

• Case Report •

A case of primary liver carcinosarcoma: CT findings

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[Abstract] Primary liver carcinosarcoma is extremely rare. We report a case of liver carcinosarcoma in a 58-year-old man, which was identified by pathologic and immunohistochemical (IHC) examinations. Plain CT scans showed a hypodense mass in the right liver lobe adjacent to the gallbladder fossa. The triple-phase contrast CT scans showed a mixed density mass with inhomogeneous enhancement. Multiple cystic nodules with irregular rim enhancement of the margin located in the tumor. The gallbladder wall and transverse colon were involved. CT presentations of liver carcinosarcoma were unspecific and the pre-operative diagnosis is difficult.

Key words: Carcinosarcoma, liver, CT

Primary liver carcinosarcoma is extremely rare, and is comprised of a mixture of carcinomatous and sarcomatous elements [1-3]. Less than 20 cases of liver carcinosarcoma with complete records have been reported [3,4]. This disease usually happened in old men with liver cirrhosis or fibrosis, and has a predilection for the light liver lobe [1-5]. The preoperative diagnosis of liver carcinosarcoma is usually difficult. We report a case of liver carcinosarcoma and its CT findings.

Case description

A 58-year-old man was admitted to the Affiliated Hospital of Ningbo University School of Medicine because of fever and syncope. He had a history of hepatitis for more than 20 years, and had poor appetite for 4 months with a weight loss of 20 kg within 1 month. On physical examination, the abdomen was febrile, without palpable mass, while with percussion tenderness over the hepatic region. Complete blood count showed an elevated level of leukocytes ($11.6 \times 10^9/L$), eosinophilia, and a slight anemia. Biochemical indices of liver function were normal. Serum level of carcinoembryonic antigen (CEA) was $3.30 \mu\text{g/L}$ (normal range, $< 9.7 \mu\text{g/L}$); serum level of α -fetoprotein (AFP) was $3.0 \mu\text{g/L}$ (normal range, $< 9.0 \mu\text{g/L}$); serum level of carbohydrate antigen 19-9 (CA19-9) was 16.69 U/mL (normal range, $< 37.0 \text{ U/mL}$). Hepatitis B surface antigen (HBsAg),

hepatitis B e-antigen (HBeAg) and anti-hepatitis B core antigen (anti-HBc) were all positive. Serum markers for hepatitis C were negative. Human immunodeficiency virus (HIV) was negative.

An abdominal ultrasonogram showed a heterogeneous echogenic, well-defined, irregular solid mass in the right liver lobe adjacent to the gallbladder fossa. Color Doppler ultrasonogram revealed rich tumor vascularity. Axial abdominal CT demonstrated a hypodense mass in the right lobe adjacent to the gallbladder fossa, measuring about $5.0 \text{ cm} \times 6.0 \text{ cm}$ in maximal transverse dimensions. Axial triple-phase contrast CT revealed a cystic solid mass with heterogeneous density, rim enhancement at the margin, and a non-enhanced necrotic area. The mass presented "quick painting and quick fainting", with obvious enhancement in hepatic arterial phase, weakened enhancement in portal vein phase and isodensity enhancement in equilibrium phase. Multiple hypodense nodules were seen in peripheral liver tissues. The gallbladder wall was thickened with homogeneous enhancement (Figure 1).

The patient underwent exploratory laparotomy and partial hepatectomy 3 weeks after admission. Abdominal exudate (light yellow) was seen. The mass was firm, with grayish white surface, while without capsule. The mass was located in the surface of the right anterior segment of the liver adjacent to the gallbladder fossa with gallbladder wall and transverse colon invasion, and some metastatic nodules in the left and right liver lobes were found.

Macroscopically, the cystic and solid mass was well-demarcated, in grayish white, with necrosis and myxoid change in the center as well as cirrhotic change in surrounding parenchyma. Microscopically, with HE staining, two components of the mass were observed: the epithelial (carcinomatous) component was composed of epithelial cancer cells; the mesenchymal (sarcomatous) component was composed of spindle-shaped cells scattered in a background of epithelial cells.

