Thieme

Contrast Enhanced Ultrasound (CEUS) Liver Imaging Reporting and Data System (LI-RADS®): the official version by the American College of Radiology (ACR)

To the Editor:

We read with interest the article by Schellhaas et al (B. Schellhaas et al. Ultraschall in Med 2016; 37: 627–634). While their study may contribute to the ongoing validation of CEUS as a non-invasive method for HCC diagnosis in at-risk patients, we take exception to their inappropriate and misleading adoption of the term "CEUS – LI-RADS".

Based on good evidence (A. Sangiovanni et al. Gut 2010; 59: 638 – 644, S Leoni et al. Ultraschall in Med 2013; 34: 280 – 287, MA Manini et al. J Hepatol 2014; 60: 995 – 1001), the American College of Radiology (ACR) convened a working group of international experts to develop ACR CEUS Liver Imaging Reporting And Data System (CEUS LI-RADS®) in 2014. Beta versions of CEUS LI-RADS® algorithm were presented at numerous national and international conferences in 2015 and 2016 (e. g. D. Cosgrove. September 2015 Bubble Conference in Chicago). Based on feedback received after those presentations and through iterative refinement and consensus, the working group completed CEUS LI-RADS® version 2016 in May 2016. The algorithm was officially approved by the ACR LI-RADS® Steering Committee in June 2016 and was published online in August 2016 (http://www.acr.org/quality-safety/resources/LIRADS).

CEUS LI-RADS® standardizes CEUS technique, interpretation, reporting, and data collection for patients at risk for developing HCC. The system currently includes a lexicon of controlled terminology, schematic illustrations, and a categorization algorithm. The ACR CEUS LI-RADS classification was specifically designed to reflect scientific knowledge in CEUS, but also to remain consistent with the ACR CT/MRI LI-RADS® classification. A complete illustrative atlas, reporting guidelines, and educational material are in development. CEUS LI-RADS® will be updated as experience accrues, as knowledge add technology advance, and in response to user feedback.

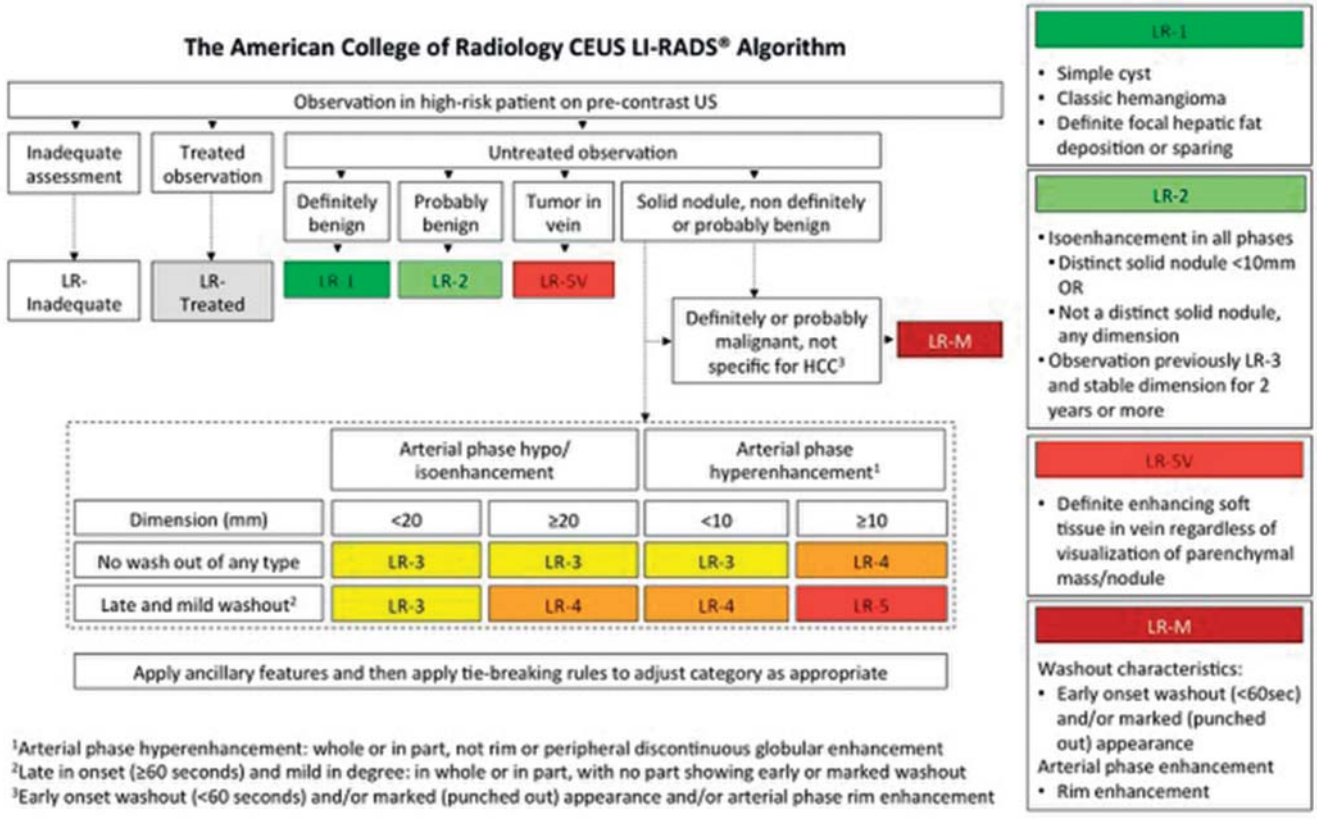
As members of the CEUS LI-RADS® Working Group, we are pleased that Schellhaas and her colleagues were inspired by LI-RADS® to propose a preliminary CEUS system for liver nodule categorization in at-risk patients. Their system is similar to but not identical to the official CEUS LI-RADS® that was released in August 2016. Some differences between their system and CEUS LI-RADS® are shown in bold font in ▶ **Table 1**.

