Spontaneous Rupture of Liver Plasmacytoma Mimicking Hepatocellular Carcinoma

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Abstract

Extramedullary plasmacytoma of the liver is rare. Here, we report a case presenting with rupture of extramedullary plasmacytoma of the liver. She had a past history of multiple myeloma with IgA λ type. Her serum was positive for hepatitis C virus infection and exhibited elevated levels of serum protein induced by vitamin K absence or antagonist-II. She was initially diagnosed as rupture of hepatocellular carcinoma (HCC) and then treated with transarterial chemoembolization (TACE) since bloody ascites and formation of hematoma were seen around hyper-vascular liver tumors on computed tomography. However, the clinical course of this case after TACE was atypical for HCC rupture, as shown by the development of a huge intra-abdominal abscess extending from the liver tumor. Immuno-histochemical analysis of the tumor biopsy specimen revealed massive infiltration of plasma cells expressing IgA and λ chain. To our knowledge, this is the first case of rupture of extramedullary liver plasmacytoma.

Key words: extramedullary plasmacytoma, rupture, liver


DOI: 10.2169/internalmedicine.49.3103)

Introduction

Multiple myeloma involves mainly the bone marrow and causes skeletal destruction, renal failure, anemia, and hypercalcaemia (1). Although plasma cell infiltration of the liver is detected in about 40% of patients with multiple myeloma at autopsy (2), it is rarely detected in living patients. Plasma cell infiltration of the liver in multiple myeloma can manifest as a nodular (3-8) or diffuse infiltration pattern (9-12). Extramedullary liver plasmacytoma causing nodular formation is visualized as either hypo-vascular or hyper-vascular tumors on computed tomography (CT) or magnetic resonance imaging (MRI) (4-8). Thus, radiological findings of extramedullary liver plasmacytoma are non-specific and liver biopsy against tumor is absolutely necessary for the definitive diagnosis of this disease.

Spontaneous rupture with intra-peritoneal hemorrhage is a life-threatening complication of hyper-vascular liver tumors such as hepatocellular carcinoma (HCC). Although some extramedullary liver plasmacytomas are visualized as hyper-vascular tumors (6-8), spontaneous rupture of liver plasmacytoma has not been reported. Here, we report a case of extramedullary liver plasmacytoma with spontaneous rupture whose radiological findings are very similar to those of HCC.

Case Report

A 76-year-old woman was admitted to Kyoto University Hospital due to severe abdominal pain with a sudden on-set. She had a past history of multiple myeloma with IgA λ type. Although she had been treated with melphalan and prednisolone, serum levels of IgA were not reduced by these chemotherapies. The laboratory data on admission revealed severe anemia (red blood cell count 2.23×10⁶/μL, hemoglo-
Figure 1. Rupture of hyper-vascular liver tumors in computed tomography (CT) and angiography. (A) Abdominal CT revealed liver tumors in S1 and S6 (arrows). The tumor at S1 was enhanced in the arterial-phase (top) and washed out in the portal-phase (bottom) in CT. Formation of hematoma (arrowheads) and accumulation of ascites were seen around the S1 and S6 tumors, respectively. (B) Tumor stains were detected in S1 (top, arrow) and S6 (bottom, arrows).

Patient was a 62-year-old man with a medical history of multiple myeloma with impaired kidney function. On the day after admission, normalization of kidney function by hydration led us to perform CT using contrast media. Abdominal dynamic CT revealed a hyper-vascular tumor at segment I (S1) of the liver (Fig. 1A). The tumor was enhanced at the arterial-phase and washed out at the portal-phase in CT, which was consistent with the HCC findings (Fig. 1A) (13). Another tumor without enhancement effect was detected at segment VI (S6) (Fig. 1A). Formation of hematoma and accumulation of ascites were seen around the tumors at S1 and S6, respectively. Based on these CT findings together with HCV infection and elevation of serum PIVKA-II, this case was diagnosed as spontaneous rupture of HCCs. Transarterial chemoembolization (TACE) was performed to control intra-peritoneal hemorrhage from liver tumors. Tumor stains were clearly visualized in S1 and S6 (Fig. 1B) by angiography and this patient was treated with chemoembolization using 30 mg of epirubicin hydrochloride and 6 mL of lipiodol via the hepatic artery.

Two weeks after the TACE, she suddenly developed a high fever with a marked elevation of serum levels of C-reactive protein (CRP, 35.5 mg/dL). Abdominal CT revealed accumulation of lipiodol in two liver tumors (Fig. 2). In addition, development of an intra-abdominal tumor (10.3 cm in diameter) was detected in CT. This encapsulated tumor
Figure 2. Development of an intra-abdominal abscess after transarterial chemoembolization via the hepatic artery. Development of an intra-abdominal abscess extending from the tumor at S1 was seen (arrowheads). Accumulation of lipiodol was also seen in two liver tumors (arrows).

Figure 3. Immunohistochemical analysis of the liver specimen obtained by biopsy against the tumor at S1. Massive infiltration of plasma cells expressing IgA was detected in the liver tumor (left; Hematoxylin and Eosin staining, middle; IgA staining, right; λ chain staining). Magnification; top×100, bottom×400.

was considered as an intra-abdominal abscess due to heterogenous enhancement effect. *Klebsiella pneumoniae* was detected from her blood and extrahepatic abscess. She was treated with administration of imipenem/cilastatin sodium and with placement of a drainage tube into the abscess.

