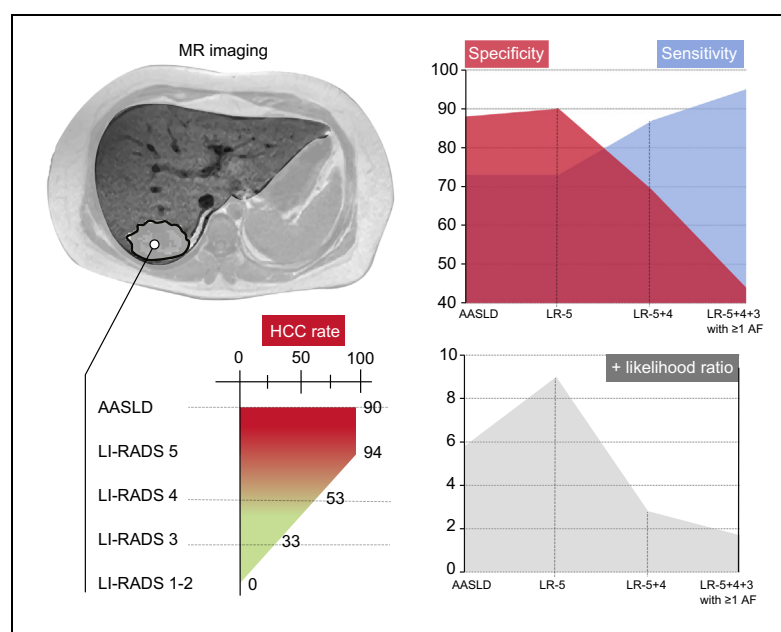


Comparison of the accuracy of AASLD and LI-RADS criteria for the non-invasive diagnosis of HCC smaller than 3 cm

Graphical abstract



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Lay summary

The 2014 version of Liver Imaging Reporting and Data System criteria does not outperform the American Association for the Study of Liver Diseases criteria for the non-invasive diagnosis of hepatocellular carcinoma (HCC) smaller than 3 cm. Liver Imaging Reporting and Data System offers a nodule-based evaluation of the risk of HCC, allowing possible changes in management in these patients. The added value of ancillary features appears limited for the non-invasive diagnosis of small HCC.

Highlights

- The 2014 version of LI-RADS does not outperform AASLD criteria for the non-invasive diagnosis of HCC <3 cm.
- The rate of HCC decreases from LR-5 to LR-3.
- LI-RADS offers a nodule-based evaluation of the risk of HCC.
- The added-value of ancillary features is limited for the non-invasive diagnosis of small HCC.



Comparison of the accuracy of AASLD and LI-RADS criteria for the non-invasive diagnosis of HCC smaller than 3 cm

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Background & Aims: Non-invasive imaging is crucial for the early diagnosis and successful treatment of hepatocellular carcinoma (HCC). Terminology and criteria for interpreting and reporting imaging results must be standardized to optimize diagnosis. The aim of this study was to prospectively compare the diagnostic accuracy of the American Association for the Study of Liver Diseases (AASLD) and the 2014 version of Liver Imaging Reporting and Data System (LI-RADS[®]) criteria for the non-invasive diagnosis of small HCC, and to evaluate the diagnostic value of ancillary features used in the LI-RADS criteria.

Methods: Between April 2009 and April 2012, patients with cirrhosis and one to three 10–30 mm nodules were enrolled and underwent computed tomography (CT) and magnetic resonance (MR) imaging. The diagnostic accuracy of both the AASLD and the LI-RADS criteria were determined based on their sensitivity, specificity, positive (PPV) and negative predictive values (NPV).

Results: A total of 595 nodules were included (559 [341 HCC, 61%] with MR imaging and 529 [332 HCC, 63%] with CT). Overall, no (0%) LR-1 and LR-2, 44 (33%) and 47 (41%) LR-3, 50 (53%) and 54 (55%) LR-4, 244 (94%) and 222 (91%) LR-5 and 4 (67%) and 9 (82%) LR-5V were HCC on MR imaging and CT, respectively. The sensitivity, specificity, PPV/NPV of the AASLD score was 72.5%, 87.6%, 90.2%, and 66.9% for MR imaging, and 71.4%, 77.7%, 84.3%, 61.7% for CT, respectively. For the combination of LR-5V and LR-5 nodules these measures were 72.5%, 89.9%, 91.9% and 67.5% on MRI and 66.9%, 88.3%, 90.9% and 63.3% on CT, respectively. For the combination of LR-5V, LR-5 and LR-4 nodules they were 87.1%, 69.1%, 81.6% and 77.3% on MRI and 85.8%, 66%, 81% on 73.5% on CT, respectively.

Conclusion: The 2014 version of the LI-RADS is no more accurate than the AASLD score for the non-invasive diagnosis of small HCC in high-risk patients, but it provides important and complementary information on the probability of having HCC in high-risk patients, allowing for possible changes in the management of these patients.

Lay summary: The 2014 version of Liver Imaging Reporting and Data System criteria does not outperform the American Association for the Study of Liver Diseases criteria for the non-invasive diagnosis of hepatocellular carcinoma (HCC) smaller than 3 cm. Liver Imaging Reporting and Data System offers a nodule-based evaluation of the risk of HCC, allowing possible changes in management in these patients. The added value of ancillary features appears limited for the non-invasive diagnosis of small HCC.

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Introduction

Hepatocellular carcinoma (HCC) is the fifth most frequent cancer and the second leading cause of death from cancer worldwide, occurring on cirrhosis in over 90% of cases.^{1,2} Early detection is the only hope for effective and curative treatment of patients with HCC, emphasizing the crucial role of screening strategies in the monitoring of high-risk patients. Computed tomography (CT) and magnetic resonance (MR) imaging play a key role in the diagnostic strategy of HCC, and an imaged-based diagnosis of HCC is accepted by several guidelines in Europe, North America and Asia, based on the unique vascular profile of this tumor.^{2–6} In fact, in nodules measuring >10 mm, the combination of hyperenhancement during the arterial phase followed by washout during the portal venous and/or delayed phases has been shown to have a specificity for HCC of nearly 100%, but the sensitivity and specificity is influenced by the size of the tumors.^{7,8}

Nevertheless, the inter-observer variability of these imaging criteria can vary according to the radiologist's experience, the local medical culture and differences in interpretation.⁹ Recently, the Liver Imaging Reporting and Data System (LI-RADS[®]) was developed by the American College of Radiology to standardize terminology and criteria for interpreting and reporting CT and MR imaging results of the liver in patients at risk of HCC. The initial version of LI-RADS first appeared online in 2011 and has been updated several times.¹⁰ The aim of LI-RADS is to help radiologists categorize findings in at-risk populations and to assist referring physicians in understanding the reports of liver imaging. Observations are categorized from LR-1 (definitely benign) to LR-5 (definitely HCC). LI-RADS includes major and ancillary criteria. The former includes lesion

Keywords: Magnetic resonance imaging; Computed tomography; Imaging; Cirrhosis; Oncology.

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