CT/MRI LI-RADS® v2017 ESSENTIALS

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		APHE (not rim)		
Observation size (mm)		< 20	≥ 20	< 10	10-19	≥ 20
Count major features: • "Washout" (not peripheral) • Enhancing "capsule" • Threshold growth	None	LR-3	LR-3	LR-3	LR-3	LR-4
	One	LR-3	LR-4	LR-4	LR-4 / LR-5	LR-5
	≥ Two	LR-4	LR-4	LR-4	LR-5	LR-5

LR-4 / LR-5

Observations in this cell are categorized LR-4, except:
- LR-5g, if ≥ 50% diameter increase in < 6 months (equivalent to OPTN 5A-g)
- LR-5us, if "washout" and visibility at screening ultrasound (per AASLD HCC criteria)

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

What's New in LI-RADS® v2017?

New algorithms:

- US Screening and Surveillance
- CEUS Diagnosis
- CT/MRI Treatment Response Assessment

New or revised categories for CT/MRI LI-RADS:

- LR-NC (new)
- LR-TIV (previously LR-5V)

Threshold growth definition modified

New explicit criteria for LR-M

Updated algorithmic display for CT/MRI LI-RADS

New list-view displays to supplement algorithmic displays

Ancillary features are now optional and their use is clarified

New ancillary feature favoring malignancy: ultrasound visibility

Name change for ancillary feature: distinctive rim → nonenhancing capsule

Improved schematic diagrams, new time-intensity curves

New FAQs

Clarifies:

- Distinction between non-rim arterial phase hyperenhancement (major feature of HCC) vs. rim arterial phase hyperenhancement (feature of LR-M)
- Distinction between nonperipheral "washout" (major feature of HCC) vs. peripheral "washout" (feature of LR-M)
- Distinction between enhancing "capsule" (major feature of HCC) vs. nonenhancing "capsule" (ancillary feature favoring HCC)
- That ancillary features favoring malignancy include some favoring malignancy in general and others favoring HCC in particular
- That CT/MRI LI-RADS can be used in liver transplant candidates with HCC
- Categorization of tumor in vein and malignancy with infiltrative appearance

Why is This Update Needed?

As new evidence emerges and based on feedback from users, LI-RADS evolves to better meet clinical, educational, and research needs. LI-RADS v2017 is the next step in this evolution.

CT/MRI LI-RADS® v2017

Apply in patients at high risk for HCC, namely those with:

- Cirrhosis **OR**
- Chronic hepatitis B viral infection **OR**
- Current or prior HCC

Including adult liver transplant candidates and recipients posttransplant

Do not apply in patients:

- Without the above risk factors
- < 18 years old
- With cirrhosis due to congenital hepatic fibrosis
- With cirrhosis due to a vascular disorder such as hereditary hemorrhagic telangiectasia, Budd-Chiari syndrome, chronic portal vein occlusion, cardiac congestion, or diffuse nodular regenerative hyperplasia

Apply for multiphase exams performed with:

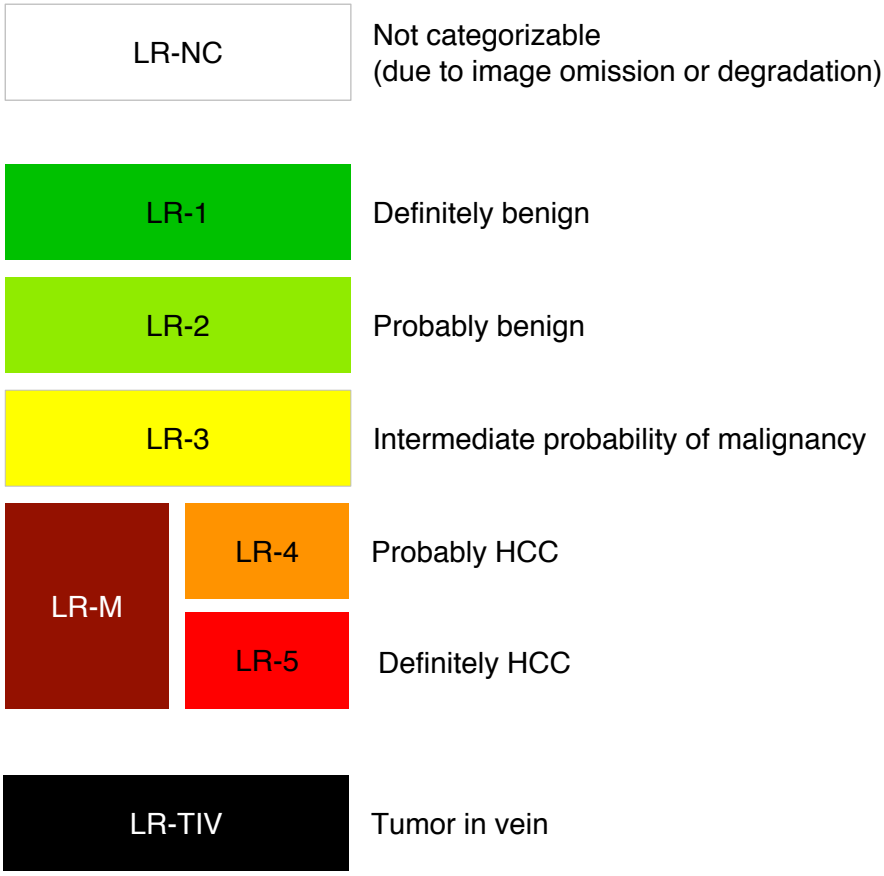
- CT or MRI with extracellular contrast agents (ECA) **OR**
- MRI with hepatobiliary contrast agents (HBA)

