

Nodular focal fat sparing of liver mimicking hepatocellular carcinoma in contrast-enhanced ultrasound

A case report

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Abstract

Introduction: Focal fatty sparing is a manifestation of fatty liver. Nodular focal fatty sparing of liver sometimes is a mimicker of malignant lesion, especially metastatic tumor. There are some case reports about this kind of tricks revealed by computed tomography (CT) and magnetic resonance imaging. However, few reports described nodular focal sparing of liver presenting an enhancement mode of hepatocellular carcinoma (HCC) in contrast-enhanced ultrasound (CEUS).

Patient concerns: A 37-year-old male had a long history of alcohol abuse and hepatitis B virus infection. Routine blood examination showed an elevation of triglyceride, and tumor markers were unremarkable. Conventional ultrasound indicated a diffuse fatty liver with a hypoechoic nodular lesion. CEUS revealed hyperenhancement in arterial phase and washout in late phase of this hypoechoic lesion. Contrast-enhanced CT showed a similar enhancement mode of the mass with CEUS.

Diagnosis: A clinical diagnosis of HCC was made. Then, liver resection was conducted. Postoperative histopathologic and immunohistochemical results of the lesion revealed no presence of tumor cells except for heterogeneous hepatic steatosis. So a final diagnosis of hepatic focal fatty sparing was determined.

Interventions: Liver resection was conducted according to the clinical diagnosis of HCC.

Outcomes: After general postoperative administration, the patient was told to discharge. Then, he had been undergoing regular serological tests and imaging examinations in our hospital for 39 months and found no manifestation of liver tumor.

Conclusion: According to guidelines, it is typical that hepatic focal fatty change (FFC) presents a mode of persistent iso-enhancement in CEUS. However, atypical enhancement presence of FFC in imaging examinations may occur and lead to misdiagnosis, which calls for more attention.

Abbreviations: CEUS = contrast-enhanced ultrasound, CT = computed tomography, FFC = focal fatty change, HBV = hepatitis B virus, HCC = hepatocellular carcinoma, MRI = magnetic resonance imaging.

Keywords: case report, CEUS, focal fatty sparing, liver

1. Introduction

Fatty liver can be diffuse or focal presented in imaging examinations. Hepatic focal fatty change (FFC) may reveal a mass-like appearance, but it is easily diagnosed in general. The

typical presence of hepatic FFC in contrast-enhanced ultrasound (CEUS) is persistent iso-enhancement compared with liver parenchyma,^[1,2] while in magnetic resonance imaging (MRI) shows a signal drop of T1-weighted gradient-echo out-of-phase image.^[3] However, there are some case reports revealed that hepatic FFC can be a mimicker of malignant lesions (especially metastatic tumor) in computed tomography (CT) and MRI.^[4,5] Besides, few report described the malignant enhancement pattern of hepatic FFC in CEUS. In this case report, we discussed a hepatic FFC (nodular focal fat sparing) presenting an enhancement mode of hepatocellular carcinoma (HCC) in CEUS.

2. Case presentation

A 37-year-old male complained of mild right epigastric pain for 3 days when he came to our hospital. He had a history of hepatitis B virus (HBV) infection for 16 years, and alcohol abuse for 15 years. There was nothing special about his physical examination.

Routine blood tests showed an elevation of triglyceride (2.83 mmol/L) (normal range, 0.29–1.83 mmol/L). HBV test showed that HBsAb, HBeAb, and HBcAb were positive. Serum level of HBV DNA was <10,000 copies/mL. Tumor markers (alpha

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fetoprotein, carcinoembryonic antigen, carbohydrate antigen 19-9) were negative.

His conventional ultrasound examination illustrated a hypoechoic, not well-circumscribed, nodular lesion on Segment VI, compared with the hyperechoic and coarse liver parenchyma. The size of the lesion was about 2.8×2.0 cm (Fig. 1A–C). Then, CEUS examination using contrast agent SonoVue was performed. Compared with background liver parenchyma, the lesion presented a slight and homogeneous hyperenhancement in the arterial phase (about 0–29 seconds after injection of contrast agent), an iso-enhancement in the portal venous phase (about 30–89 seconds after

injection), and a slight and homogeneous washout in the delayed phase (more than 90 seconds after injection) (Fig. 1D–F). Contrast-enhanced CT showed a similar enhancement mode of the lesion with CEUS. Two imaging examinations indicated a diagnosis of HCC.

A combined imaging finding with his history of long-term HBV infection and alcohol abuse, a clinical diagnosis of HCC was made. Therefore, the patient underwent partial hepatectomy of the right lobe.

