

Small hypovascular hepatocellular nodules: Association with signal intensity at SPIO-enhanced MR imaging in cirrhotic livers

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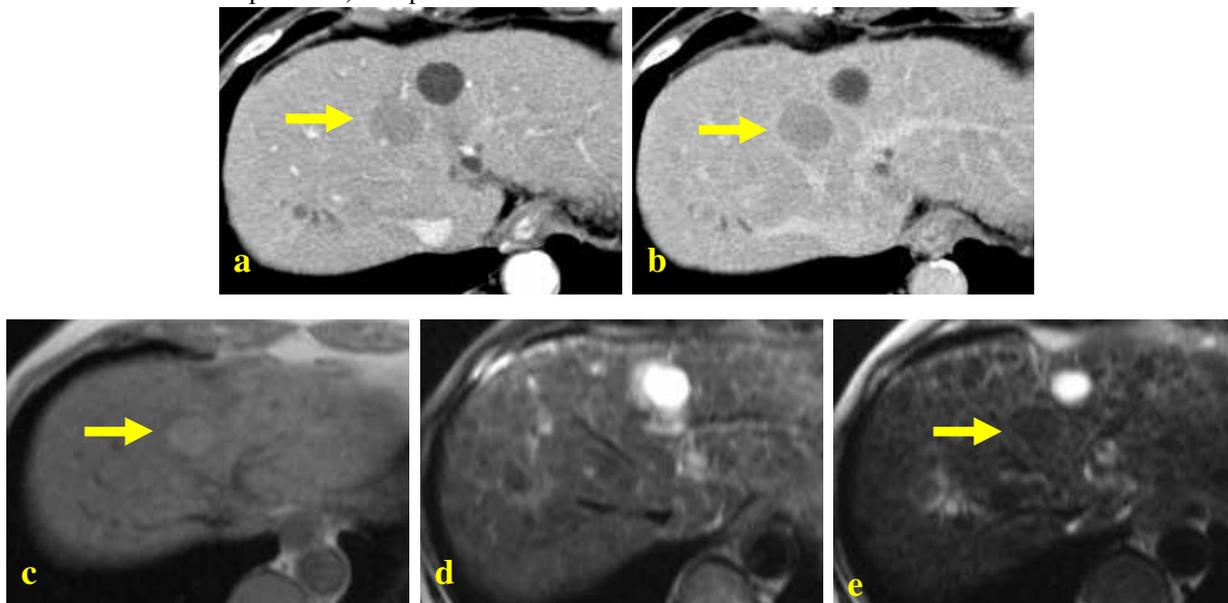
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Purpose: Classic HCCs show discrete early enhancement on the arterial phase and decline on the late phase of multiphase contrast-enhanced dynamic CT. However, we have sometimes encountered small hypovascular hepatocellular lesions in cirrhosis seen as slightly low-attenuated nodules at equilibrium phase CT without early arterial enhancement. Superparamagnetic iron oxide (SPIO) are taken up by the Kupffer cells, resulting in a signal intensity loss on T2- and T2*-weighted MR images. The presence or absence of Kupffer cells in cirrhotic nodules has been shown to be closely related to the degree of differentiation of hepatocellular lesions. The purpose of this study was to evaluate signal-intensity patterns of small hypovascular hepatocellular lesions at SPIO-enhanced MR imaging.

Materials and Methods: This study included 67 hypovascular (iso- or low-attenuation at arterial-phase CT and slight low-attenuation at equilibrium-phase CT, compared with surrounding liver parenchyma) hepatocellular lesions (HCC or dysplastic nodule) in 47 patients (26 men and 21 women; mean age, 66.7 years; age range 48-83 years) with chronic hepatitis or cirrhosis who underwent multiphase (arterial, portal and equilibrium phase) contrast-enhanced dynamic helical CT. Hepatocellular lesions ranging from 5 to 46 mm in diameter (mean 14.3 mm). Signal-intensity patterns of the lesions in SPIO-enhanced MR imaging were evaluated by two radiologist experienced in liver MR imaging, and categorized as 3 types (high-, iso-, and low-signal intensity), compared with surrounding liver parenchyma.

Result: Thirty-four (51%) of 67 lesions showed iso-signal intensity on SPIO-enhanced MR imaging, indicating preserved Kupffer cells and their functions. Twenty-one (31%) of 67 lesions showed low-signal intensity on SPIO-enhanced MR imaging, suggesting increased Kupffer cells as well as their hyperfunctions within the lesions, compared with surrounding liver parenchyma. Conversely, twelve (18%) of 67 lesions showed high-signal intensity on SPIO-enhanced MR imaging, indicating decreased Kupffer cells.

Conclusion: Most hypovascular hepatocellular lesions seen at multiphase contrast-enhanced dynamic CT in cirrhosis showed iso- or low-signal intensity at SPIO-enhanced MR imaging, indicating that these lesions tended to possess an almost identical or higher number of Kupffer cells in the nodules than the surrounding liver tissues. This fact may suggest close association between intranodular blood supply and SPIO uptake (numbers and functions of Kupffer cells) of hepatocellular lesions.



Hypovascular Hepatocellular Lesion with Increased SPIO Uptake

(a) Arterial-phase CT shows a hepatic lesion without early enhancement (arrow). (b) On the equilibrium-phase CT, this lesion is demonstrated as slightly low-attenuated area (arrow), indicating a hypovascular nodule. (c) On the T1-weighted MR image before SPIO, the lesion shows high-signal intensity (arrow). (d) On the T21-weighted FSE image before SPIO, the lesion shows iso-signal intensity compared with surrounding liver parenchyma. (e) On the T2-weighted FSE image after SPIO, the lesion shows low-signal intensity (arrow), indicating increased Kupffer cells within the nodule, compared with surrounding liver tissues.