As shown in the Table, their system omits one LI-RADS® category (LR-3), changes the name of one category (LR-M), uses a different diameter threshold for LR-5, modifies the terminology for APHE and washout, adds a new major feature (subtotal infiltration), and lacks an algorithmic display and cannot thus be considered consistent with the overall ACR LI-RADS® system. The official ACR algorithmic display for CEUS LI-RADS® is shown in ▶ **Fig. 1**.

Having two different systems with the same name will have negative consequences, as it is likely to cause misunderstanding and misapplication of the systems. Potential users should be aware that the system proposed by Schellhaas et al. differs from the official ACR CEUS LI-RADS®.

▶ **Table 1** Key Differences between ACR CEUS LI-RADS® and System Proposed by Schellhaas.

	ACR CEUS LI-RADS®	**Schellhaas system**
population	▪ cirrhosis of any cause ▪ chronic hepatitis B ▪ current or prior HCC	▪ cirrhosis of any cause ▪ chronic hepatitis B ▪ treated HCC ▪ **chronic hepatitis C with advanced fibrosis** ▪ **NASH**
categories	LR-1 (cyst, classic hemangioma, definite focal fat deposition or sparing)	LR-1 (cyst)
	LR-2	LR-2
	LR-3	—
	LR-4	LR-4
	LR-5	LR-5
	LR-M	**LR-C**
	LR-5V	**LR-V**
diameter threshold for LR-5	≥ 10 mm	**≥ 20 mm**
other major features for LR-5	APHE, not rim or peripheral discontinuous	APHE, not rim-like
	late (≥ 60 s) and mild washout	washout in portal venous or late phase, not < 60 s
	—	**subtotal infiltration of right/left lobe**
ancillary features	▪ positive: diameter increase, nodule-in-nodule ▪ negative: diameter reduction, diameter stability ≥ 2y	—
algorithmic display	yes	**no**



▶ **Fig. 1** The official ACR algorithmic display for CEUS LI-RADS®.

Respectfully and on behalf of the ACR LI-RADS® Steering Committee and ACR CEUS LI-RADS® Working Group,

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