Do not assign LI-RADS categories for observations:

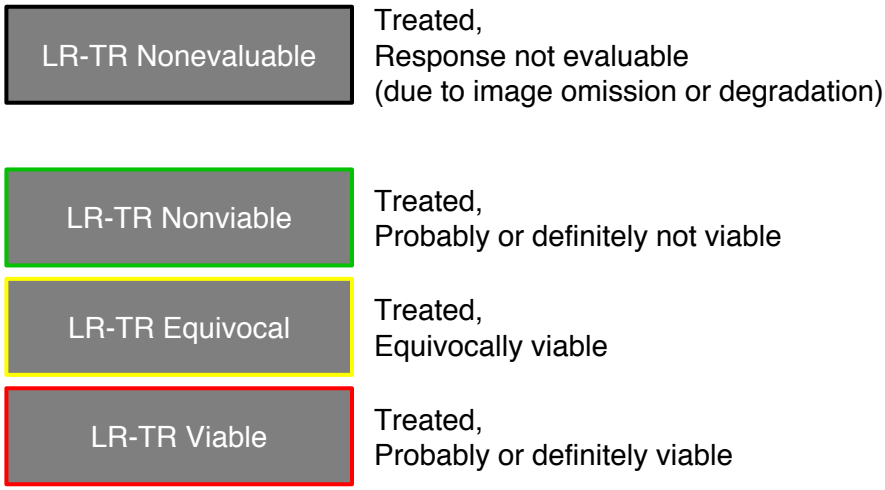
- That are path-proven malignancies **OR**
- That are path-proven benign lesions of non-hepatocellular origin such as hemangiomas

CT/MRI LI-RADS® v2017 Categories

Diagnostic Categories



Treatment Response Categories



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

Untreated observation without pathologic proof in patient at high risk for HCC

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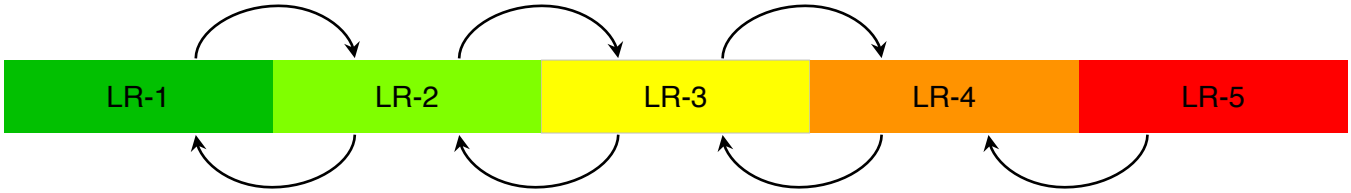
If unsure about the presence of any major feature: characterize that feature as absent

Step 2. Optional: Apply Ancillary Features (AFs)

Ancillary features may be used **at radiologist discretion** for:
Improved detection, increased confidence, or category adjustment

For **category adjustment** (upgrade or downgrade), apply ancillary features as follows:

One or more ancillary features favoring malignancy: upgrade by 1 category up to LR-4
(Absence of these ancillary features should not be used to downgrade)



One or more ancillary features favoring benignity: downgrade by 1 category
(Absence of these ancillary features should not be used to upgrade)

If there are conflicting AFs (i.e., one or more favoring malignancy and one or more favoring benignity):
Do not adjust category

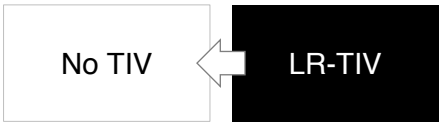
Ancillary features cannot be be used to upgrade to LR-5

