

Hepatocellular carcinoma detection in liver cirrhosis: diagnostic performance of contrast-enhanced CT vs. MRI with extracellular contrast vs. gadoxetic acid

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Abstract

Objectives

To evaluate the diagnostic performance of contrast-enhanced CT vs. MRI with extracellular contrast agents (EC-MRI) vs. MRI with gadoxetic acid (EOB-MRI) for HCC detection in patients with liver cirrhosis using liver explant as the reference. The additional value of hepatobiliary phase (HBP) post Gadoxetic acid was also assessed.

Methods

Two-hundred seventy-seven consecutive patients who underwent liver transplantation over a 9 year period and imaging within 90 days of were retrospectively included. Imaging consisted in CT ($n = 100$), EC-MRI ($n = 77$) and EOB-MRI ($n = 100$), the latter subdivided into dynamic EOB-MRI and full EOB-MRI (dynamic+HBP). Three radiologists retrospectively categorized lesions ≥ 1 cm using the LI-RADSv2017 algorithm. Dynamic EOB-MRI was re-evaluated with the addition of HBP. Results were correlated with explant pathology.

Results

Pathology demonstrated 265 HCCs (mean size 2.1 ± 1.4 cm) in 177 patients. Per-patient sensitivities were 86.3% for CT, 89.5% for EC-MRI, 92.8% for dynamic EOB-MRI and 95.2% for full EOB-MRI (pooled reader data), with a significant difference between CT and dynamic/full EOB-MRI ($p = 0.032/0.002$), and between EC-MRI and full EOB-MRI ($p = 0.047$). Per-lesion sensitivities for CT, EC-MRI, dynamic EOB-MRI and full EOB-MRI were 59.5%, 78.5%, 69.7% and 76.8%, respectively, with a significant difference between MRI groups and CT (p -range: 0.001–0.04), and no difference between EC-MRI and dynamic EOB-MRI ($p = 0.949$). For HCCs 1–1.9 cm, sensitivities were 34.4%, 64.6%, 57.3% and 67.3%, respectively, with all MRI groups significantly superior to CT ($p \leq 0.01$) and full EOB-MRI superior to dynamic EOB-MRI ($p = 0.002$).

Conclusions

EOB-MRI outperforms CT and EC-MRI for per-patient HCC detection sensitivity, and is equivalent to EC-MRI for per-lesion sensitivity. MRI methods outperform CT for detection of HCCs 1–1.9 cm.