Meeting

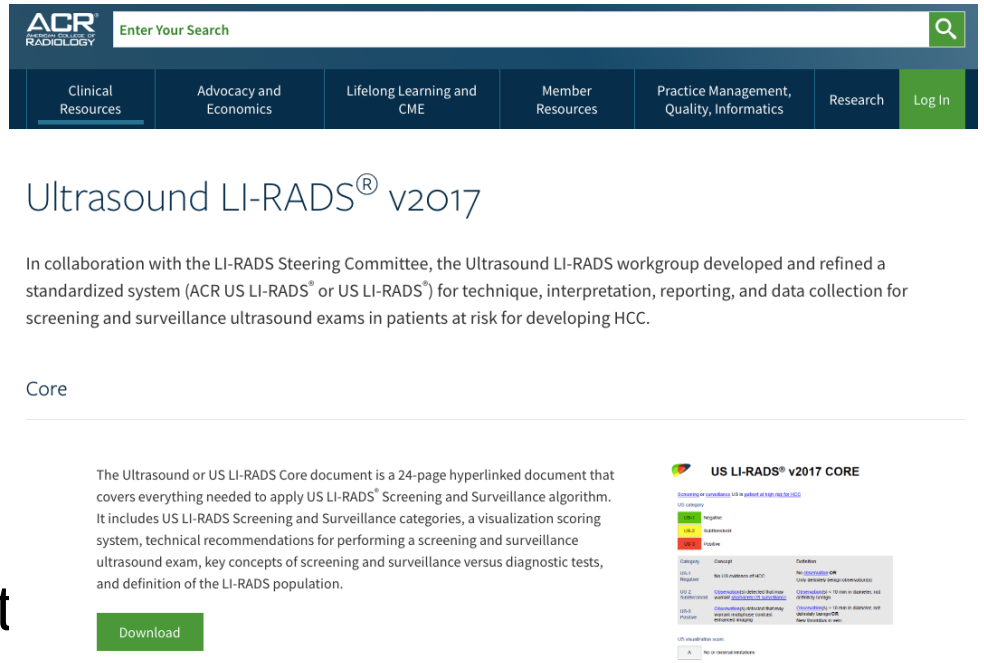
Scuola di Specializzazione in Radiodiagnostica

CT/MRI LI-RADS® v2018 CORE

Liver Imaging Reporting And Data System

- US senza mdc
- CEUS
- CT/MR con ECA/HBA

trat



CARCINOMA EPATOCELLULARE (HCC)

- Il più comune tumore maligno epatico primitivo
- Terza causa di morte per cancro nel mondo
- Caratteristiche peculiari nelle acquisizioni dinamiche

Possibilità di fare diagnosi radiologica
(No biopsia)

PROTOCOLLI DI ACQUISIZIONE

TC

- Basale (se il paziente ha subito trattamenti locoregionali)
- Fase arteriosa tardiva
- Fase portale
- Fase tardiva

RM

- Sequenze basali T1-pesate in fase e fuori fase
- Sequenze T2-pesate
- Immagini pesate in diffusione
- Sequenze T1-pesate multifasiche

ECA

- Basale
- Fase arteriosa tardiva
- Fase portale
- Fase tardiva

HBA

- Basale
- Fase arteriosa tardiva
- Fase portale
- Fase di transizione (2-5')
- Fase epatospecifica

CT/MRI LI-RADS® v2018 CORE

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

CT/MRI LI-RADS® v2018 CORE

Diagnostic Categories

LR-NC	Not categorizable (due to image omission or degradation)
LR-1	Definitely benign
LR-2	Probably benign
LR-3	Intermediate probability of malignancy
LR-4	Probably HCC
LR-M	Probably or definitely malignant, not necessarily HCC
LR-5	Definitely HCC
LR-TIV	Tumor in vein