Ancillary features favoring malignancy	Ancillary features favoring benignity
Favoring malignancy in general, not HCC in particular • US visibility as discrete nodule • Subthreshold growth • Restricted diffusion • Mild-moderate T2 hyperintensity • Corona enhancement • Fat sparing in solid mass • Iron sparing in solid mass • Transitional phase hypointensity • Hepatobiliary phase hypointensity **Favoring HCC in particular** • Nonenhancing “capsule” • Nodule-in-nodule • Mosaic architecture • Blood products in mass • Fat in mass, more than adjacent liver	• Size stability > 2 yrs • Size reduction • Parallels blood pool • Undistorted vessels • Iron in mass, more than liver • Marked T2 hyperintensity • Hepatobiliary phase isointensity

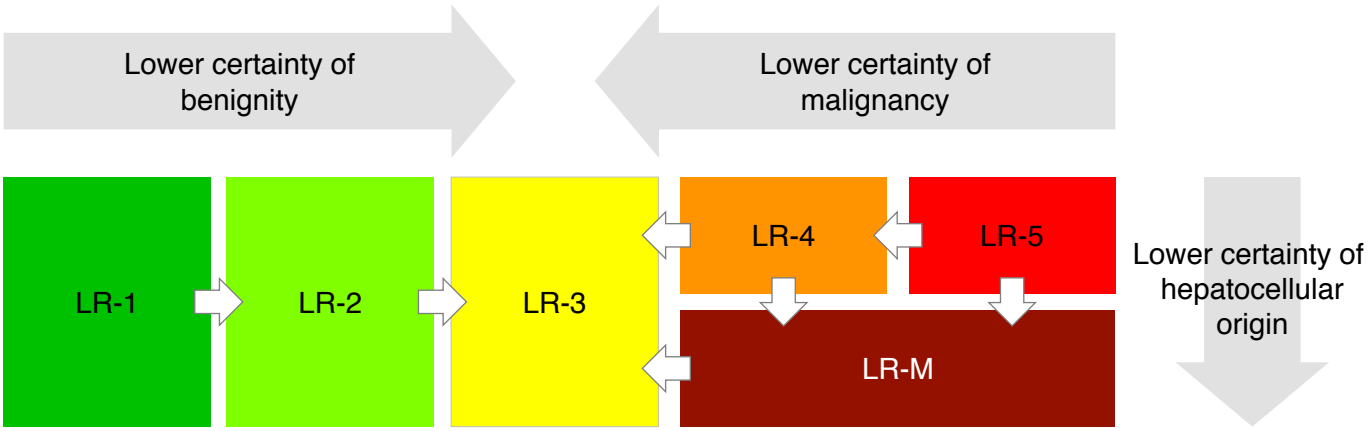
If unsure about presence of any ancillary feature: characterize that feature as absent

