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Case Report

Unusual computed tomography features of ruptured sarcomatous hepatocellular carcinoma

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Abstract

Sarcomatous change in hepatocellular carcinoma (HCC) is an uncommon histologic variant of HCC, characterized by the proliferation of spindle cells or bizarre giant cells. Poor outcome has been reported in most cases after diagnosis. Here, we report the first case of a sarcomatous HCC with complete central necrosis and rupture of the liver capsule. The patient received target therapy with sorafenib, but died of progressive intra-abdominal carcinomatosis 3 months after treatment. We reviewed the published reports of 13 patients with sarcomatous HCC that included computed tomography features and found that our patient was the only one to have received sorafenib. It appears that this patient's life span was not significantly prolonged with the use of sorafenib.

Keywords: hepatocellular carcinoma; rupture; sarcomatous; sorafenib

1. Introduction

Sarcomatous hepatocellular carcinoma (HCC) is an uncommon form of primary liver tumor. The incidence of sarcomatous HCC has been reported to be 3.9–9.4% in patients with primary liver cancer.[1] The pathogenesis of sarcomatous HCC remains unknown. Kakizoe and colleagues[2] reported that the sarcomatous component of HCC is derived from a dedifferentiation of anaplastic changes in ordinal HCC rather than from collided double cancer. Kojiro et al[3] reported that the incidence of sarcomatous HCC was higher in patients who had received transarterial embolization or hepatic arterial infusion. They also observed that the serum alpha-fetoprotein (AFP) level was greater in patients with ordinary HCC than in those with sarcomatous HCC. Sarcomatous HCC is known to be associated with central necrosis and hemorrhage more frequently than ordinary HCC, because the sarcomatous component consists of poorly differentiated cells that grow rapidly, with the neovasculature unable to supply the fast-growing malignant cells adequately, resulting in central necrosis.[4] In this report, we present a case of ruptured sarcomatous HCC, which manifested atypical computed tomography (CT) features. Early recognition of sarcomatous HCC appears important, and surgical intervention to resect the tumor is indicated for patients with this unfavorable variant.

2. Case report

A 49-year-old man presented with epigastric pain that had persisted for 5 months and weight loss of 5 kg in 2 months. A physical examination revealed epigastric tenderness. Laboratory

Conflicts of interest: The authors declare that there are no conflicts of interest related to the subject matter or materials discussed in this article.

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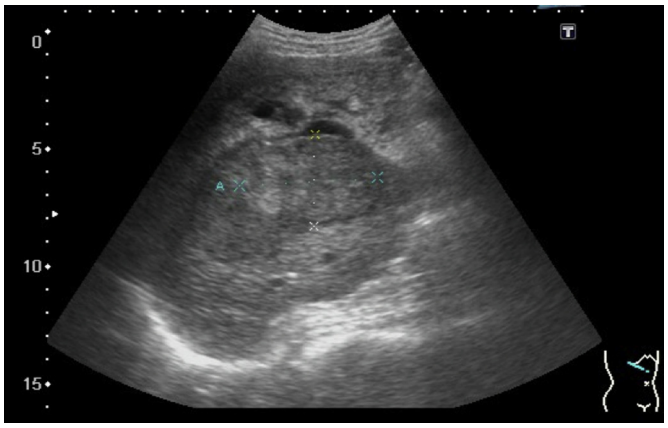

Fig. 1. Abdominal sonography showing a 5.9 × 3.9 cm heterogeneous mass in segments 5–7 of the liver.