- Rim APHE
- Peripheral "washout"
- Delayed central enhancement

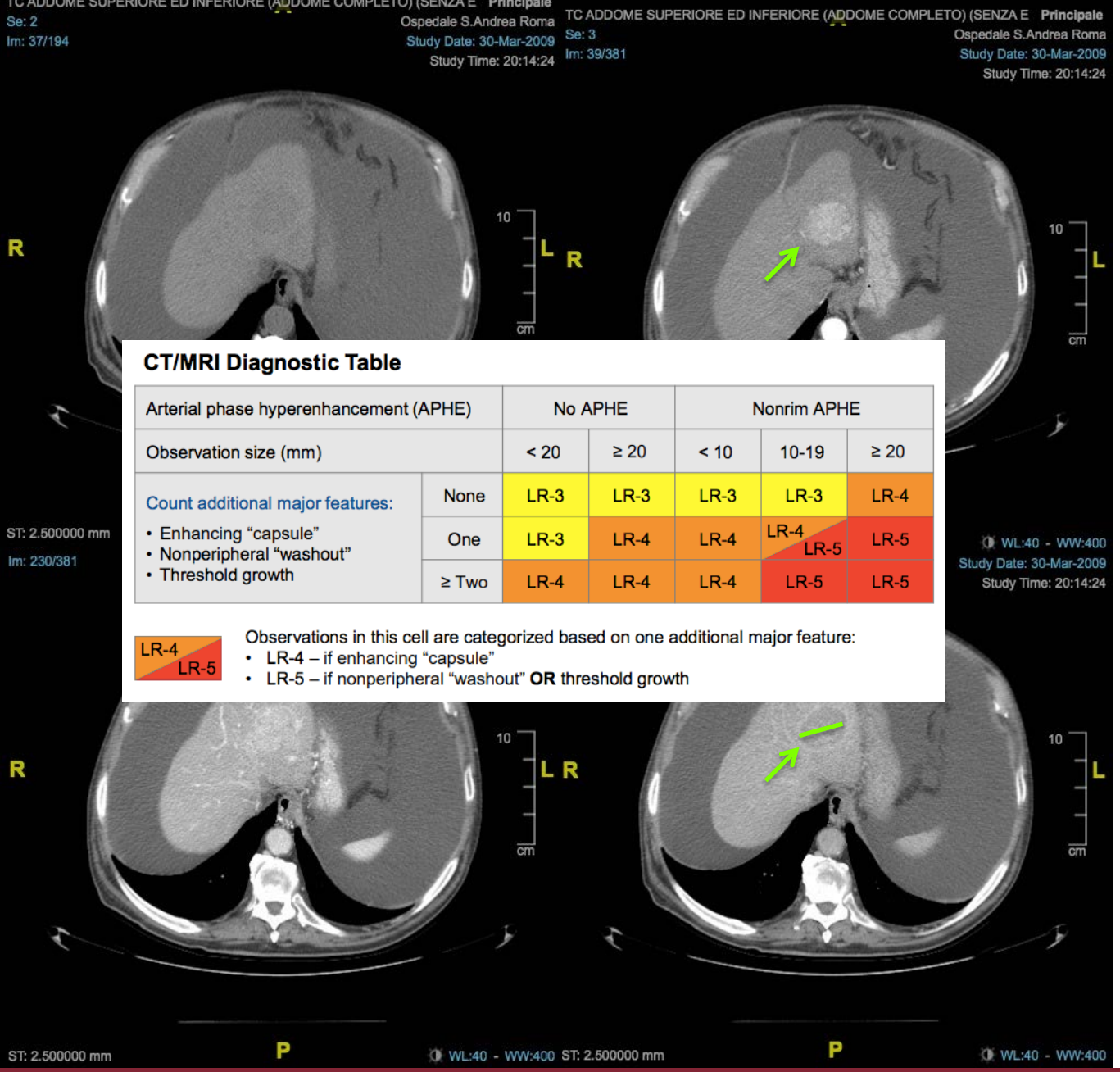
CT/MRI LI-RADS® v2018 CORE

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: • Enhancing "capsule" • Nonperipheral "washout" • 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 based on one additional major feature:
- LR-4 – if enhancing "capsule"
- LR-5 – if nonperipheral "washout" **OR** threshold growth



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: • Enhancing "capsule" • Nonperipheral "washout" • 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 based on one additional major feature:
- LR-4 – if enhancing "capsule"
- LR-5 – if nonperipheral "washout" **OR** threshold growth

STEP 1: wash-in arterioso

Sì/No

STEP 2: dimensioni

<10mm

10-19mm

>20mm

STEP 3: criteri maggiori:

- Capsula?
- Wash-out?
- Crescita?

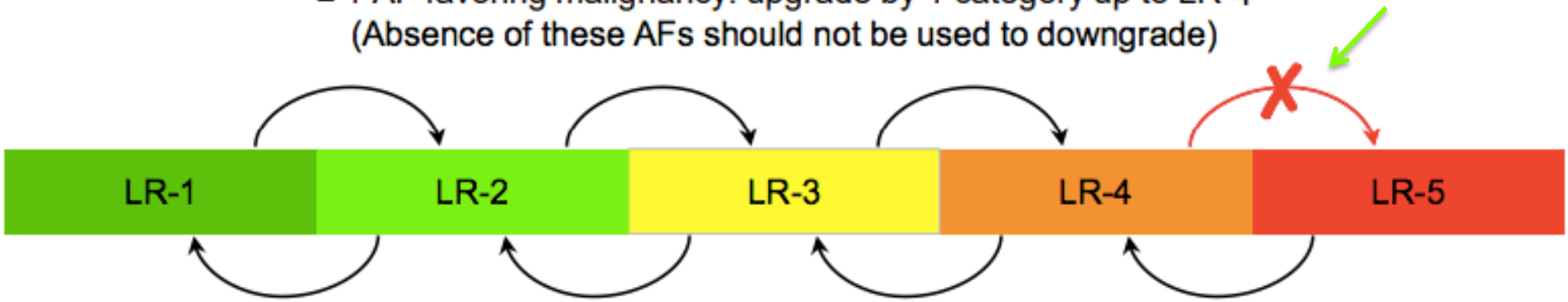
Nessuno / uno / ≥ due

LR 5

CT/MRI LI-RADS® v2018 CORE

CRITERI ANCILLARI

≥ 1 AF favoring malignancy: upgrade by 1 category up to LR-4
(Absence of these AFs should not be used to downgrade)