Since the clinical course of this case after the TACE was atypical for that of HCC rupture, we reconsidered the diagnosis. In this regard, this patient had a history of multiple myeloma with IgA λ type, suggesting a possibility of extramedullary plasmacytoma of the liver. Liver biopsy against the tumor at S1 was performed to exclude this possibility. As shown in Fig. 3, histological examination revealed massive infiltration of plasma cells, most of which were positive for IgA staining. On higher magnification, it was clear that most of the cells exhibit characteristic features of plasma cells such as an eccentric nucleus with heterochromatin in a cartwheel or clock face arrangement. Moreover, IgA-expressing plasma cells co-expressed λ chain. These immuno-histocemical analysis strongly suggested extramedullary liver plasmacytoma with IgA λ type. It was less likely that the infiltration of plasma cells was associated with primary development of HCC since no hepatocytes were detected in the specimens. Consistent with this diagnosis, normalization of a serum level of PIVKA-II was seen after administration of vitamin K and fresh frozen plasma. Thus, an elevated serum level of PIVKA II on admission was associated with deficiency of vitamin K or coagulation factors. These results taken together support the diagnosis of rupture of extramedullary liver plasmacytoma.
Discussion

Plasma cell infiltration of the liver in multiple myeloma can be histologically classified into diffuse (9-12) or nodular forming pattern (3-8). The latter histological pattern corresponds to the clinical manifestation of extramedullary liver plasmacytoma which can be radiographically detected as space-occupying lesions. Although patients with extramedullary liver plasmacytoma show a variety of symptoms such as abdominal pain, back pain, and jaundice (3-8), spontaneous rupture of liver plasmacytoma has not been reported. Thus, to our knowledge, this is the first case of a patient presenting with intra-abdominal hemorrhage due to rupture of extramedullary liver plasmacytoma.

The radiographic findings of extramedullary plasmacytoma are non-specific. It can be visualized as hyper-vascular or hypo-vascular nodules on enhanced CT or MRI (14). Thus, radiographic examinations alone are not enough for the diagnosis of this disease, and pathological examinations are absolutely necessary. Extramedullary liver plasmacytoma of the present case showed enhancement and wash-out effects at the arterial and portal phases of dynamic CT study, respectively. These CT findings were consistent with those of HCC (13), and thus led us to the initial diagnosis of HCC rupture. The elevation of the serum level of PIVKA-II, a typical tumor marker for HCC, and infection with HCV supported the diagnosis. However, this case was finally diagnosed as rupture of extramedullary liver plasmacytoma by pathologic examinations. Thus, the present case suggests that we need to bear in mind a possibility of extramedullary liver plasmacytoma when liver tumor is detected in patients with multiple myeloma. In such cases, liver biopsy against plasmacytoma are non-specific. It can be visualized as hyper-vascular or hypo-vascular nodules on enhanced CT or MRI (14). Thus, radiographic examinations alone are not enough for the diagnosis of this disease, and pathological examinations are absolutely necessary. Extramedullary liver plasmacytoma of the present case showed enhancement and wash-out effects at the arterial and portal phases of dynamic CT study, respectively. These CT findings were consistent with those of HCC (13), and thus led us to the initial diagnosis of HCC rupture. The elevation of the serum level of PIVKA-II, a typical tumor marker for HCC, and infection with HCV supported the diagnosis. However, this case was finally diagnosed as rupture of extramedullary liver plasmacytoma by pathologic examinations. Thus, the present case suggests that we need to bear in mind a possibility of extramedullary liver plasmacytoma when liver tumor is detected in patients with multiple myeloma. In such cases, liver biopsy against tumors is required to exclude the possibility of liver infiltration of plasma cells even if tumors show characteristic findings of HCC.

The clinical course after TACE was complicated in this case as shown by the development of septicemia due to an intra-abdominal abscess. Abscess formation is not a rare complication of TACE for HCC therapy. In fact, about 2.5% of patients who received TACE exhibited this complication (15). However, most abscesses associated with TACE procedure are localized in the liver and extrahepatic development is rare (15). In this case, abdominal CT revealed extrahepatic development of a huge abscess. Thus, the pattern of abscess formation after TACE was atypical and unique in this case as compared with that after TACE for HCC therapy. The exact mechanisms leading to the formation of a huge extrahepatic abscess remain currently unknown since no report is available regarding complications associated with TACE for rupture of extrahepatic medullary plasmacytoma. In this regard, we considered the following two possibilities. First, it is well established that patients with multiple myeloma are immuno-compromised hosts (1). Thus, the immuno-suppressive state of the patient with multiple myeloma might cause the development of a huge abscess. However, extrahepatic development of the abscess seen in this case cannot be explained by this idea. Another possibility is related to the pre-existing hematoma around the tumor at S1. Given that the bowel-derived bacteria, Klebsiella pneumoniae, was isolated from this abscess, the colonization of this bacteria from the bowel into the hematoma might have enhanced the development of the extrahepatic huge abscess. The localization pattern of the pre-existing hematoma and post-TACE abscess supports this view.

Given the fact that plasma cell infiltration of the liver is detected in about 40% of patients with multiple myeloma at autopsy (2), HCC accompanied by infiltration with plasma cells can occur in patients with multiple myeloma and liver cirrhosis. However, this possibility is less likely in the present case since no hepatocytes were detected in the biopsy specimens of the liver tumor and tumor cells consisted of monoclonal plasma cells expressing λ chain and IgA. Normalization of a serum level of PIVKA-II after administration of vitamin K and fresh frozen plasma supports this idea.

In conclusion, we report a case of patient with spontaneous rupture of extramedullary liver plasmacytoma. Although extramedullary liver plasmacytoma is very rare, it is important to take this disease into consideration for the differential diagnosis of liver tumors in patients with multiple myeloma.

References


