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	作成者: Takahashi, Atsushi, Saito, Hironobu, Takahashi,
	Yuta, Sato, Ai, Takagi, Tadayuki, Irisawa, Atsushi,
	Sakuma, Fumitaka, Kuroda, Masahito, Tsuchiya, Takao,
	Ohira, Hiromasa
	メールアドレス:
	所属:
URL	https://fmu.repo.nii.ac.jp/records/2000021

Cyst-like Extension of hepatic subcapsular bleeding caused by ruptured Hepatocellular Carcinoma into the Bursa Omentalis

Running title: Cyst-like Extension by Ruptured HCC

Atsushi Takahashi, Hironobu Saito, Yuta Takahashi, Ai Sato, Tadayuki Takagi, Atsushi Irisawa, Hiromasa Ohira, Second Department of Internal Medicine, Fukushima Medical University School of Medicine, 1 Hikarigaoka, Fukushima 960-1295, Japan

Sakuma Fumitaka, Masahito Kuroda, Takao Tsuchiya*, Department of Internal Medicine and Surgery*, Fukushima Red Cross Hospital, 11-31 Iriecho, Fukushima 960-8530, Japan

Abstract

An 81-year-old man, who experienced upper abdominal pain after shoveling snow, was admitted to a local hospital where a computed tomography (CT) showed a cystic lesion adjoining the pancreas. He was transferred to our department for detailed investigations and treatment. On ultrasonography, a tumor of the caudate lobe of the liver, with which the cystic lesion was continuous, was seen. The tumor of the caudate lobe of the liver was enhanced in the early phase of the CT but was washed out in the delayed phase. Subsequently, T1-weighted and T2-weighted Magnetic Resonance Imaging (MRI) images showed a low intensity and a high intensity, respectively. Since the cystic lesion was continuous with the tumor of the caudate lobe of the liver, its CT value was higher than that of water, and both the T1-weighted and T2-weighted MRI images showed a high intensity, which was attributed to a hematoma. Examination of the image suggested that rupture of a hepatocellular carcinoma (HCC) might have caused intracavitary hemorrhage. After the HCC was treated by transcatheter arterial embolization therapy, the patient was discharged. Subsequently, tumor enlargement was confirmed, and surgical removal of the tumor was

conducted at the hospital where the patient had originally presented. On histology, moderately differentiated HCC was diagnosed, but the cyst-like lesion was confirmed to be a hepatic subcapsular hematoma extending into the bursa omentalis. Although ruptured HCC often causes intraperitoneal bleeding, this rare case showed a cyst-like imaging finding in the form of a subcapsular hematoma within the bursa omentalis.

Key words: ruptured HCC, cystic lesion, bursa omentalis.

Introduction

Rupture of hepatocellular carcinoma (HCC) is an important cause of HCC-related death. Most ruptured HCCs are located on the liver surface and often form an extrahepatic projection¹⁾. Most patients (70-90%) with HCC rupture present with sudden upper abdominal $pain^{2)-3}$. Of the imaging diagnostic modalities, CT is useful, showing evidence of fluid accumulation of uneven absorbance mixed with a high absorbance site near the tumor⁴⁾⁻⁵⁾. Although ruptured HCC usually causes intraperitoneal bleeding, we report a rare case in which bleeding attributable to hepatic subcapsular bleeding extended into the bursa omentalis and appeared as a cyst-like structure on imaging.

Case Report

An 81-year-old man developed sudden upper abdominal pain after shoveling snow on February 1, 2006. The pain worsened, and he was admitted to his local hospital. The pain subsided spontaneously after admission, but a CT scan showed a cystic lesion next to the pancreas. On March 1, he was transferred to our department for detailed investigation and treatment. The patient had no history of hepatic disorder, and his alcohol ingestion was occasional.

On admission, his conjunctivae were not anemic, and heart and respiratory sounds were normal. The patient's height was 155cm, his weight was 72Kg, and his body mass index was 29.9. Palpation of the abdomen revealed a soft mass accompanied by tenderness in the upper abdomen. Although admission laboratory examinations revealed a mild anemia (hemoglobin, 11.6 g/dl), biochemical tests showed no abnormal findings, such as inflammation or hepatic dysfunction. Hepatitis B surface antigen, hepatitis B core antibody, and HCV antibody were negative. Of the tumor markers, protein induced by vitamin K absence or antagonist II (48 mAu/ml, criterion <40) and α -fetoprotein (41.0 ng/ml, criterion \leq 10.0) levels were increased.

On abdominal ultrasonography, a hypoechoic tumor was seen in the caudate lobe of the liver, while the cystic lesion, which was continuous with the tumor, had extended to near the pancreas. Endoscopic ultrasonography showed that the internal part of the cyst had an isoechoic pattern that partly included a hyperechoic area, which was attributed to fibrin deposition. On CT, the tumor was enhanced in the early phase but was washed out in the late phase. On the coronal section, the cystic lesion was found to be connected to the tumor; it was presumed to be evidence of subcapsular bleeding (Figs.1A and 1B).