≥ 1 AF favoring benignity: downgrade by 1 category
(Absence of these AFs should not be used to upgrade)

If ≥ 1 AF favoring malignancy and ≥ 1 AF favoring benignity:
Do not adjust category

CT/MRI LI-RADS® v2018 CORE

Ancillary features favoring malignancy

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

Ancillary features favoring benignity

- Size stability > 2 yrs
- Size reduction
- Parallels blood pool
- Undistorted vessels
- Iron in mass, more than liver
- Marked T2 hyperintensity
- Hepatobiliary phase isointensity

CT/MRI LI-RADS® v2018 CORE

CRITERI DISCRIMINANTI

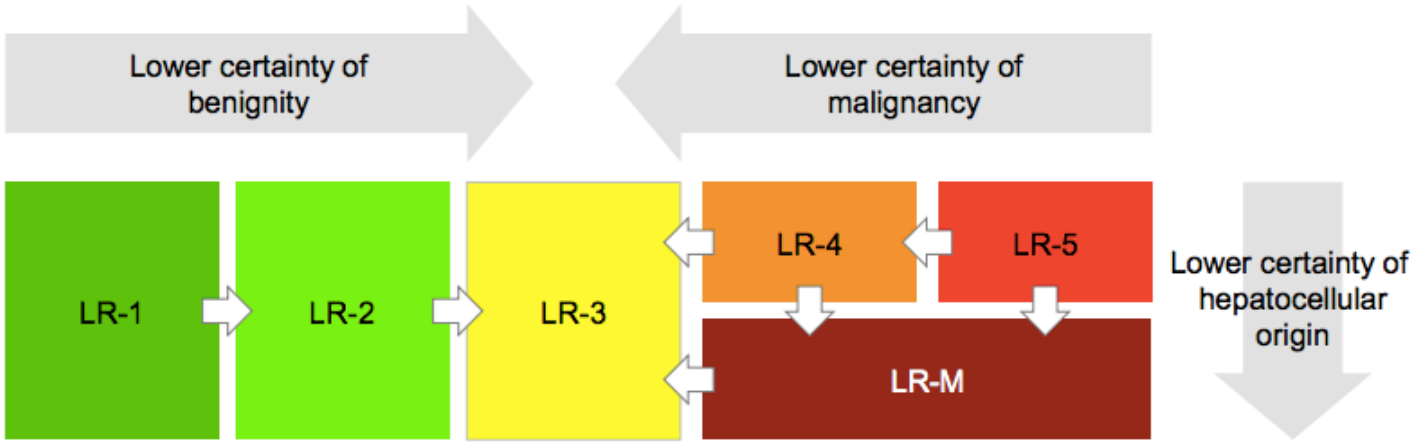
If unsure about presence of TIV, do not categorize as LR-TIV