Postoperative histopathologic test revealed an extensive hepatocellular steatosis (more than 75%) of background liver

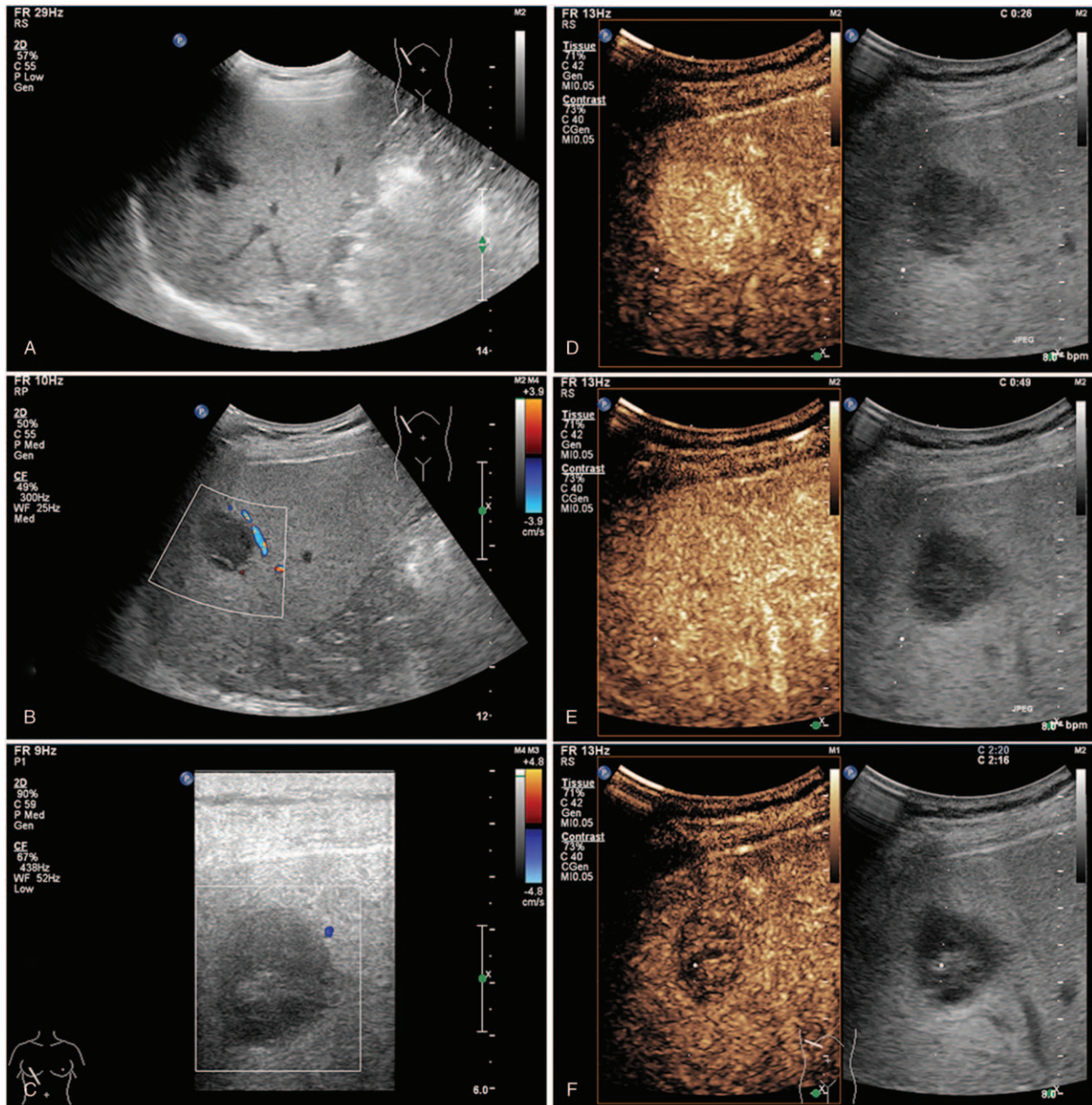


Figure 1. Ultrasound findings of the lesion. Panels A to C were conventional ultrasound images. A hypoechoic, not well-circumscribed, nodular lesion on Segment VI, compared with the hyperechoic and coarse liver parenchyma. The size of the lesion was about 2.8×2.0 cm. Panels D to F were images of contrast-enhanced ultrasound. The lesion illustrated (D) a slight and homogeneous hyperenhancement in the arterial phase, (E) an iso-enhancement in the portal venous phase, and (F) a slight and homogeneous washout in the delayed phase.

