

Characteristic Peroral Cholangioscopy Findings in Bile Duct Tumor Thrombus of Hepatocellular Carcinoma

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ABSTRACT

Hepatocellular Carcinoma (HCC) rarely forms tumor thrombus within the bile duct. In such cases, differentiation from intrahepatic cholangiocarcinoma is difficult, and the tumor is often showed as a smooth, yellowish-white, polypoid tumor with neovascularization within the bile duct. HCC forming bile duct tumor thrombus can mimic various tumors. Furthermore, early multidisciplinary patient evaluation is very crucial for obtaining an accurate diagnosis of HCC forming bile duct tumor thrombus. This review report describes characteristic Peroral Cholangioscopy (POCS) findings in bile duct tumor thrombus of HCC.

Key words

Bile duct tumor thrombus; Hepatocellular carcinoma; Peroral cholangioscopy

INTRODUCTION

Hepatocellular Carcinoma (HCC) is the most common type of primary liver cancer, and the primary treatment is surgical resection. HCC frequently infiltrates the portal vein or hepatic veins to form tumor thrombus, but tumor thrombus within the bile ducts is rare. In such cases, distinguishing tumor thrombus from intrahepatic cholangiocarcinoma is difficult. However, during peroral cholangiography (POCS), tumor thrombus of HCC is often recognized as a smooth, yellowish-white, polypoid tumor with neovascularization within the bile duct lumen [1-3]. This review primarily reports the macroscopic findings of the bile duct tumor thrombus of HCC on POCS.

CHARACTERISTIC POCS FINDINGS IN BILE DUCT THROMBUS OF HCC

HCC causing obstructive jaundice due to tumor thrombus within the bile ducts is often quite advanced at the time of onset, and hepatic resection has been considered difficult. Furthermore, HCC causing obstructive jaundice due to tumor thrombus within the bile ducts is frequently poorly differentiated and highly malignant. It also frequently resembles intrahepatic cholangiocarcinoma in terms of both clinical

presentation and radiological findings, making differentiation from intrahepatic cholangiocarcinoma challenging in many cases preoperatively. Clinical history factors such as underlying cirrhosis due to Hepatitis B Virus (HBV) infection or Hepatitis C Virus (HCV) infection, and laboratory values such as elevated serum Alpha-Fetoprotein (AFP) levels without elevated Carbohydrate Antigen 19-9 (CA 19-9) or Carcinoembryonic Antigen (CEA), are considered somewhat useful but limited in distinguishing HCC with tumor thrombus within the bile duct from intrahepatic cholangiocarcinoma. However, POCS proved useful in allowing direct characteristic findings of the HCC invading the bile duct; for example, a smooth, yellowish-white, polypoid tumor with neovascularization was clearly revealed within the bile duct (Figure 1a). Furthermore, using SpyBite MAX biopsy forceps, POCS enabled direct morphological assessment of characteristic POCS findings such as a smooth, yellowish-white polypoid tumor with neovascularization, acquisition of reliable tissue sampling, and direct visualization-guided targeted biopsy from the bile duct tumor thrombus of HCC and also provided a definitive pathological diagnosis for differentiation from intrahepatic cholangiocarcinoma (Figure 1b).

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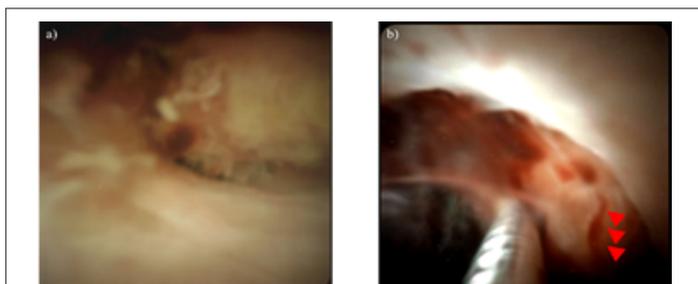


Figure 1

Figure 1: Findings on POCS, (a): POCS clearly reveals a smooth, yellowish-white, polypoid tumor with neovascularization within the right intrahepatic bile duct and (b): Biopsies from the tumor were performed under POCS using SpyBite MAX biopsy forceps. Neovascularization associated with HCC is observed (red arrowheads).