Tumor in vein

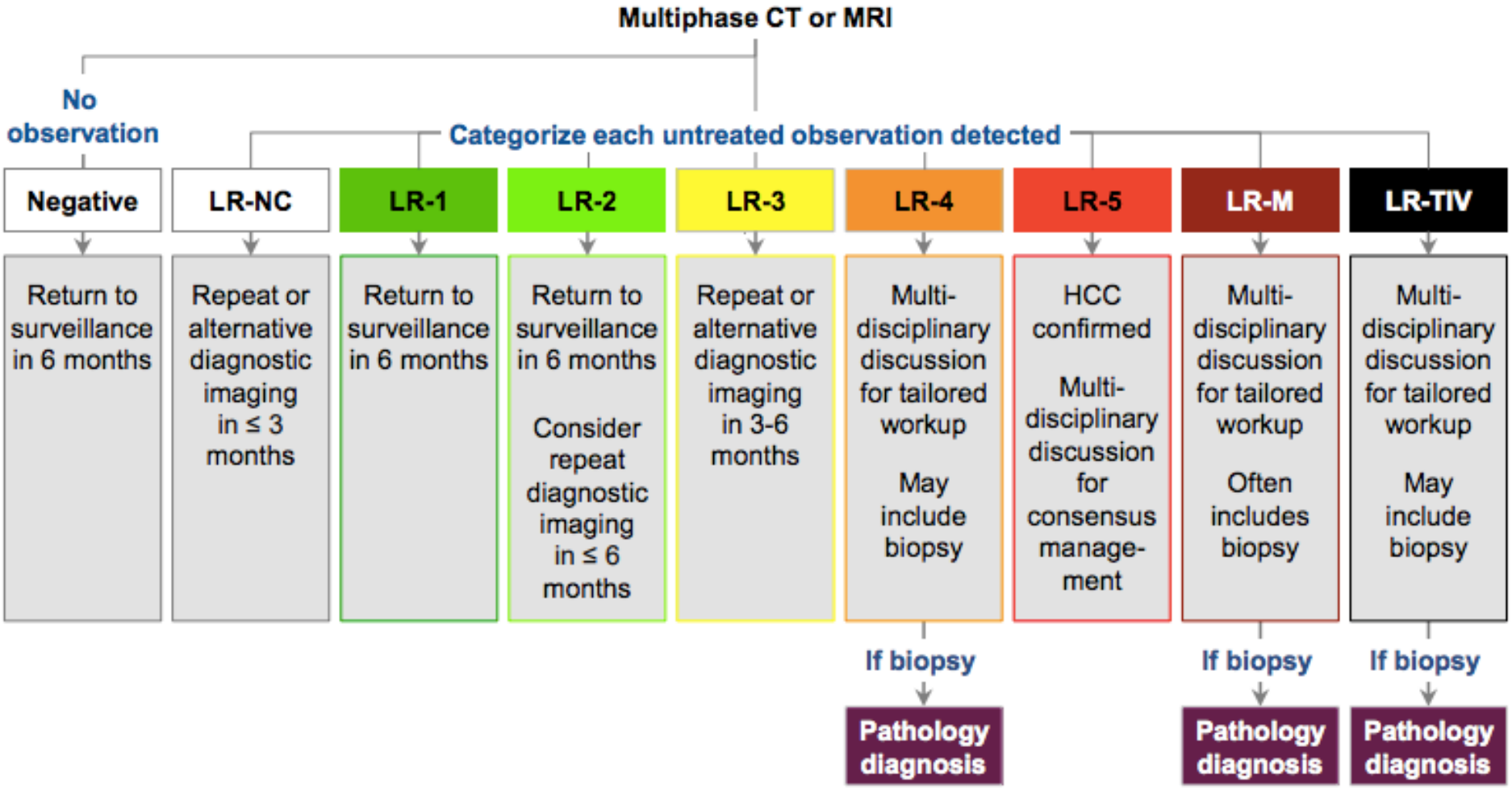
LR-TIV

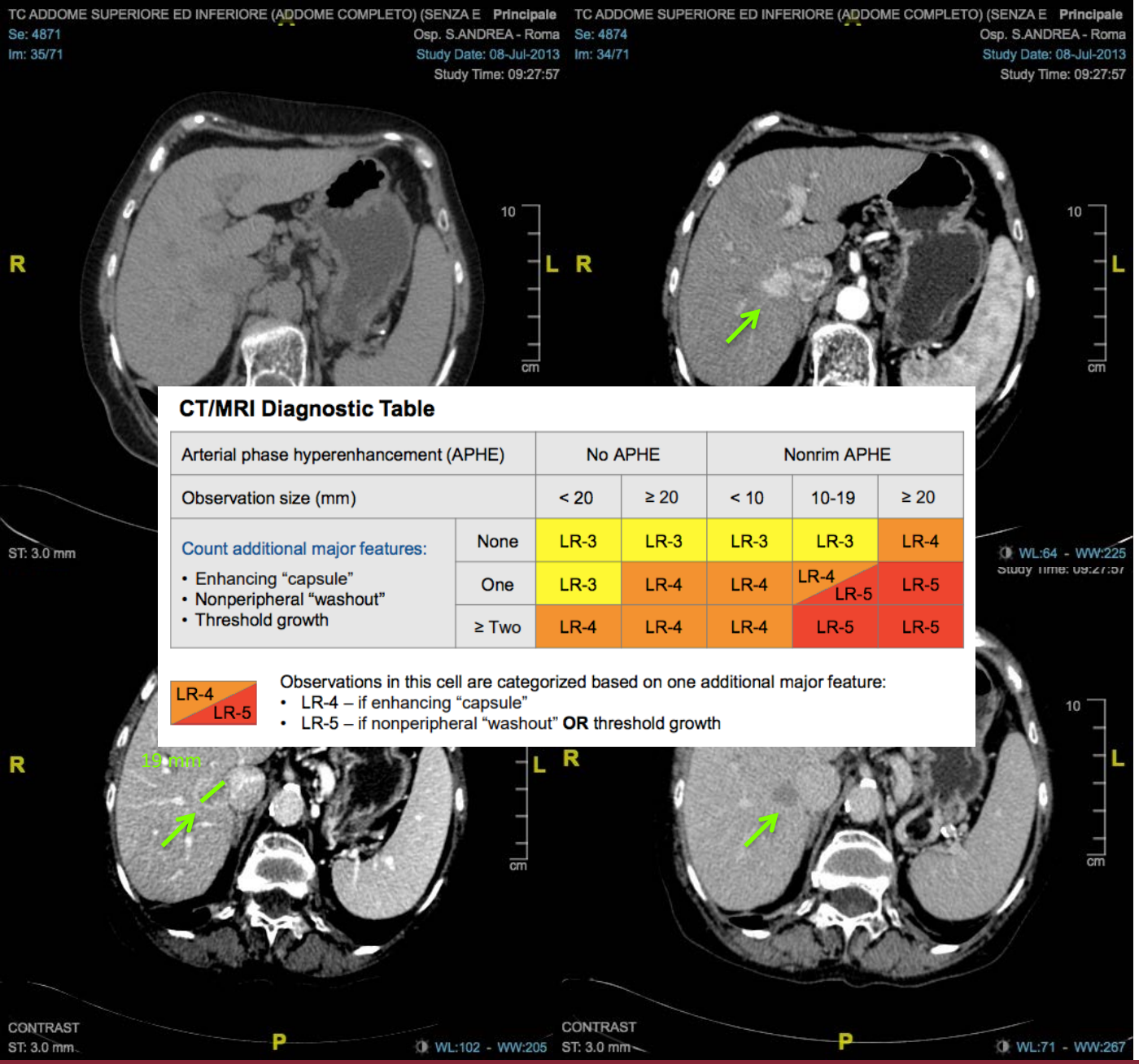
Unequivocal enhancing soft tissue in vein, regardless of visualization of parenchymal mass