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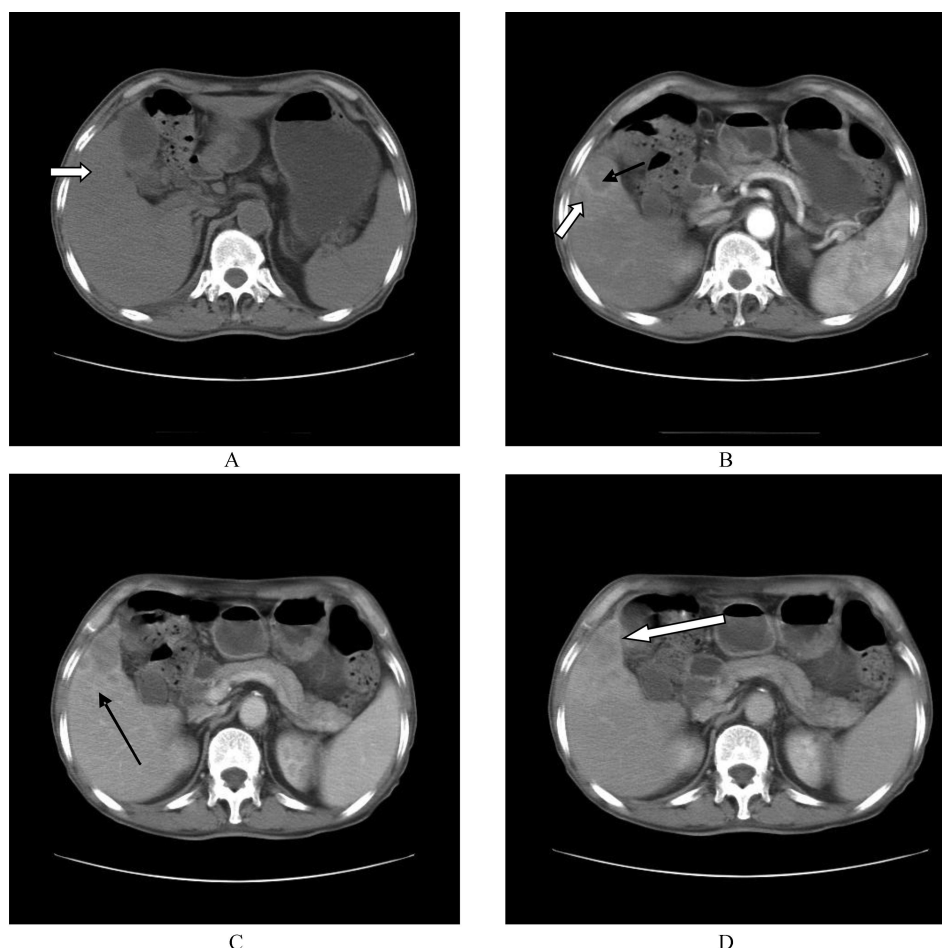


Figure 1 CT images of a 58-year-old male patient with primary liver carcinosarcoma

A, Plain CT scan shows a single hypodense lesion in the right liver lobe adjacent to the gallbladder fossa (white arrow). B, Contrast CT scan in hepatic arterial phase shows obvious enhancement in the solid component (white arrow), and subtle rim enhancement in the cystic component (black arrow). C, Contrast CT scan in portal vein phase shows well obvious enhancement in the solid component, no enhancement in the cystic component, and multiple hypodense nodules in surrounding liver tissues (black arrow). D, Contrast CT scan in equilibrium phase shows isodensity enhancement in the solid component, no enhancement in the cystic component, and gallbladder wall invasion (white arrow).

The two components were lying separately without obvious transition zone between them (Figure 2A). The immunohistochemistry revealed that the epithelial component was positive for cytokeratin (CK) and epithelial-specific antigen (ESA), but was negative for actin (HHF35), smooth muscle actin (SMA) and vimentin, and the mesenchymal component was positive for HHF35, SMA and vimentin, but was negative for CK and ESA (Figures 2B-E); both components were negative for alpha-fetoprotein (AFP), desmin and vimentin. All antibodies were purchased from Maixin-Bio Corporation. Diagnosis of liver carcinosarcoma was made, based on the histopathologic findings.

The patient received postoperative chemoradiotherapy. His general condition gradually worsened and he died of hepatic failure after five months.

Discussion

Carcinosarcoma is most commonly occurred in the esophagus, ovary, uterus and urinary bladder [5]. Primary liver carcinosarcoma is mainly occurred in older men (34-84 years

old), with a man-predominance, unspecific clinical manifestations, such as abdominal pain or distention, anorexia and weight loss^[1-4], usually with liver cirrhosis or fibrosis^[1-3]. The mass has a predilection for the right liver lobe.

The World Health Organization (WHO) defined liver carcinosarcoma as a tumor that showed both carcinomatous (either hepatocellular or cholangiocellular) differentiation and sarcomatous differentiation without obvious transition zone between them [1]. By this definition, our case met the criteria for liver carcinosarcoma. Liver carcinosarcoma should be mainly differentiated from sarcomatoid carcinoma and sarcomatoid cholangiocarcinoma. Immunohistochemical staining should be done to determine the nature and source of spindle cells if the tumor of the liver is composed of both carcinoma and spindle cells. If the sarcomatous component areas are positive for epithelia-originated markers, while the mesenchymal component areas are negative, it would be diagnosed as sarcomatoid carcinoma of the liver. The definition of sarcomatoid cholangiocarcinoma is bile duct cancer accompanying with other sarcoma structures, such as spindle cell sarcoma, or