CHARACTERISTICS OF HCC OF BILE DUCT THROMBUS

HCC causing obstructive jaundice due to tumor thrombus formation within the bile ducts is frequently quite aggressive at the time of diagnosis, making liver resection challenging. Furthermore, HCC forming tumor thrombus within the bile ducts has been reported in multiple studies to exhibit shorter overall survival, more aggressive characteristics, and extremely poor long-term prognosis compared to HCC without such tumor thrombus formation within the bile ducts. HCC forming tumor thrombus within the bile ducts also possesses more aggressive biological characteristics, such as poor tumor differentiation, major vessel invasion, and lymph node metastasis compared to HCC without such tumor thrombus formation within the bile ducts [4, 5]. In addition, HCC forming tumor thrombus within the bile ducts also has been shown to have a higher incidence of post-liver-transplant recurrence in the retrospective study, although this finding is not observed in large-volume center studies [6]. Endoscopic Retrograde Cholangiopancreatography (ERCP) findings of HCC forming tumor thrombus within the bile duct reveal partial or complete obstruction due to an intraluminal shadow defect and proximal bile duct dilatation (Figure 2).

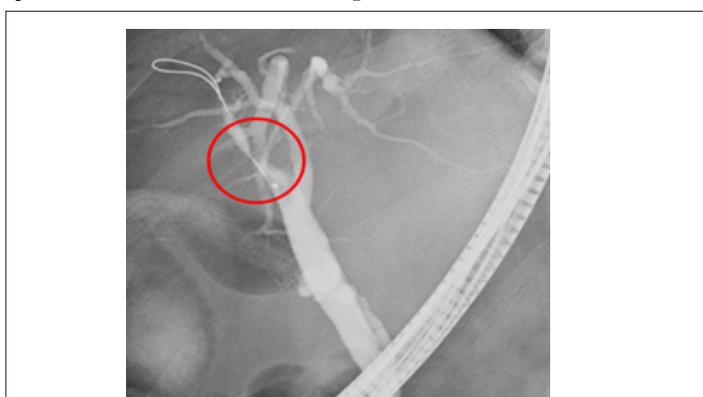


Figure 2

Figure 2: Findings on ERCP, ERCP reveals stenosis of the right intrahepatic bile duct due to invade HCC (red circle).

However, these cholangiographic features are not useful for the definitive diagnosis of bile duct invasion by HCC, necessitating additional investigations such as POCS. Nevertheless, the following points are cited in multiple literature as characteristic ERCP findings for HCC forming tumor thrombus in the bile duct: An oval-shaped shadow defect; a massive filling defect within the bile duct, but relatively inconspicuous dilation of the proximal bile duct and localized, short, and smooth bile duct stricture may be considered characteristic ERCP findings for HCC forming tumor thrombus within the bile duct [7-9].

DISCUSSION

HCC is a disease with a poor prognosis. It results in the third highest number of deaths from malignant neoplasms worldwide and the fifth highest in Japan [10]. HCC is conventionally considered to be associated with chronic liver inflammation and cirrhosis caused by HBV infection or HCV infection, alcoholic liver disease, or non-alcoholic steatohepatitis. However, recent advances in viral therapy, such as the use of nucleic acid analogues against HBV and Direct-Acting Antiviral Agents (DAAs) against HCV, have reduced the number of HCC cases caused by these viruses. Meanwhile, the number of non-B, non-C liver cancers developing in the context of alcohol-related liver disease or non-alcoholic fatty liver disease has increased [11, 12]. Risk factors for the development of HCC include old age, fibrosis, male sex, alcohol consumption, and diabetes mellitus. The high Sustained Virological Response (SVR) rate among patients receiving DAAs, which is also related to the increasing use of DAAs therapy even for HCV patients who were difficult to treat with interferon therapy, means the cumulative carcinogenesis rate is higher than during the interferon therapy era [13, 14]. Hepatocarcinogenesis has also been observed despite virus control. Post-SVR HCC occurs after HCV is eliminated by DAAs and is an important issue to address. This will help elucidate the risk factors for developing HCC among patients in whom HCV has been eliminated, and will enable the establishment of a surveillance system.