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



CT/MRI LI-RADS® v2018 CORE





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: • Enhancing "capsule" • Nonperipheral "washout" • 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 based on one additional major feature:
- LR-4 – if enhancing "capsule"
- LR-5 – if nonperipheral "washout" **OR** threshold growth

STEP 1: wash-in arterioso

Sì/No

STEP 2: dimensioni

<10mm

10-19mm

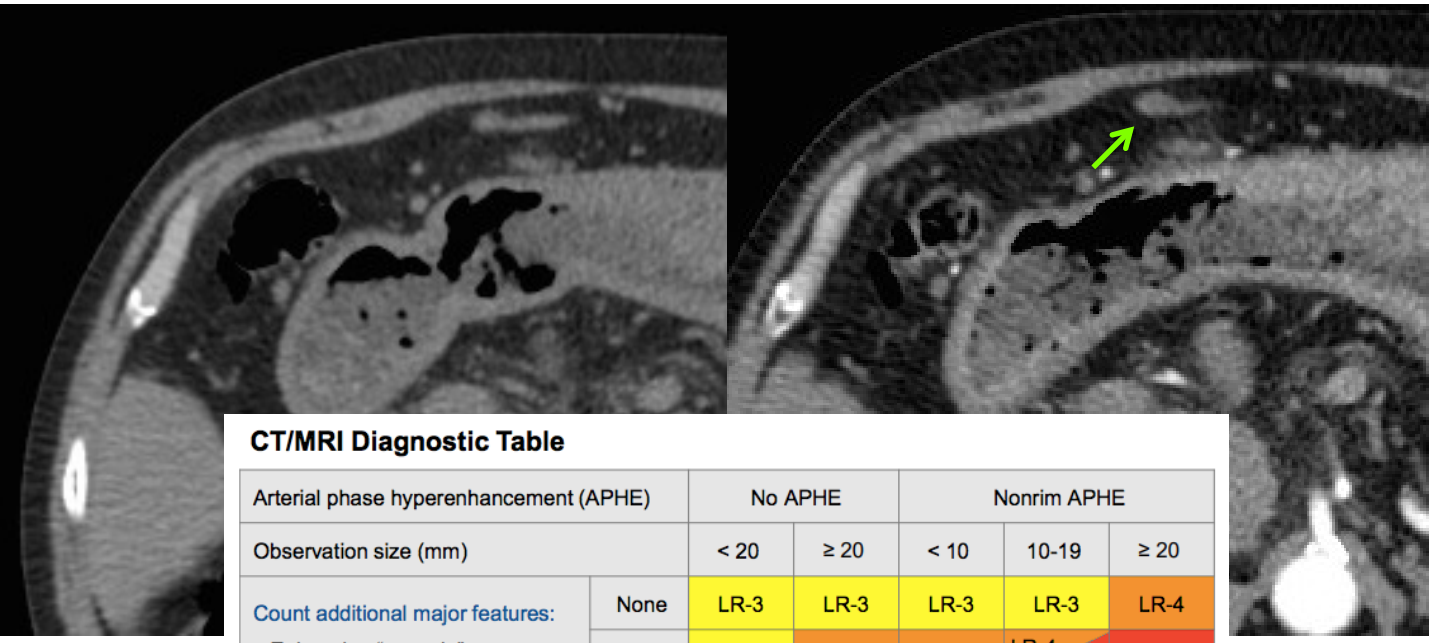
>20mm

STEP 3: criteri maggiori:

- Capsula?
- Wash-out?
- Crescita?

Nessuno / uno / ≥ due

LR 5



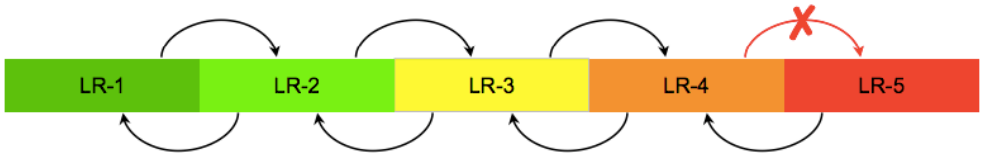
CT/MRI Diagnostic Table

Arterial phase hyperenhancement (APHE)		No APHE		Nonrim APHE		
Observation size (mm)		< 20	≥ 20	< 10	10-19	≥ 20
Count additional major features: • Enhancing "capsule" • Nonperipheral "washout" • 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 based on one additional major feature:
- LR-4 – if enhancing "capsule"
- LR-5 – if nonperipheral "washout" **OR** threshold growth