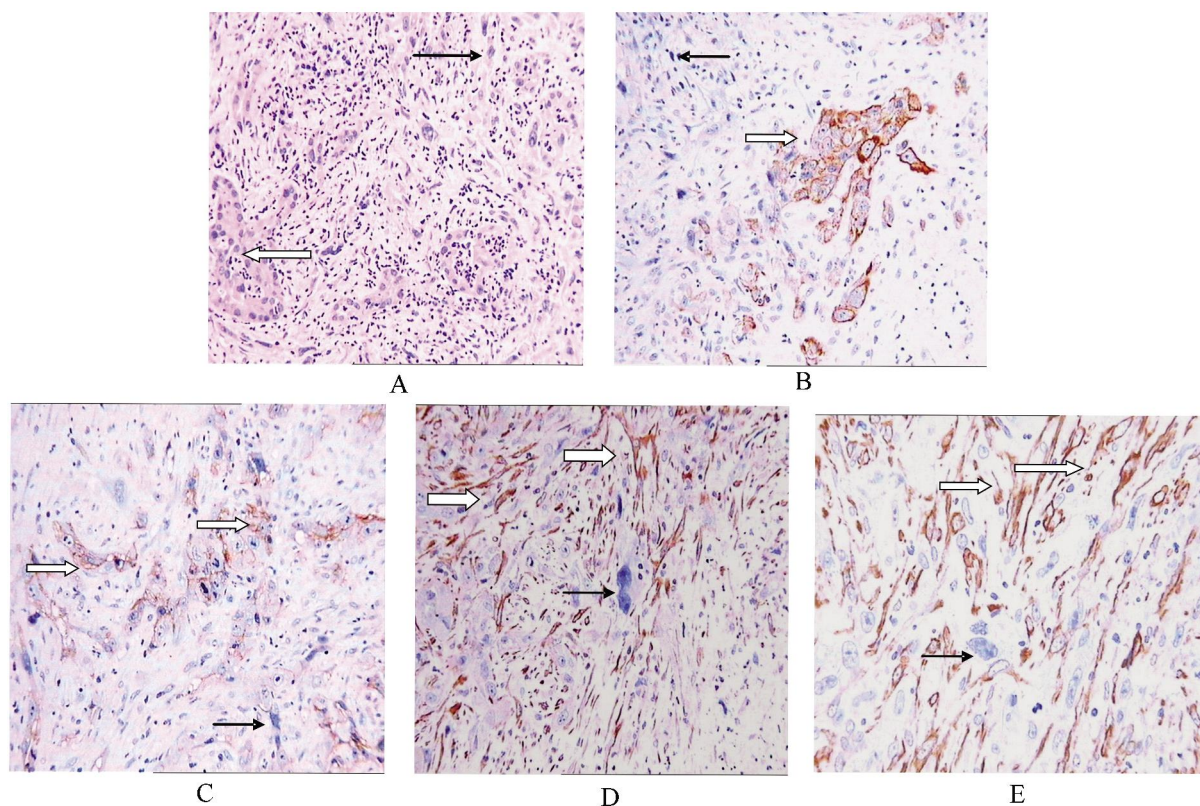


Figure 2 Histopathologic features of primary liver carcinosarcoma

A, The tumor mass is composed of epithelial cell clusters (white arrow) and scattered spindle-shaped atypical cells (black arrow) without obvious transition zone between them (HE $\times 200$). B, The epithelial component is positive for cytokeratin (white arrow), but the mesenchymal component is negative (black arrow) (IHC $\times 400$). C, The epithelial component is positive for epithelial specific antigen (white arrows), but the mesenchymal component is negative (black arrow) (IHC $\times 400$). D, The epithelial component is positive for actin (HHF35) (white arrows), but the mesenchymal component is negative (black arrow) (IHC $\times 400$). E, The epithelial component is positive for smooth muscle actin (white arrows), but the mesenchymal component is negative (black arrow) (IHC $\times 400$).

fibrosarcoma, or malignant fibrous histiocytoma, with obvious transition zone between the two components.

In literature, most reports on primary liver carcinosarcoma are case reports, lacking systematic report on imaging findings. Summarizing related reports on CT findings of primary liver carcinosarcoma published between 1999 and 2007^[3-9], most cases showed a single mass, round or oval in shape, without capsule, with a predilection for the right lobe; plain CT scans showed hypodense-to-isodense or solid component with cystic change; contrast CT scans showed a mass with mixed density and variable enhancement, subtle irregular rim enhancement in cystic lesions, as well as multiple nodules in surrounding liver tissues; dynamic contrast CT scans showed obvious enhancement in the solid component, presenting gradually delayed enhancement in most cases as well as "quick painting and quick fainting" enhancement (hyperdense in the hepatic arterial phase and hypodense in portal venous phase) in a few cases. Primary liver carcinosarcoma is an aggressive tumor, it often invade adjacent organs, such as the stomach, kidneys and gallbladder^[5-7].

For our patient, CT scans showed a hypodense lesion in the right lobe of the liver, contrast CT scans showed the mass with mixed density, obvious enhancement in the solid components, subtle irregular rim enhancement in the cystic components, and irregular rim enhancement in multiple hypodense nodules. Both

the gallbladder wall and transverse colon were involved.

Primary liver carcinosarcoma is rare, with unspecific CT presentations. The pre-operative diagnosis is difficult. It is diagnosed according to its histological features. Liver carcinosarcoma should be included in the differential diagnosis of the liver masses in older man patients.

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