Step 3. Apply Tiebreaking Rules if Needed

If unsure about presence of TIV, do not categorize as LR-TIV



If unsure between two categories, choose the one reflecting lower certainty



Step 4. Final Check

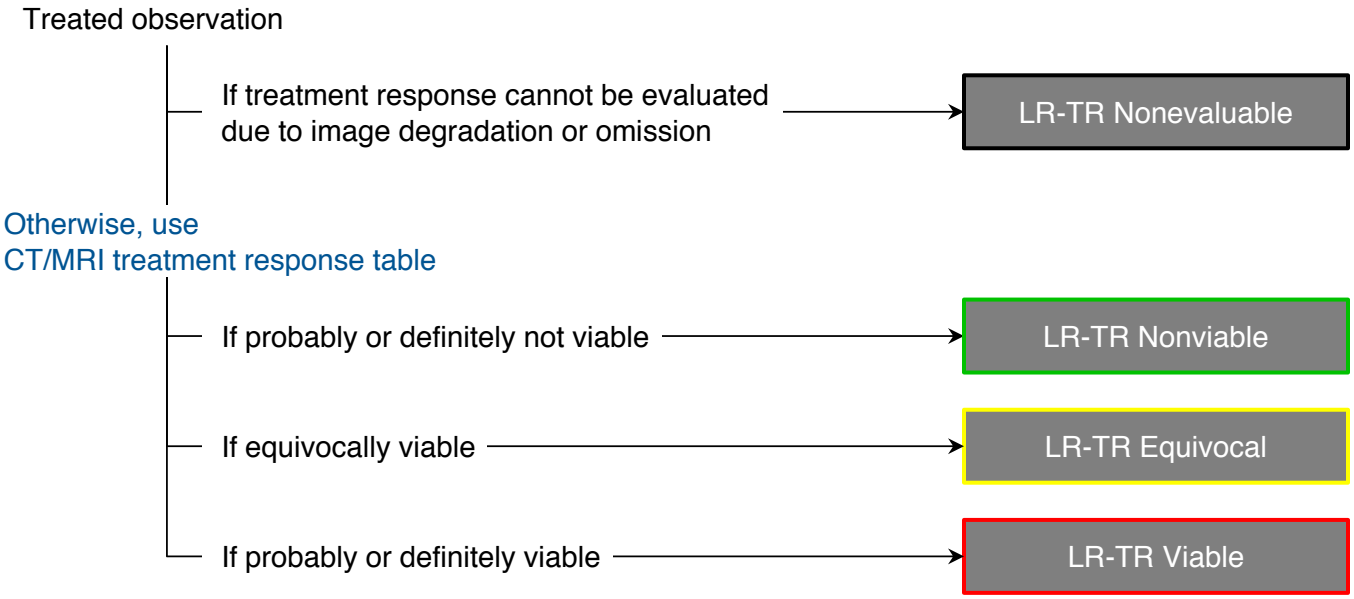
After Steps 1, 2, and 3 –

Ask yourself if the assigned category seems reasonable and appropriate

If YES: You are done, move on the next observation (if any).

If NO: Assigned LI-RADS category may be inappropriate, so reevaluate.

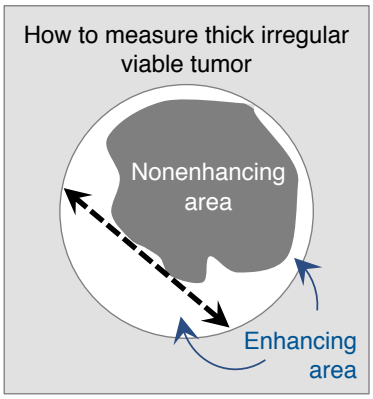
Step 1. Apply LI-RADS® CT/MRI Treatment Response Algorithm

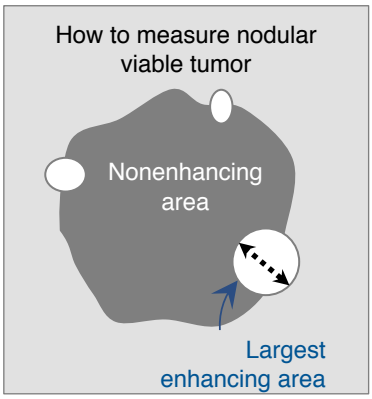


CT/MRI Treatment Response Table

Response Category	Criteria
LR-TR Nonviable	• No lesional enhancement **OR** • Treatment-specific expected enhancement pattern
LR-TR Equivocal	Enhancement atypical for treatment-specific expected enhancement pattern and not meeting criteria for probably or definitely viable
LR-TR Viable	Nodular, masslike, or thick irregular tissue in or along the treated lesion with any of the following: • Arterial phase hyperenhancement **OR** • Washout appearance **OR** • Enhancement similar to pretreatment

Step 2. Measure Viable Tumor Size



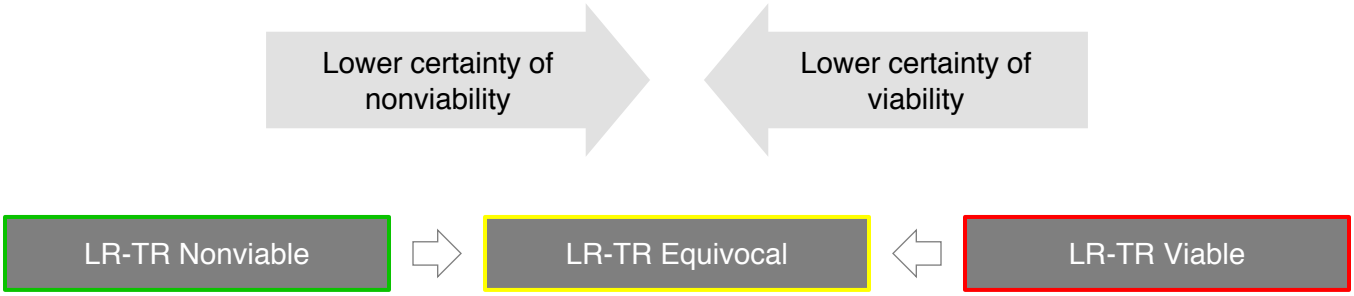


Size of equivocally, probably, or definitely viable tumor

Longest dimension through enhancing area of treated lesion, not traversing nonenhancing area

Step 3. Apply Tiebreaking Rule if Needed

If unsure between two categories, choose the one reflecting lower certainty as illustrated below



Step 4. Final Check

After Steps 1, 2, and 3 -

Ask yourself if the assigned response category seems reasonable and appropriate

If YES: You are done, move on the next observation (if any).

If NO: Assigned LI-RADS category may be inappropriate, so reevaluate.