≥ 1 AF favoring malignancy: upgrade by 1 category up to LR-4
(Absence of these AFs should not be used to downgrade)



≥ 1 AF favoring benignity: downgrade by 1 category
(Absence of these AFs should not be used to upgrade)

If ≥ 1 AF favoring malignancy and ≥ 1 AF favoring benignity:
Do not adjust category

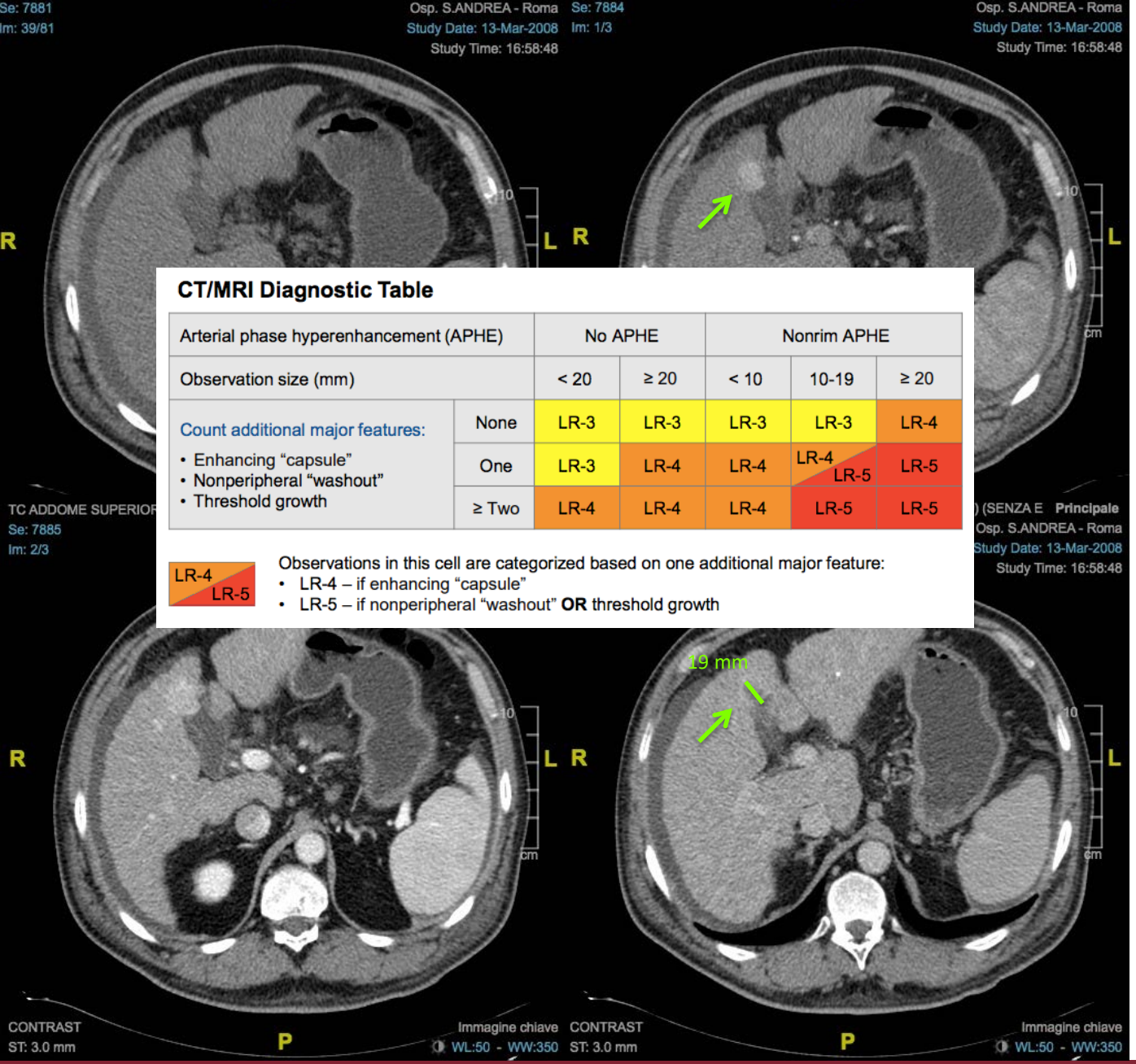
STEP 1: wash-in arterioso
Sì/No

STEP 2: dimensioni
<20mm
≥20mm

STEP 3: criteri maggiori:
- Capsula?
- Wash-out?
- Crescita?

Nessuno / uno / ≥ due

LR 3



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: • Enhancing "capsule" • Nonperipheral "washout" • 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 based on one additional major feature:
- LR-4 – if enhancing "capsule"
- LR-5 – if nonperipheral "washout" **OR** threshold growth

STEP 1: wash-in arterioso

Sì/No

STEP 2: dimensioni

<10mm

10-19mm

>20mm

STEP 3: criteri maggiori:

- Capsula?
- Wash-out?
- Crescita?