HCC frequently infiltrates the portal vein or hepatic vein to form tumor thrombus, but tumor thrombus in the bile duct is rare. In such cases, differentiation from intrahepatic cholangiocarcinoma is difficult, and the tumor often forms a smooth, yellowish-white polypoid tumor with neovascularization within the bile duct lumen during POCS [1-3]. HCC that causes obstructive jaundice due to tumor thrombus in the bile duct is called icteric-type hepatocarcinoma by Lin et al. in 1975, although it may not be evident at the initial diagnosis [15]. Furthermore, HCC causing obstructive jaundice due to tumor thrombus in the bile ducts comprises 0.5-12.9% of all liver cancer cases [16, 17]. Well-differentiated HCC typically exhibits an isovascular pattern in both the arterial and delayed phases. In contrast, moderately differentiated HCC usually retain the contrast agent in the early arterial phase on Contrast Enhanced Computed Tomography (CECT), but the contrast agent disappears in the venous phase [18]. However, some poorly differentiated HCCs show no early enhancement, which makes

differentiation from other malignancies difficult in some cases prior to surgery. Similarly, HCC forming tumor thrombus within the bile ducts also possesses more aggressive biological characteristics, such as poor tumor differentiation. Consequently, HCC forming tumor thrombus within the bile ducts does not present with typical HCC imaging findings, such as early arterial phase contrast retention and contrast washout in the venous phase on CECT, making preoperative differentiation from intrahepatic cholangiocarcinoma challenging.

Because of this possibility, it is important to plan POCS and perform ERCP primarily to confirm the pathological diagnosis. However, it is difficult to distinguish between HCC exposed in the right intrahepatic bile duct and intrahepatic cholangiocarcinoma based on ERCP findings alone. Therefore, we believe that performing POCS to biopsy from the tumor thrombus in the bile duct is extremely useful. POCS clearly revealed a smooth, yellowish-white, polypoid tumor with neovascularization within the right intrahepatic bile duct (Figure 1a). Biopsies of the tumor in the bile duct were performed under POCS using SpyBite MAX biopsy forceps (Figure 1b). These findings demonstrate that the utility of POCS in diagnosing HCC with bile duct invasion. Specifically, POCS enables direct morphological assessment of characteristic POCS findings such as a smooth, yellowish-white polypoid tumor with neovascularization, acquisition of reliable tissue sampling, and direct visualization-guided targeted biopsy from the tumor, thereby facilitating differentiation from intrahepatic cholangiocarcinoma.

CONCLUSION

HCC with obstructive jaundice due to tumor thrombus in the bile ducts is very rare. POCS proved useful in enabling the direct observation of characteristic findings of the HCC invading the bile ducts, the reliable biopsy of these areas under direct visualization and the pathological diagnosis of HCC forming tumor thrombus in the intrahepatic bile ducts rather than intrahepatic cholangiocarcinoma.

AUTHOR CONTRIBUTIONS

Conceptualization: Keisuke Kinoshita; Formal analysis and investigation: Keisuke Kinoshita and Kazuhisa Okamoto; Writing-original draft preparation: Keisuke Kinoshita; Writing-review and editing: Kazuhisa Okamoto, Masaaki Kodama and Kazunari Murakami.; Supervision: Kazunari Murakami. All authors have approved the final version of the paper.