studies showed the following levels of biochemicals: aspartate aminotransferase, 103 IU/L (normal range: 5–34 IU/L); alanine aminotransferase, 57 IU/L (normal range: 7–55 IU/L); total bilirubin, 0.5 mg/dL (normal range: 0.2–1.2 mg/dL); AFP, 1270 ng/mL (normal: <10 ng/mL); and carcinoembryonic antigen, 1.62 ng/mL (normal: <5 ng/mL). Hepatitis C antibody was negative, but hepatitis B virus surface antigen was positive. Abdominal ultrasonography revealed a heterogeneous tumor, 5.9 × 3.9 cm in size, in the right lobe of the liver (Fig. 1). The CT of the abdomen revealed a cirrhotic appearance of the liver with a cystic hepatic mass measuring 9.0 × 9.5 × 9.3 cm in segments 5–7. The mass had caused liver rupture and outside extension to the adjacent peritoneum (Fig. 2, white arrows). The hepatic mass had a complete cystic appearance and did not show evidence of contrast enhancement or early washout during dynamic CT scan (Fig. 2A–D). There was no enhancing soft-tissue component within the mass. The portal vein was patent. Accordingly, the CT features of this hepatic mass were not typical for HCC. Sonography-guided liver biopsy was performed, which showed a poorly differentiated carcinoma with extensive tumor necrosis and scant residual hepatocytes. Necrotic tumor tissues were dominant in the central area of the tumor, whereas viable tumor cells were predominant over the peripheral regions. The tumor comprised an epithelial component with somewhat trabecular and/or glandular structures and focally sarcomatous differentiation characterized by bizarre, spindle-shaped tumor cells (Fig. 3A and B). Immunohistochemical studies demonstrated that these tumor cells were immunoreactive to cytokeratin (CK) AE1/AE3 (Fig. 3C), CK 7, and vimentin (Fig. 3D), but negative for Hepar-1, CD31, CD34, C-kit, CD68, smooth muscle actin, and S100. Based on the radiologic features, histopathologic findings, and immunohistochemical results, HCC with sarcomatous change was diagnosed.

The patient refused surgical resection, radiofrequency ablation (RFA), or transarterial chemoembolization (TACE) and received target therapy with sorafenib and underwent outpatient department follow-up. The patient was admitted to the hospital several times because of refractory ascites, diarrhea, and abdominal distention with frequent vomiting, due to disease progression with carcinomatosis over the whole abdominal cavity. The patient died in the hospital 3 months after diagnosis.