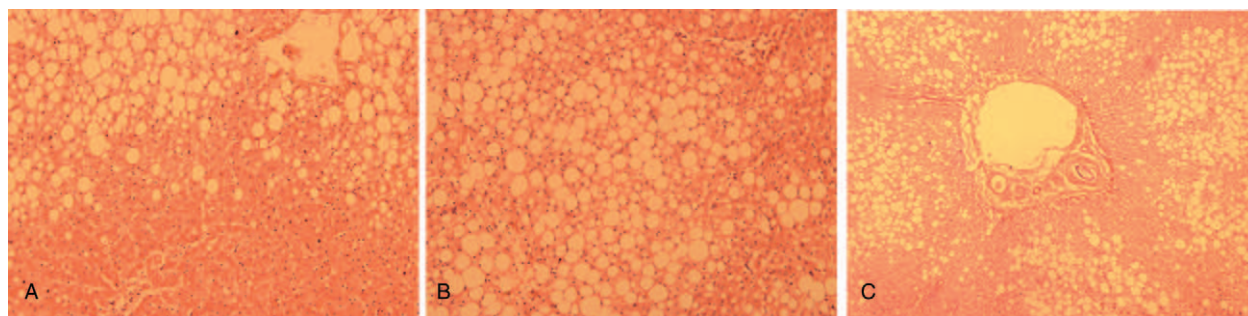


Figure 2. Posthepatectomy pathologic images of the lesion, with hematoxylin–eosin stain. (A) Margin of the lesion, compared with steatosis of liver parenchyma (original magnification, $\times 20$). (B) Steatosis of background liver (original magnification, $\times 20$). (C) Portal area found in the lesion (original magnification, $\times 10$).

parenchyma, visible regenerate hepatocyte and proliferative Kupffer cell, and an area of normal hepatic structure. No round or polygonal liver cell with clear or eosinophilic cytoplasm and dense nuclei was found (Fig. 2).

After general postoperative administration, the patient was told to discharge. Then, he had been undergoing regular serological tests and imaging examinations in our hospital for 39 months, and found no manifestation of liver tumor.

Ethical approval was not required, because this paper is a case report with the clinical information of the patient. Informed written consent of publishing this case report and accompanying images were obtained from the patient.

3. Discussion

Fatty liver is a worldwide healthcare problem, and alcoholic liver disease and nonalcoholic liver disease are the most common causes.^[6] Fatty liver may present as diffuse or focal pattern. Diffuse fatty liver usually appears an increase of echogenicity in conventional ultrasound,^[7] and lower attenuation value compared with spleen in CT scan.^[3] Hepatic FFC may present a mass-like appearance, but it is easy to diagnose in general, with a typical persistent iso-enhancement pattern in CEUS,^[8,9] or a hypoattenuation of fatty infiltration in CT.^[10]

In this case, conventional ultrasound revealed a hypoechoic lesion in the hyperechoic background liver, without typical features of focal fatty sparing (wedge-shaped appearance, location near gallbladder, or penetration by branches of portal or hepatic veins).^[11] Furthermore, the hypoechoic lesion illustrated homogeneous arterial phase hyperenhancement and late phase washout, which were the typical enhancement patterns of HCC according to CEUS Liver Imaging Reporting and Data System.^[12] Besides, long-term HBV infection and alcohol abuse increased the probability of diagnosis with HCC. However, postoperative histopathologic result was focal fatty sparing.

The possible reason for this unusual CEUS enhancement pattern of focal fatty sparing might be regional vascular malformation. We think that arteriovenous shunt may be the main cause of this focal fatty sparing presenting like a hypervascular tumor in imaging examinations.

Previous reports demonstrated similar cases of the misdiagnosis. Some of them revealed multiple hepatic focal areas of persistent reduced attenuation in contrast-enhanced CT, or diffused hepatic lesions of increased signal intensity in arterial phase in contrast-enhanced MRI. Then, the imaging diagnosis with liver metastases was made; however, the histopathologic

diagnosis confirmed to be hepatic FFC.^[4,13] To our knowledge, it was the first case report about an unusual CEUS enhancement pattern of arterial phase hyperenhancement and late phase washout with a histopathologic diagnosis of hepatic focal fatty sparing.

In conclusion, although persistent iso-enhancement is well known for diagnosis with hepatic FFC according to CEUS guidelines,^[14] unusual enhancement mode of focal fatty sparing mimicking malignant tumor may occur, which requires combination with additional methods to determine the treatment plan of the patient.

Author contributions

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Writing – review & editing: Rong Fu, Tingting Qiu, Yan Luo.

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