DISCLOSURES

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3. Kinoshita K, Endo M, Tokumaru T, Saito T, Uchida T, Iwao M, et al. A Case of Obstructive Jaundice due to Bile Duct Tumor Thrombus of Hepatocellular Carcinoma Diagnosed by Peroral Cholangioscopy. *DEN open*. 2026;6(1):e70228.
4. Feng JK, Wu YX, Chen ZH, Sun JX, Wang K, Chai ZT, et al. The effect of bile duct tumor thrombus on the long-term prognosis of hepatocellular carcinoma patients after liver resection: a systematic review and meta-analysis. *Ann Transl Med*. 2020; 8(24):1683.
5. Yu XH, Xu LB, Liu C et al. Clinicopathological characteristics of 20 cases of hepatocellular carcinoma with bile duct tumor thrombi. *Dig Dis Sci* 2011;56:252-259.
6. Ha TY, Hwang S, Moon DB, Ahn CS, Kim KH, Song GW, et al. Long-term survival analysis of liver transplantation for hepatocellular carcinoma with bile duct tumor thrombus. *Transplant Proc* 2014 Apr 1;774-777. Elsevier.
7. Lau WY, Leow CK, Leung KL, Leung TW, Chan M, Yu SC. Cholangiographic features in the diagnosis and management of obstructive icteric type hepatocellular carcinoma. *HPB Surg*. 2000;11:299-306.
8. Qin LX, Tang ZY. Hepatocellular carcinoma with obstructive jaundice: diagnosis, treatment and prognosis. *World J Gastroenterol*. 2003;9:385.
9. Chiba M, Aokawa M, Goto T, Sato W, Takahashi K, Minami S, et al. Peroral cholangioscopy for the evaluation of bile duct stricture in hepatocellular carcinoma on a preoperative examination. *J Rural Med*. 2023;19:44-48.
10. Balogh J, Victor III D, Asham EH, Burroughs SG, Boktour M, Saharia A, et al. Hepatocellular carcinoma: A review. *J Hepatocellular Carcinoma*. 2016;3:41-53.
11. Tateishi R, Uchino K, Fujiwara N, Takehara T, Okanoue T, Seike M, et al. A nationwide survey on non-B, non-C hepatocellular carcinoma in Japan: 2011–2015 update. *J Gastroenterol*. 2019;54:367-376.
12. Kudo M, Izumi N, Kokudo N, Sakamoto M, Shiina S, Takayama T, et al. Report of the 22nd nationwide follow-up Survey of Primary Liver Cancer in Japan (2012–2013). *Hepato Res*. 2022 ;52:5-66.
13. Waziry R, Hajarizadeh B, Grebely J, Amin J, Law M, Danta M, et al. Hepatocellular carcinoma risk following direct-acting antiviral HCV therapy: a systematic review, meta-analyses, and meta-regression. *J Hepatol*. 2017;67(6):1204-1212.
14. Toyoda H, Tada T, Takaguchi K, Senoh T, Shimada N, Hiraoka A, et al. Differences in background characteristics of patients with chronic hepatitis C who achieved sustained virologic response with interferon-free vs. interferon-based therapy and the risk of developing hepatocellular carcinoma after eradication of hepatitis C virus in Japan. *J Viral Hepat*. 2017;24(6):472-476.
15. Lin TY, Chen KM, Chen YR, Lin WS, Wang TH, Sung JL. Icteric type hepatoma. *Med Chir Dig* 1975;4: 267-270.
16. Iijima H, Kudo M, Kubo S, Kurosaki M, Sakamoto M, Shiina S, et al. Report of the 23rd nationwide follow-up survey of primary liver cancer in Japan (2014–2015). *Hepato Res*. 2023;53(10):895-959.
17. Wu JY, Huang LM, Bai YN, Wu JY, Wei YG, Zhang ZB, et al. Imaging features of hepatocellular carcinoma with bile duct tumor thrombus: a multicenter study. *Front Oncol*. 2021;11:723455.
18. Tachibana Y, Takaji R, Maruno M, Honda K, Endo M, Murakami K, et al. LI-RADS classification and outcomes of hepatocellular carcinoma treated with transcatheter arterial chemoembolization plus radiofrequency ablation. *Cancer Diagn Progn*. 2022; 2(4):471.

Inoue T, Ohashi T, Nakade Y, Kobayashi Y, Ishii N, Ito K, et al.

Diagnostic utility of digital cholangioscopy for dislodged bile duct tumor thrombus of hepatocellular carcinoma. *Endoscopy*. 2017;49(S 01):E33-E44.

Moon DB, Hwang S, Wang HJ, Yun SS, Kim KS, Lee YJ, et al. Surgical outcomes of hepatocellular carcinoma with bile duct tumor thrombus: a Korean multicenter study. *World J Surg*. 2013;37(2):443-451.