Case report

Rare CT and MR imaging features of scirrhous hepatocellular carcinoma with gross specimen and pathologic correlation: Case report and review of the literature

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Received 2 May 2015; revised 8 July 2015; accepted 21 September 2015
Available online 29 July 2015

Abstract

Scirrhous hepatocellular carcinoma, which is rare, has been identified as one of the histological subtypes of hepatocellular carcinoma. The typical CT and MRI imaging features of SHCC is hypo-attenuating or hypointensity masses with peripheral enhancement in the arterial phase, followed by centripetal enhancement during portal venous and equilibrium phases [1,2]. In this report, we present a 65-year-old woman suffering from SHCC with rare CT and MR imaging features.

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Keywords: Hepatocellular carcinoma; ‘Scirrhous’ type; Computed tomography; Magnetic resonance imaging; Contrast agent

1. Introduction

Scirrhous hepatocellular carcinoma (SHCC), which is rare, has been identified as one of the histological subtypes of hepatocellular carcinoma (HCC). SHCC is pathologically characterized by an abundant fibrous stroma in which cords of neoplastic tumor cells are embedded [3]. Diffuse fibrosis (scirrhous change) is frequently reported in cases of hepatocellular carcinoma treated by various anticancer therapies such as chemotherapy, irradiation and transcatheter arterial embolization, but similar changes could also be occasionally observed in HCC without anticancer therapies. Histologically, SHCC is characterized by diffuse fibrosis along the sinusoid-like blood spaces with varying degrees of atrophy of tumor trabeculae [4]. To date, imaging studies, such as CT and MRI, about the diagnosis of SHCC are extremely rare. Due to the rarity and general unawareness of scirrhous hepatic carcinoma, it might be misdiagnosed as one of the other malignant hepatic tumors with abundant fibrosis. Here, we present a case of poorly differentiated SHCC with atypical CT and MRI findings.

2. Case report

A 65-year-old woman with chronic liver disease was admitted in January 2013 for further examination of a 50-mm hypoechoic mass in segment six (S6). The patient had no history of alcoholism, blood transfusion or drug abuse. On admission, physical examination showed no remarkable abnormalities. Laboratory studies disclosed that HBsAg, HBeAb and HBcAb were positive, and hepatitis C virus was negative. Other laboratory studies disclosed no abnormalities. The levels of tumor markers were as follows: AFP 4.5 ng/mL (normal, <10 ng/mL), CA19-9 15.9 U/mL (normal, 0—37 U/mL).

US disclosed a 50-mm hypoechoic mass in S6. MDCT revealed a low-density lobulated mass with a distinct margin on the non-enhanced scanning, and light heterogeneous
enhancement in the arterial phase, ring and prolonged enhancement in the interior of the tumor during portal venous and equilibrium phases, as well as an enhancement-free low-density area in the center of the tumor (Fig. 1). There was a surface retraction adjacent to the tumor. MRI revealed homogeneous hypointensity at T1WI (FLASH) and heterogeneous hyperintensity at fat-suppressed T2WI (BLADE) and heterogeneous hyperintensity at DWI (EPI, b = 800 s/mm²) sequences. Contrast-enhanced MRI (3D-VIBE) also revealed light heterogeneous enhancement in the early phase and progressing ring enhancement in the interior of the tumor in the portal venous phase and equilibrium phase (Fig. 2). Based on these imaging findings, the tumor was diagnosed as a hepatic neoplasm only. We conducted right hepatic segmentectomy for the SHCC and chemotherapy after operation. Macroscopically, the mass was whitish in color, solid, lobulated and not encapsulated (Fig. 3). Histologically, the tumor was poorly-differentiated HCC characterized by typical cytological and structural atypia with dense fibrosis (Fig. 4). Immunohistochemically, the tumor was positive for hepatocyte paraffin 1 (Hep par 1), GPC-3, cytokeratin 7(CK7), cluster of differentiation 34(CD34), cluster of differentiation 56 (CD56), and negative for cytokeratin 19(CK19), CD54, CD133, vimentin, SYN, and Ki-67 about 50%. From the above findings, the tumor was diagnosed as SHCC. Intrahepatic recurrence has been observed over a period of 5 months (Fig. 2F). Then we conducted CT-guided radiofrequency ablation for the recurrence.