Nessuno / uno / ≥ due

LR 4

CT/MRI LI-RADS® v2018 CORE

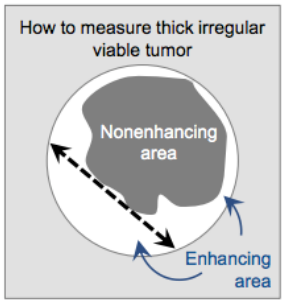
Treatment Response Categories

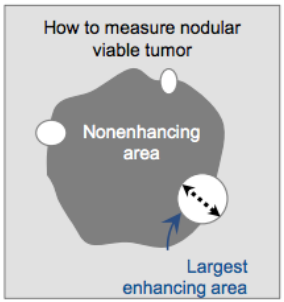
LR-TR Nonevaluable	Treated, Response not evaluable (due to image omission or degradation)
LR-TR Nonviable	Treated, Probably or definitely not viable
LR-TR Equivocal	Treated, Equivocally viable
LR-TR Viable	Treated, Probably or definitely viable

CT/MRI LI-RADS® v2018 CORE

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





Size of equivocally, probably, or definitely viable tumor

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

No lesional enhancement

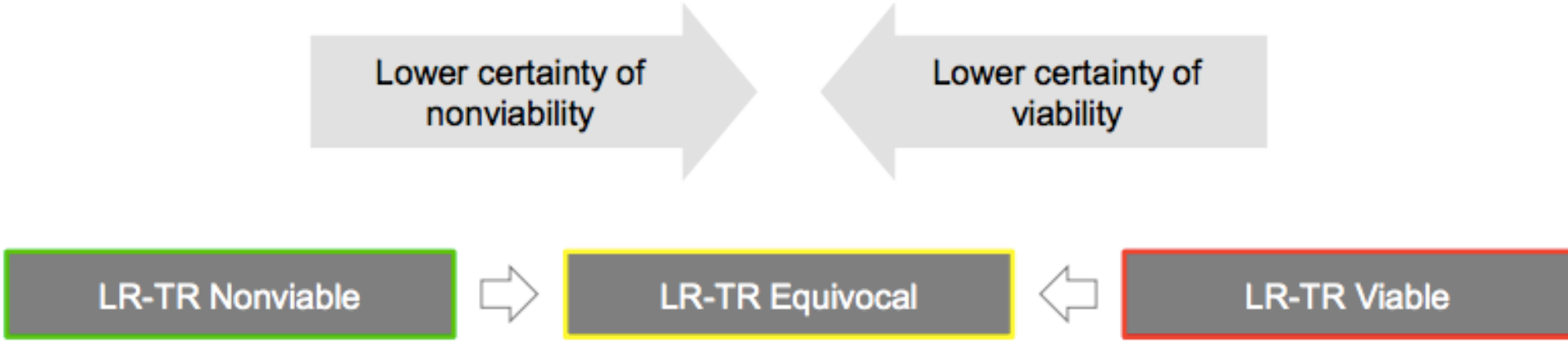
Posttreatment APHE

Posttreatment "washout"

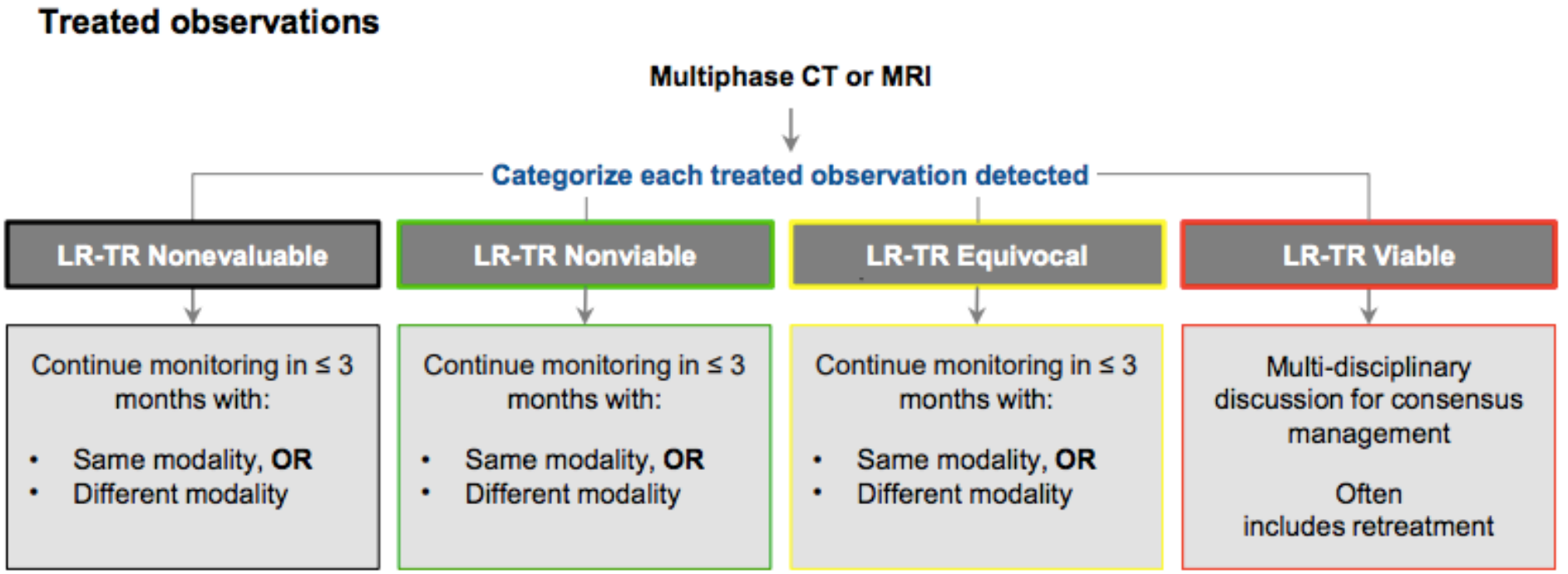
Posttreatment enhancement similar to pretreatment

