

Encouraging the Assignment of LI-RADS Scores by Radiologists via Reporting Template Changes

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Introduction

- Liver Imaging Reporting and Data Systems (LI-RADS) was first introduced in 2011 to standardize lexicon and diagnostic criteria, providing clinicians with clearer reports and management options
- According to LI-RADS, patients who are high-risk for HCC (known cirrhosis, chronic hepatitis B viral infection, or current/prior HCC) deserve a LI-RADS score
- University Radiology Group implemented several changes to structured reporting templates to encourage use of LI-RADS score
- Prior to this, compliance rate for MR studies that meet criteria for LI-RADS score use was low

Methods: First Template Change

N/A, no nodule
Definitely benign + Untreated
Probably benign + untreated
- arterial enhance, no add'l major criteria
- arterial, <2cm, +1 add'l major criterion
- arterial, <2cm, >+2 add'l major criteria
- arterial, >2cm, +1 add'l major criterion
- arterial, >2cm, >=2 add'l major criteria
+ arterial, <2cm, 0 add'l major criteria
+ arterial, <1cm, at least 1 add'l major criterion
+ arterial, 1-2 cm, +1 add'l major criterion, no wash
+ arterial, >=2cm, at least 1 add'l major criterion
+ arterial, 1-2 cm, +1 add'l major criterion, AND w/v
+ arterial, >=2cm, 0 add'l major criterion
+ arterial, >1cm, at least 2 add'l major criteria
Tumor in vein
Malignant but +/- HCC etiology
Treated HCC site disease
ANCILLARY FEATURES
(OPTIONAL MODIFICATION)
Suspicious ancillary features with LR3
Suspicious ancillary features with LR4, N/A still LR4
Benign ancillary features with LR3
Benign ancillary features with LR4
Benign ancillary features with LR5

LI-RADS: LR-5, definitely HCC. LR-5,

Multidisciplinary discussion workgroup for staging and individualized treatment. Biopsy is not needed to confirm the diagnosis of HCC but may be obtained in some settings (e.g., for clinical trials requirements or molecular characterization)]

LI-RADS CLASSIFICATION: [LR-5. Imaging features diagnostic of HCC]

LI-RADS Features:

Liver nodule identified: []

If yes, give features of the most suspicious nodule below:

Location (Couinaud segment): []

Size (longest axial dimension, cm): []

Image/Series: []

Arterial hyperenhancement: []

Washout: []

Capsule: []

Threshold growth: []

Suspicious ancillary features: []

Benign ancillary features: []

- First template change occurred on 5/30/2018
- Pick list in impression field that lets radiologist calculate LI-RADS score with criteria provided

Methods: Second Template Change

History of HBV, Cirrhosis or HCC: [No]

Refer to attached LI-RADS chart.

Negative

LR-1, definitely benign

LR-2, probably benign

LR-3, intermediate probability of malignancy

LR-4, probably malignant

LR-5, definitely malignant

LR-NC, not characterized

LR-M, cancer but not definitely HCC

LR-IV, tumor in vein

LI-RADS CALCULATOR IS AVAILABLE IN BRACKET BELOW, IF NEEDED.

LI-RADS® v2018
CT/MRI Core

Diagnostic Algorithm Treatment Response Last Viewed Diagnosis

Step 1. Apply CT/MRI LI-RADS® Diagnostic Algorithm

Untreated observation without pathologic proof in [patient at high risk for HCC](#)

- If cannot be categorized due to image degradation or omission → LR-NC
- If definite [tumor in vein \(TIV\)](#) → LR-TIV
- If definitely benign → LR-1
- If probably benign → LR-2
- If probably or definitely malignant but not HCC specific (e.g., if [targetoid](#)) → LR-M

Otherwise, use CT/MRI diagnostic table below

- If intermediate probability of malignancy → LR-3
- If probably HCC → LR-4
- If definitely HCC → LR-5

CT/MRI Diagnostic Table

Arterial phase hyperenhancement (APHE)		No APHE		Nonrim APHE		
Observation size (mm)		< 20	≥ 20	< 10	10-19	≥ 20
Count additional major features:	None	LR-3	LR-3	LR-3	LR-3	LR-4
	One	LR-3	LR-4	LR-4	LR-4	LR-5
	≥ Two	LR-4	LR-4	LR-4	LR-5	LR-5

Observations in this cell are categorized based on one additional major feature:

- LR-4 – if enhancing “capsule”
- LR-5 – if nonperipheral “washout” OR threshold growth

If unsure about the presence of any major feature: characterize that feature as absent

OPTN users in USA: see [page 15](#) for conversion of LI-RADS® categories to OPTN Classes

Categories (page 7) Major features (page 20) LR-NC Definition (page 8) Tumor in Vein (page 21) LR-1 & LR-2 Examples (page 27) LR-M Criteria (page 22)

- Second template change occurred on 10/1/2020 to further increase compliance
- Addition of field reminding radiologist whether patient qualifies for a LI-RADS score by asking whether patient has a history of HBV, cirrhosis, or prior HCC
- LI-RADS scoring system also attached within PACS

Methods: continued

- To calculate compliance rate prior to any template changes, May 2018 was chosen as a representative month for data
- Studies that met criteria for LI-RADS score or given a score were counted
- Studies that had no LI-RADS score but had findings not felt to be clinically significant were also counted

Results

	Meets criteria for LI-RADS score	Used LI-RADS score	Findings felt to be not clinically significant	Nominal compliance ¹	Adjusted compliance ²
Prior to any template changes (5/1/2018 - 5/29/2018)	31	1	20	3.23%	35.48%
First change (10/1/2020 - 12/22/2020)	96	20	70	20.83%	93.75%
Second change (10/1/2020 - 12/22/2020)	44	18	25	40.91%	97.73%

¹Nominal compliance: study that meets criteria for LI-RADS score (known hepatitis B virus infection, cirrhosis, or hepatocellular carcinoma on contrast-enhanced studies)

²Adjusted compliance: nominal compliance but excluding findings not felt to be clinically significant (benign findings, cirrhosis, interval follow up of a known lesion)

Conclusion

- Introduction of LI-RADS was meant to standardize lexicon and diagnostic criteria, reduce vague wording used by radiologists, and provide clearer management options for referring clinicians
- Prior to structured reporting changes, low compliance rate for LI-RADS score reports (adjusted compliance rate: 35.48%)
- After two template changes (5/30/2018, 10/1/2020), both nominal/adjusted compliance rates increased dramatically
 - With second template change, nominal compliance rate is 40.91% while adjusted compliance rate is 97.73%
- With right guidance structured in the reporting template, compliance rate will increase

References

1. “CT/MRI LI-RADS v2018.” CT/MRI LI-RADS v2018 | American College of Radiology, www.acr.org/Clinical-Resources/Reporting-and-Data-Systems/LI-RADS/CT-MRI-LI-RADS-v2018.