3. Discussion

Since scirrhous hepatic carcinoma was firstly introduced by Omata, only a few reports have described this rare malignant hepatic tumor [5]. Imaging studies, such as MDCT and MRI, for the diagnosis of SHCC remain extremely rare [1,5]. Regarding terminology, SHCC was often confused with
‘sclerosing hepatic carcinoma’ that was used to designate a variety of tumors with sclerotic change and hypercalcemia arising from non-cirrhotic livers [5]. However, sclerosing hepatic carcinoma did not constitute a distinct histopathological entity as some of these tumors appear to be HCC, but others cholangiocarcinoma. Therefore, it was deleted from the WHO classification [4,6]. Matsuura et al. [7] defined ‘scirrhous’ as an area with scattered cords or nests of tumor cells in an abundant fibrous stroma, which accounted for more than a quarter of the entire area, as shown by light microscopy and Masson trichrome staining. Next, scirrhous HCC was defined as a tumor in which the scirrhous area made up more than half of the largest section. WHO has defined SHCC as a scirrhous growth pattern characterized by marked fibrosis along the sinusoid-like blood spaces with varying degrees of atrophy of tumor trabeculae [6].

Fibrosis in the tumor can be classified into the following three patterns: (1) fibrosis extending along the sinusoid-like blood spaces with atrophy of tumor trabeculae; (2) dense fibrosis with hyalinization separating the tumor into various sizes of tumor nests; and (3) fibrosis with a lamellar pattern. Many of these three types of fibrosis coexisted to various degrees in most cases [8].

Previous research presented that pathologically confirmed SHCC accounted for 4.5% of the total confirmed cases of hepatocellular carcinoma in the same period. Furthermore it was unveiled that the prognosis of SHCC was as good as that of HCC [2]. Besides, the clinical backgrounds of SHCC are not significantly different from those of non-SHCC with regard to age, gender, positive rates to hepatitis viruses, AFP levels, Child-Pugh classification, and stage of tumor-node-metastasis [8].

The proportion of fibrous capsules in the scirrhous HCCs was significantly lower than that in ordinary HCCs. Necrosis was found in significantly lower proportions in the scirrhous HCCs than in ordinary HCCs. Portal tracts in the tumor were unveiled in scirrhous HCCs at a significantly higher rate than in ordinary HCCs [7]. SHCC is characterized by its unique location. Most SHCC are peripherally-located and surface retraction adjacent to the tumor is common [2,8].

Imaging studies for (about) SHCC are rare. Kim et al. [1] reported that for CT enhancement pattern, all tumors showed hypovascular masses with peripheral enhancement in hepatic arterial phase, followed by centripetal enhancement progressively during portal venous and equilibrium phases. Centripetal enhancement during portal venous and equilibrium phases appeared to be either concentric or irregular. In the author’s previous study [2] about CT and MRI features of SHCC, the dynamic enhanced CT and MRI appearances of SHCC can be divided into 3 types: (1) Peripheral rim enhancement in the arterial phase, followed by centripetal enhancement during portal venous and delayed phases (46.9%, 15/32). (2) No enhancement or light heterogeneous enhancement in the interior of the tumor in the arterial phase, peripheral enhancement and separate enhancement in the interior of the tumor on the delayed phase (46.9%, 15/32). (3) Small nodular-like enhancement in the early phase and wash-out during portal venous and late phase (6.2%, 2/32). The characteristic imaging features of SHCC is centripetal and prolonged enhancement during multiphasic dynamic imaging [1,2]. In this case, the imaging feature of contrast-enhanced CT and MRI was very special, characterized by light heterogeneous enhancement in the arterial phase, ring and prolonged...
enhancement in the interior of the tumor during portal venous and equilibrium phases, which did not conform to the imaging characteristics of SHCC or intrahepatic cholangiocarcinoma (ICC). Based on these imaging findings, the tumor was diagnosed as a hepatic neoplasm only before operation.

SHCC is frequently misdiagnosed as intrahepatic mass-forming ICC, and combined HCC-CCC or metastatic carcinoma is characterized by abundant fibrous stroma. The misdiagnosis can be attributed to the prolonged enhancement of the tumor in the equilibrium phase and heterogeneous enhancement in the arterial phase on contrast-enhanced CT and MRI [9–12].

In summary, radiologists and clinicians engaged in hepatology should exercise caution with suspected SHCC when imaging studies reveal atypical findings, especially as shown in our case without any liver disease.

Author contributions

Feng Chen, Da-Wei Zhao, Hong-Jun Li, Jin-Li Ding designed and performed the research; Feng Chen performed the radiology research; Ji-Liang Feng performed the pathology research; Feng Chen wrote the paper.

References