On MRI, the hepatic tumor showed a low intensity on T1-weighted imaging and a high intensity on T2-weighted imaging. The cystic lesion showed high intensity on both T1-weighted and T2-weighted imaging, but on T1-weighted imaging, there was a partly low-intensity area within the cystic lesion (Figs. 2A and 2B). Based on these imaging findings, the hepatic tumor was diagnosed as HCC, and the cystic lesion was considered to be bleeding within the bursa omentalis due to rupture of the HCC. Angiography of the hepatic arterial area confirmed that there was a feeding artery from a portion of the left hepatic artery to the tumor. From that site, transcatheter arterial embolization therapy was performed. Having made satisfactory progress, the patient was discharged from the hospital on April 25. However, a subsequent CT scan revealed enlargement of the hepatic tumor, so partial resection of caudate lobe and removal of the cystic lesion were carried out in June, 2006 (Figs. 3A). On pathology, the hepatic tumor was a moderately differentiated hepatocellular carcinoma, and its connected cystic lesion consisted primarily of bleeding and hematoma; it was circumfused with thick, fibrous, connective tissue (Figs. 3Band 3C). The bleeding of the ruptured HCC remained within the capsule of the liver and extended, resulting in the cystic finding. On the other hand, noncancerous liver tissues showed mild chronic hepatitis (Fig. 3D).

Discussion

Currently, HCC is often discovered at an early stage because of advanced imaging diagnostic technology and screening study. As in the present case, however, it is sometimes found accidentally as a result of its rupture. According to a Japanese report, fatal cases caused by intra-abdominal

7

bleeding associated with rupture account for 6.4% of all deaths of HCC patients. Therefore, such rupture is considered an important cause of death⁶⁾. The mechanisms of HCC rupture include mechanical stimulation of the carcinoma when a tumor mass projects out from the liver surface, increased intratumoral pressure attributable to bleeding or congestion within the tumor, and a functional problem of the intratumoral vessel^{2), 7).}

In the present case, the tumor was located on the surface of the caudate lobe of the liver, which was presumably compressed when the patient was shoveling snow. The symptoms associated with ruptured HCC often include upper abdominal pain²⁾⁻³⁾, which was also seen in the present case. In addition, when bleeding is excessive, evidence of peritoneal irritation, such as guarding, or hemorrhagic shock is detected¹⁾. In the present case, however, there was neither decreased blood pressure nor evidence of peritoneal irritation.

The bursa omentalis is located posterior to the stomach and anterior to the pancreas, with its superior recess close to the caudate lobe of the liver^{8)–10).} Although it communicates with the intraperitoneal part through an epiploic foramen, the fluid collection within the bursa omentalis can provide evidence to suggest malignancy of neighboring organs or the peritoneum. Iwasaki et al. and Lin CH et al. reported cases similar to the present one, in which HCC of the caudate lobe of the liver burst and caused a lesser sac hematoma^{11) -12)}. However, the mechanism of intracavitary hemorrhage caused by the ruptured HCC remains unclear. In the present case, bleeding was detected even in the subcapsule of the right hepatic lobe. As for its mechanism, inflammation at the site may have caused adhesion of an epiploic foramen, and the subsequent bleeding flowed into its nearby bursa omentalis. The present case and Lin CH et al. reported case are rare, in that the rupture of the HCC appeared as a cystic lesion. Moreover, the present case is very rare in that there are not major contibuing factors to carcinogenesis. We inferred that the bleeding remained in the hepatic subcapsule, from which the hepatic capsule extends into the bursa omentalis, appearing cyst-like. In fact, the external side of the HCC of the excised specimen was covered with thick fibrous connective tissues with no evidence of peritoneum. During the present patient's clinical course, although abdominal pain was present, the fact that the anemia was mild and the blood pressure was not decreased suggests that the rupture of the HCC remained within the hepatic

subcapsule.

As in the present case, it is important to consider rupture of HCC in the differential diagnosis of a cystic lesion connected to a liver tumor.

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Figure Legends

Figure1. Abdominal dynamic enhanced CT. The tumor was enhanced in the early phase. On sagittal section, the cystic lesion is associated with the caudate lobe tumor, and is located within the bursa omentalis (A). On the coronal section, an area can be seen that is connected to the tumor but not visualized in the right hepatic lobe subcapsule (B).

Figure2. Abdominal MRI images. The hepatic tumor (arrow) shows a low intensity on T1-weighted imaging (A) and a high intensity on T2-weighted imaging (B) . The cystic lesion shows high intensity on both T1-weighted (C) and T2-weighted imaging (D) with a partly low-intensity area within the lesion on T1-weighted imaging.

Figure3. The tumor (arrow) and hematoma are connected with fibrotic tissue (A). Histological examination of the tumor shows moderately differentiated hepatocellular carcinoma (B) and the cystic lesion consists primarily of bleeding and hematoma; it is circumfused with thick, fibrous tissues (C). Histological examination of the noncancerous liver tissue shows mild infiltration of mononuclear cells in portal tract. There are no

13

appearances of fibrosis or steatosis (D) (HE staining, $\times 100$).

Figure 1



A

B

Figure 2



Figure 3