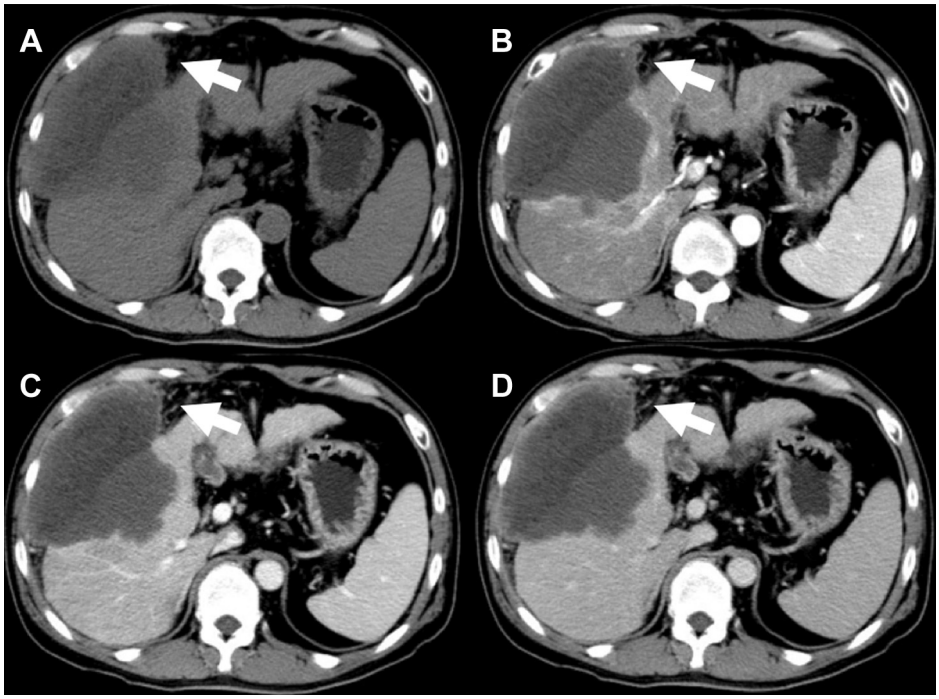

Fig. 2. Computed tomography (CT) of the abdomen revealing a cirrhotic appearance of the liver with a complete cystic mass measuring 9.0 × 9.5 × 9.3 cm (white arrows) in segments 5–7. (A) Noncontrast and dynamic CT; (B) arterial; (C) portal; and (D) delay phases demonstrated that the cystic mass showed no contrast enhancement or early washout. The portal vein was patent, and no peripheral bile duct dilatation was seen.

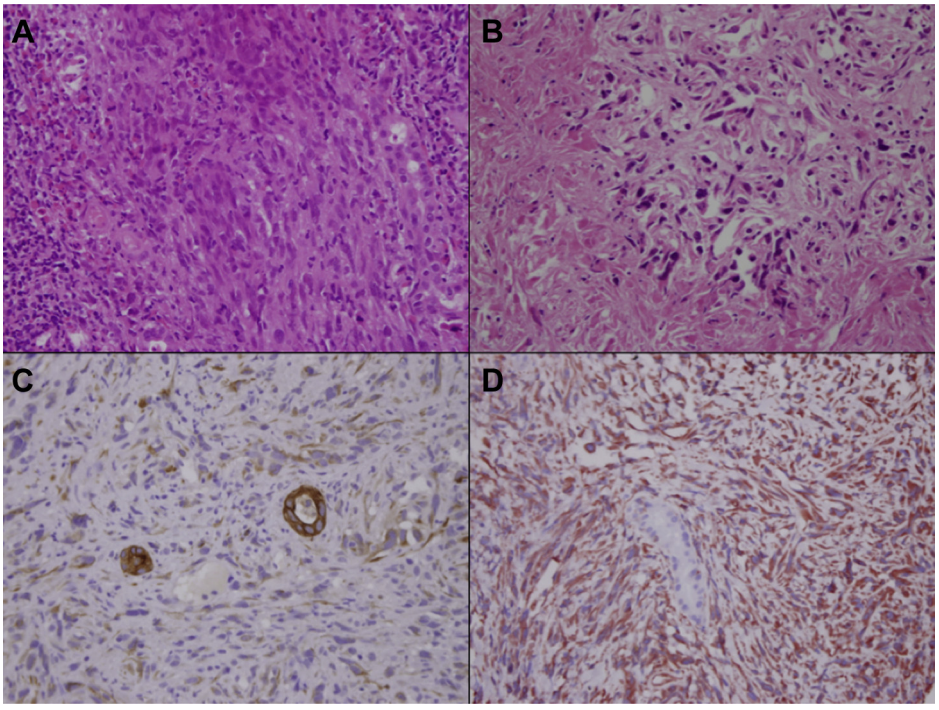

Fig. 3. (A) Liver core needle biopsy showing a poorly differentiated carcinoma with focal spindle cell transformation. (B) Pleomorphic and hyperchromatic spindle tumor cells (right and upper part) with prominent tumor necrosis (left and lower part); hematoxylin and eosin staining. (A) Original magnification 200× and (B) 400×. Immunohistochemical examination revealed that sarcomatous elements were positive for (C) cytokeratin AE1/AE3 and (D) vimentin.

3. Discussion

We searched the PubMed database for case reports on sarcomatous HCC published in English (articles published between 2001 and 2011 were searched) using the following keywords: "sarcomatous" and "hepatocellular carcinoma". The inclusion criteria were availability of full text and papers with CT or magnetic resonance imaging features. A total of 13 cases were found.[5–17] The clinical and image features of the 13 previous cases of sarcomatous HCC and our case are summarized in Table 1. Central necrosis, which is the predominant CT feature of sarcomatous HCC, was seen in 12 of the 13 tumors (92.3%); among these cases, the present case showed a huge, homogeneous mass with complete central necrosis and rupture of the

Table 1
Clinical findings of sarcomatous hepatocellular carcinoma in 14 patients.

