree of hepatic impairment.

In these three cases, diagnosing whether the lesion was a bile duct tumor thrombus on CT and endoscopic retrograde cholangiopancreatography was difficult. Therefore, POCS can aid in diagnosing bile duct tumor thrombus in HCC by differentiating it from other biliary stenoses, such as external compression caused by HCC.

Biopsy under POCS was performed in cases 1 and 2; however, sufficient tissue samples for histopathological diagnosis could not be obtained. The tumor thrombus in HCC

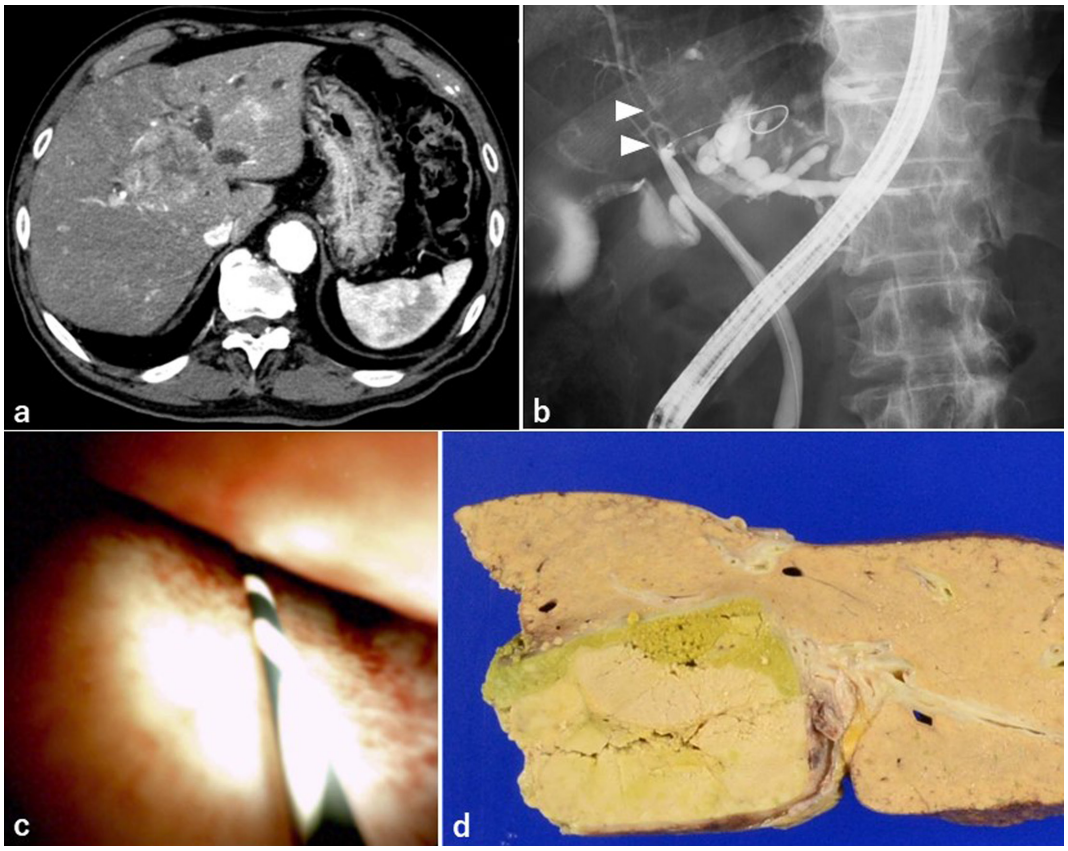

Figure 3 Case 3. (a) CT showed a tumor that was mildly enhanced in the early vascular phase in liver segment 4, with dilatation of the intrahepatic bile duct in the left lobe of the liver. (b) ERC revealed a filling defect in the left hepatic duct (arrowheads). (c) POCS displayed normal bile duct epithelium that was compressed from the outside in the left hepatic duct. (d) The surgical specimen revealed that HCC had not invaded the left hepatic duct.

is sometimes covered by a tumor capsule, such as in case 2, unlike biliary tract cancer; therefore, a biopsy under POCS seems unlikely to obtain tumor tissue compared with biliary tract cancer. Notably, scraping the mass is reportedly an option for obtaining tissue[9]. In addition, boring biopsies may also be useful. However, these methods carry a risk of bleeding because HCC is a hypervascular tumor. Thus, it is important to observe the surface findings of tumors using POCS when diagnosing bile duct tumor thrombus of HCC instead of relying solely on histopathological diagnosis.

In conclusion, POCS for HCC with bile duct features is useful for the preoperative diagnosis of bile duct tumor thrombus in HCC, especially in cases where the surgical procedure depends on the presence of a bile duct tumor thrombus. However, several issues, such as high cost and invasiveness, remain to be addressed. Therefore, POCS should be limited to cases in which a bile duct tumor thrombus cannot be diagnosed using other examinations.

Conflict of interest: The authors have no conflict of interest for this article.

Ethics approval and consent to participate: We obtained consent from the patients for the publication of this report, including images.

Author contributions: M. Chiba wrote the manuscript. M. Chiba, M. Aokawa, W. Sato, K. Takahashi, and S. Minami collected case information and images. T. Goto and K. Iijima reviewed the literature and critically revised the manuscript. All authors contributed to the writing of the manuscript. All the authors have read and agreed to the published manuscript.

Acknowledgment

The authors would like to thank the endoscopists and the surgeons for the management of the patients.

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