

Hepatocellular adenoma and the surrounding liver: a spectrum of characteristic findings at state-of-the-art MR imaging, with histopathological correlation

I. C. van den Bos¹, S. M. Hussain¹, P. E. Zondervan², P. A. Wielopolski¹, J. N. IJzermans³, R. A. de Man⁴

¹Radiology, Erasmus Medical Center, Rotterdam, Netherlands, ²Pathology, Erasmus Medical Center, Rotterdam, Netherlands, ³Surgery, Erasmus Medical Center, Rotterdam, Netherlands, ⁴Gastroenterology, Erasmus Medical Center, Rotterdam, Netherlands

Purpose:

To describe and illustrate the spectrum of imaging findings of hepatocellular adenoma and the surrounding liver at state-of-the-art MR imaging and to analyse the abnormalities observed in the surrounding liver parenchyma, with histopathological correlation.

Material and Methods:

MR images of 51 hepatocellular adenomas (HA) in 13 patients were retrospectively assessed at state-of-the-art MR imaging. All patients were female, with a mean age of 39 years (range: 21-52 years). Ten patients used oral contraception at presentation, one had glycogen storage disease. Mean size of the lesions was 24.5 mm (range 8-110 mm). The liver was assessed for size, shape, extent of fatty infiltration, homogeneity of signal intensity and signs of liver cirrhosis. All lesions were assessed for presence of secondary features such as pseudocapsule, fatty or hemorrhagic components, and signal intensity, with calculation of contrast-to-noise ratio (CNR). Percentage of enhancement in dynamic gadolinium(gad)-enhanced imaging was calculated for both liver and lesions. Histopathology sections of the liver were assessed, including fatty infiltration, fibrosis, aspect of cytoplasm, arrangement in plates and vessel structure.

Results:

The liver showed either partial or total enlargement in all patients, and moderate to severe fatty infiltration in 10 of 13 patients. No signs of cirrhosis were observed. Signal intensity of the liver was inhomogeneous in the following sequences: opposed-phase T1w gradient-echo (GRE), T2w fast spin-echo (FSE fatsat), diffusion-weighted black-blood echo-planar imaging (BBEPI) and in the arterial phase of gad-enhanced imaging; most likely because of a combination of fatty infiltration and vascular malformation with shunting. At histopathological analysis of the liver, abnormally wide portal tracts with periportal neovascularity were observed in 89%, inflammatory infiltration in 90% and subtle periportal fibrotic changes in 44%, which may also account for the inhomogeneity observed at MR imaging. The lesions showed fatty infiltration in 78%, diffuse or focal hemorrhage in 12% and a pseudocapsule in 29%. On in-phase T1w GRE, most lesions were isointense whilst on opposed-phase T1w GRE, lesions were slightly to markedly hyperintense due to fatty infiltration of the liver. On single-shot T2w FSE (SSFSE), the lesions were mostly isointense, whilst on fat-suppressed T2w sequences, including FSE fatsat and BBEPI, signal intensity was slightly to markedly hyperintense. Calculated CNR showed high values for BBEPI and FSE fatsat compared to SSFSE; and for opposed-phase compared to in-phase T1w GRE. Dynamic gad-enhanced imaging showed intense arterial enhancement of the lesions compared to the liver (Fig 1).

Conclusion:

Our study indicates that: 1) morphology and signal intensity of the liver has changed in most patients with HA, with either partial or total enlargement of the liver, moderate to severe fatty infiltration and inhomogeneity at multiple sequences; 2) histopathology of the liver in case of HA shows vessel malformation, inflammatory infiltration and subtle periportal fibrotic changes; 3) accumulation of fat is present in >70% of HA; 4) enhancement of HA is early and intense.

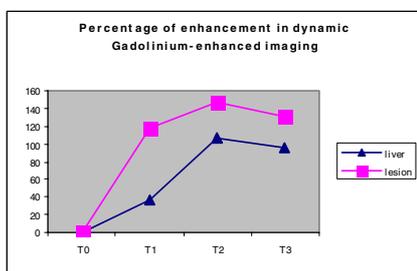


Fig 1: Percentage of enhancement of liver and lesions in dynamic gadolinium-enhanced imaging.

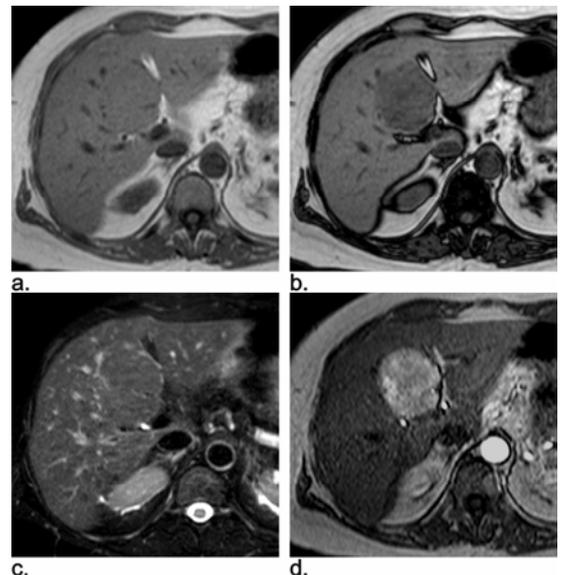


Fig 2: Classic adenoma: a) in-phase T1w GRE: isointensity of the lesion; b) opposed-phase T1w GRE: homogeneous drop in signal intensity, indicating fatty infiltration; c) FSE fatsat: isointensity of the lesion; d) art phase Gad-enhanced T1w GRE: intense homogeneous enhancement of the lesion.