



## Reply to “Letter to the editor”

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We thank Madhusudhan and Srivastava [1] for their interest in our manuscript [2] and for sharing their experience. We reported on five pitfalls that, in our opinion, are commonly encountered when applying the Liver Imaging Reporting and Data System (LI-RADS) [2]. However, we recognize that there are many more challenges related to the diagnosis of hepatocellular carcinoma (HCC) on CT and MR imaging studies of cirrhotic livers, including the scenarios mentioned in this letter.

The presence of significant fat deposition may be problematic for both detection and characterization of liver lesions. Two recent studies investigated the performance of LI-RADS in this scenario. Kim et al. [3] showed that the performance of major features on contrast-enhanced CT was not significantly different between patients with and those without severe steatosis. On the other hand, Thompson et al [4] reported that the lack of visualization of washout and capsule on MRI was associated with increasing histologic steatosis grade. The reduced conspicuity of washout in a steatotic liver is likely due to the decreased T1-weighted signal intensity in the perilesional liver. When the observation appears hyperintense on pre-contrast T1-weighted images, subtraction imaging (e.g., extracellular phase—pre-contrast) may be useful to detect washout although care is needed to ensure the images are well registered [5].

In Fig. 2 [1], Madhusudhan and Srivastava report a case of LR-TIV (tumor-in-vein) contiguous with an infiltrative mass with minimal APHE and washout, suggesting a LR-M observation. Although we agree with the authors that the presence of portal vein thrombosis may affect the enhancement pattern

of a liver mass/tumor, to our knowledge, no study has evaluated it in the context of LI-RADS. We would like to add that it is possible that the decreased conspicuity of APHE and washout in HCC presenting with a diffuse/infiltrative appearance may be due to the macroscopic growth pattern characterized by minute tumor nodules spread among cirrhotic nodules, regardless of the presence of tumor-in-vein [6].

We welcome further conversation on the current status of LI-RADS with the overarching goal of further improving the system and promoting its use in clinical practice.

### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interests.

**Ethical approval** This article does not contain any studies with human participants performed by any of the authors.

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