A Case of Peritoneal Metastasis from Hepatocellular Carcinoma That Was Treated with Balloon-Occluded Transarterial Chemoembolization

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Peritoneal metastasis is a relatively rare manifestation of metastasis from hepatocellular carcinoma. The prognosis of peritoneal metastasis is generally poor, because multiple metastases can occur. It has been reported that hepatocellular carcinoma can be treated with balloon-occluded transarterial chemoembolization. However, there have been no reports of the treatment of peritoneal metastasis from hepatocellular carcinoma with transarterial chemoembolization. A 65-year-old man had a history of partial hepatic resection of segment 8 for hepatocellular carcinoma. At that time, a percutaneous tumor biopsy was performed. Follow up computed tomography showed hepatocellular carcinoma in segment 4, and peritoneal metastasis. Therefore, the patient was admitted for treatment of the hepatocellular carcinoma and its peritoneal metastasis. The feeding arteries to the peritoneal metastasis were identified and treated with balloon-occluded transarterial chemoembolization. Two months after transarterial chemoembolization, contrast-enhanced computed tomography showed greater than 50% tumor necrosis.

Key words: peritoneal metastasis, hepatocellular carcinoma, liver, transarterial chemoembolization

Introduction

Extrahepatic metastasis from hepatocellular carcinoma (HCC) is not as frequent as intrahepatic metastasis\(^1\). Peritoneal metastasis is a relatively rare manifestation of metastasis from HCC\(^1\). The causes of peritoneal metastasis are hemorrhage of HCC, subphrenic invasion of HCC, tumor biopsy, and local therapy\(^1\). The prognosis of peritoneal metastasis is poor, because multiple metastases occur and lead to abdominal hemorrhage or ileus.

A case of solitary peritoneal metastasis from hepatocellular carcinoma treated with balloon-occluded transarterial chemoembolization (B-TACE) is reported.

Case Presentation

A 65-year-old man was admitted to our hospital for treatment of HCC and its peritoneal metastasis. He had a history of partial hepatic resection of segment 8 for HCC. At that time, a percutaneous tumor biopsy was performed, and the pathological diagnosis was poorly differentiated hepatocellular carcinoma. He had no symptoms, and on physical examination, a tumor was palpable in the right upper abdomen. Blood examination showed thrombocytopenia (13.4 × 10^9/mm^3), elevated des-gamma-carboxy prothrombin (DCP; 2,972 AU/mL), and positive for hepatitis B surface antigen. Abdominal ultrasonography demonstrated a 40-mm, round, heterogeneous, hypoechic tumor under the right lateral abdominal wall (Fig. 1). Color Doppler sonography showed basket-like signals in the tumor. Ultrasonography also demonstrated two hepatic nodules, 30 mm and 20 mm, in segments four and six. Plain computed tomography (CT) showed a hypodense tumor under the abdominal wall, and contrast-enhanced CT showed total ring-enhancement in the arterial phase (Fig. 2). Contrast-enhanced CT also showed hepatic nodules with total enhancement in the arterial phase and hypo enhancement in the portal phase. The hepatic nodules were diagnosed HCC. Surgical resection was considered as therapy for the peritoneal metastasis, and abdominal angiography was performed for the intrahepatic HCC before surgery.

Celiac arteriography showed tumor stains in segment 4 of the liver and right lateral abdomen, apart from the liver. It also showed feeding arteries from the gastroduodenal artery (Fig. 3). The tumor stain in segment 4 was consistent with HCC.

Celiac arteriography showed a feeding artery for the peritoneal metastasis. So, TACE was performed.

A guiding catheter (Elway; Terumo Clinical Supply, Gifu, Japan) was placed into the gastroduodenal...
artery, and a 3.0-Fr micro balloon occlusion catheter (Attendant; Terumo Clinical Supply) was inserted into the branch of the omental artery arising from the right gastroepiploic artery. A micro balloon was inflated, and then TACE was performed with gelatin sponge particles (Gelpart; Astellas, Tokyo, Japan) after the injection of 20 mg of miriplatin hydrate (Miriplatin; Dainippon Sumitomo Pharma, Co.,

Tokyo, Japan)-lipiodol suspension (Fig. 4). Then, 40 mg of miriplatin-lipiodol suspension and Gelpart were injected from the other branch of the omental artery. This procedure was repeated at three peripheral branches. Contrast-enhanced CT a week after the procedure showed accumulation of lipiodol and no enhancement in the arterial phase (Fig. 5).

Two months after TACE, CT showed the tumor necrosis of higher 50% (Fig. 6). However, repeated TACE was performed because tumor vascularity was detected on contrast-enhanced CT.
Although technical success was achieved, peritoneal metastasis increased in size and vascularity 4 months later. Surgical resection was performed, and the patient died from other peritoneal and brain metastasis 10 months after TACE.

Discussion

Distant metastasis from HCC is relatively rare. Lung, lymph node, bone, and adrenal are frequently the organs of metastasis. Peritoneal metastasis from HCC is reported to be observed in 0.6% during surgery and 18.4% during autopsy. The causes of peritoneal metastasis are spontaneous hemorrhage of HCC, invasion to the diaphragm, and a history of tumor biopsy or local therapy, including percutaneous ethanol injection and radiofrequency ablation. In this case, the cause of peritoneal metastasis was considered the history of tumor biopsy.

Ding et al. reviewed the therapy and outcome of peritoneal metastasis from HCC. Cytoreductive surgery was performed in most cases, and their average overall survival was 26 months. The other reported therapies were hepatic artery infusion chemotherapy, tamoxifen, and interferon-alpha-2b and oral tegafur/uracil. Reports of TACE for peritoneal metastasis from HCC have been few. Miyayama et al. reported that TACE for peritoneal metastasis of HCC via the omental artery was safe and was technically feasible. Although multiple lesions are detected in many cases in this setting, TACE was chosen because the lesion was solitary, and the feeding arteries could be detected. Moreover peritoneal metastasis has a risk of spontaneous hemorrhage; we believe TACE is safe from this point of view.

B-TACE for HCC has been reported and used for prevention of backflow or reversing flow direction. A micro balloon catheter is a novel microcatheter dedicated to B-TACE. It enables dense lipiodol emulsion accumulation in HCC nodules through decreased blood pressure of the peripheral hepatic artery. Recent study revealed that local efficacy was significantly higher in nodules treated by B-TACE than by conventional TACE. In the present case, a micro balloon catheter was used to prevent backward flow into the omental artery. Outflow of gelatin sponges or anticancer agents into arterioles of the mesentery has led to severe intestinal injury. There were no adverse effects in the present patient, who did not develop fever. B-TACE for HCC via an omental artery has several advantages over conventional TACE. First, B-TACE can prevent backflow. Second, when the balloon occludes, the blood flow of the anastomosis between the peripheral branches of the omental artery is directed from other branches to the feeding artery. Thus, the risk of non-target embolization may be reduced by this procedure.

This is the first report of B-TACE for peritoneal metastasis from HCC. Clearly, the safety of this method for peritoneal metastasis cannot be determined based on a report of only one case. Further study is needed to prove the safety of this method for peritoneal metastasis.

References