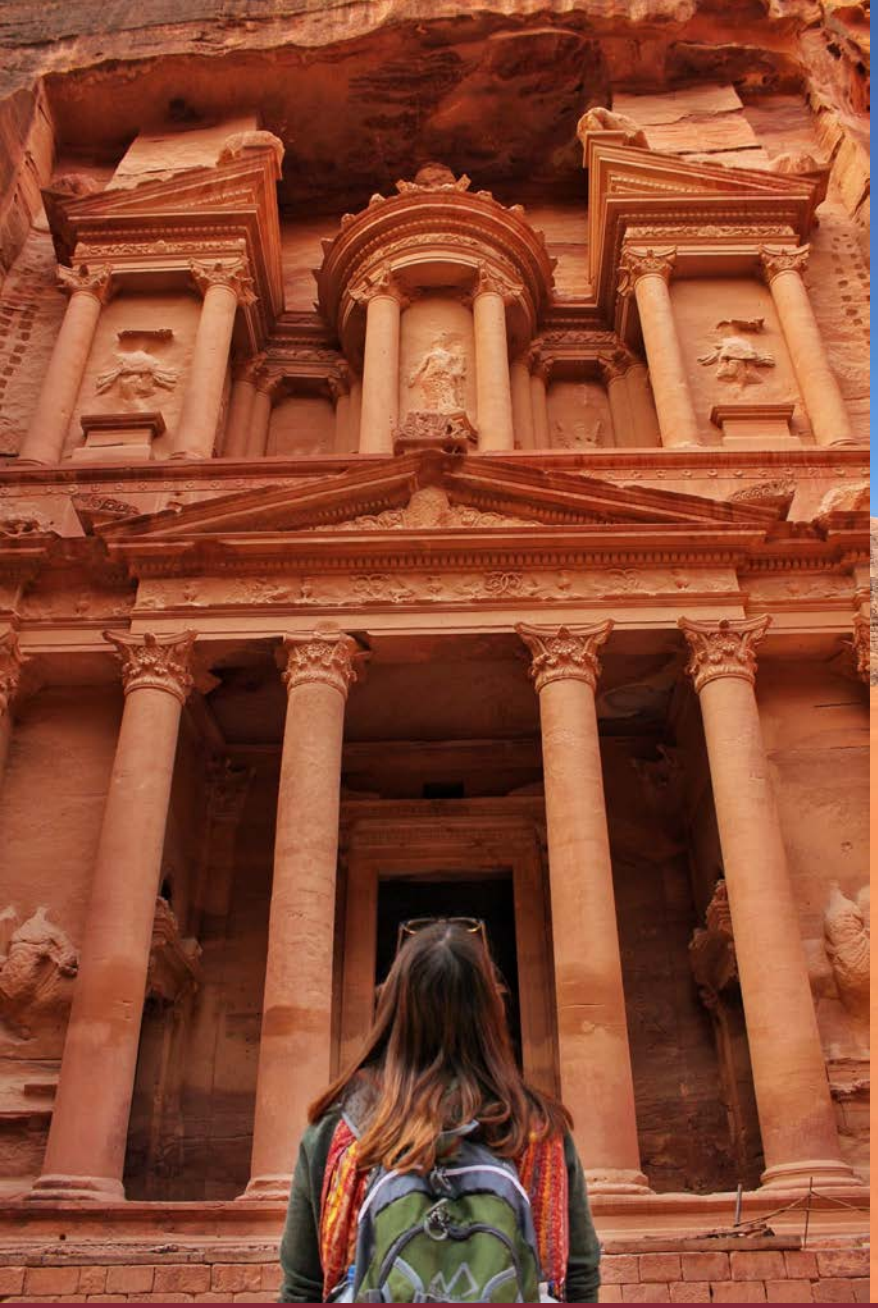
CT/MRI LI-RADS® v2018 CORE

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



CT/MRI LI-RADS® v2018 CORE





Grazie per l'attezione!