Case	Sex	Age (y)	AFP (ng/mL)	Central necrosis	Soft tissue part	Liver capsule rupture	Treatment	Complication	Follow-up[a]	Reference
1	Male	71	1.3	+	+	+	Supportive	Leukemoid reaction	Dead (7 mo)	5
2	Male	73	120.9	+	+	−	Surgical resection	No recurrence	Alive (19 mo)	6
3	Male	56	3	+	+	−	Surgical resection with liver transplantation	Local recurrence	Dead (3 mo)	7
4	Male	66	536	+	+	−	Surgical resection	Hepatic failure	Dead (3 mo)	8
5	Male	63	848	+	+	+	Surgical reaction	Local recurrence, distal metastasis	Dead (8 mo)	9
6	Male	72	WNL	+	+	−	Surgical resection	No recurrence	Alive (30 mo)	10
7	Male	79	3772	+	+	−	Surgical resection	ND	Alive (12 mo)	11
8	Male	53	323	−	+	−	Surgical resection with liver transplantation	Distal metastasis	Dead (12 mo)	12
9	Male	66	4.7	+	+	−	Surgical resection, TAE	Local recurrence, distal metastasis	Dead (4 mo)	13
10	Male	72	17.1	+	+	−	Surgical resection	ND	ND	14
11	Male	74	WNL	+	+	−	TACE	Leukemoid reaction	Dead (2 mo)	15
12	Male	70	WNL	+	+	+	Surgical resection	Distal metastasis	Dead (1 mo)	16
13	Male	59	3	+	+	−	Surgical resection, chemotherapy	ND	Alive (12 mo)	17
Present	Male	49	1270	+	−	+	Target therapy	Hepatic failure	Dead (3 mo)	—

AFP = alpha-fetoprotein; ND = not described; TACE = transarterial chemoembolization; TAE = transarterial embolization; WNL = within normal limits.
[a] Duration since diagnosis.

liver capsule and with no contrast enhancement or washout lesion on three-phase dynamic contrast-enhanced CT. Thus, the case presented here represents an extremely unusual CT presentation of sarcomatous HCC.

The prognosis is poor in patients with sarcomatous HCC, due to its significantly higher frequency of recurrence or metastasis compared with ordinary HCC.[7] Most patients die within 1 year, even after undergoing anticancer therapy such as chemotherapy or radiotherapy. In the cases reviewed here, 11 patients underwent surgery and four of these patients (36.3%) survived more than 1 year. According to the American Association for the Study of Liver Diseases (AASLD) practice guidelines,[18] our patient was classified as HCC, Barcelona Clinic Liver Cancer (BCLC) Stage C and was not resectable. The patient refused to undergo TACE and therefore sorafenib was administrated, a multikinase inhibitor with activity against Raf-1, B-Raf, vascular endothelial growth factor receptor 2, platelet-derived growth factor receptor, and c-Kit receptors. Sorafenib is now the first-line target therapeutic agent for patients with unresectable HCC who are not suitable for RFA or TACE.

In conclusion, sarcomatous HCC is a rare variant of HCC, and central necrosis is the most common CT feature of these tumors. Patients with HCC should be evaluated first for surgical resection. If the HCC is not resectable, other local therapy (such as RFA) or TACE should be considered. Based on the AASLD guidelines, for patients with advanced stage (BCLC Stage C) HCC but Child classification A, like the case presented here, the treatment of choice is the target therapy with sorafenib. The patient died 3 months after sorafenib treatment due to poor response. The poor outcome might have been too late for the recognition of the HCC (liver capsule rupture). Early recognition of the tumor and surgical resection may have a better prognosis in some patients.

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