

Intraindividual Comparison of MRIs with Extracellular and Hepatobiliary Contrast Agents for the Noninvasive Diagnosis of Hepatocellular Carcinoma using the Korean Liver Cancer Association-National Cancer Center 2022 Criteria

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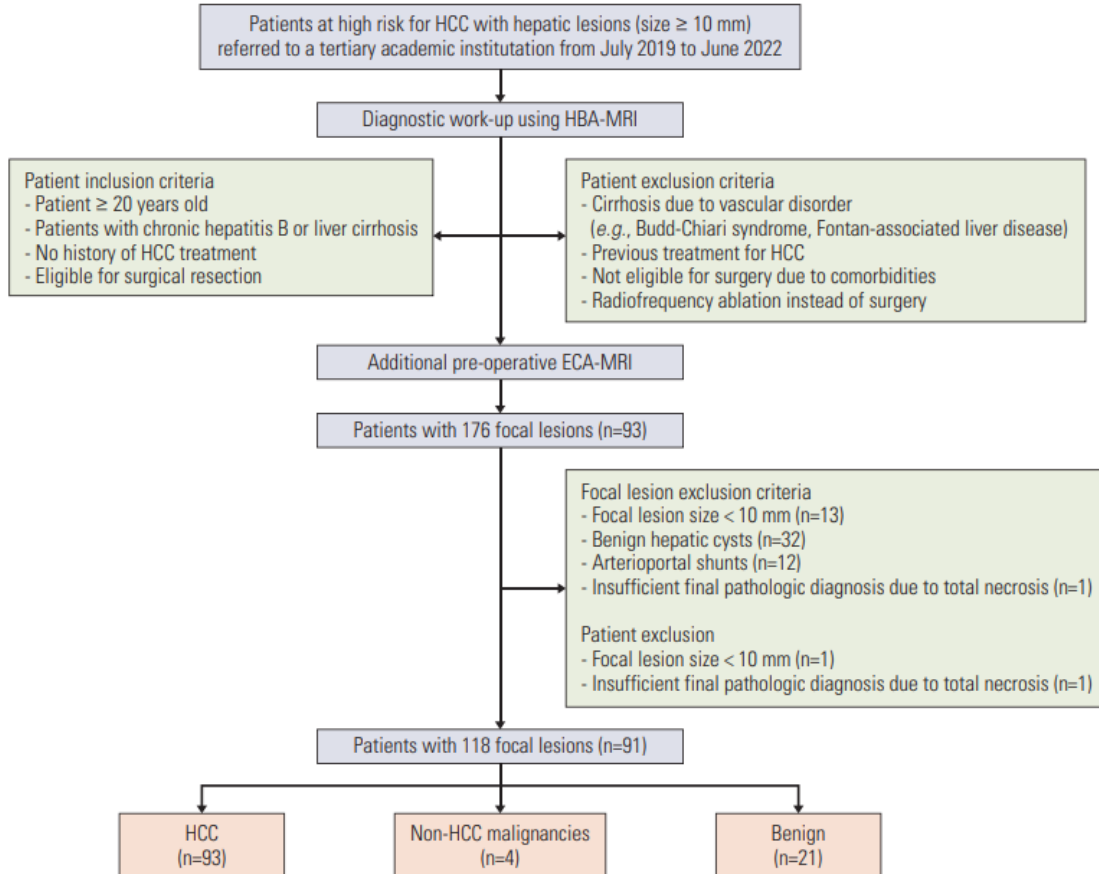
Background

- The Korean Liver Cancer Association (KLCA)- National Cancer Center (NCC) published the 2018 KLCA-NCC HCC practice guideline and recently updated it in 2022. They provide diagnosis, staging, and treatment guidelines for HCC specific to Asia, especially Korea.
- There have not yet been reports on the diagnostic performance of the updated KLCA-NCC 2022 criteria, owing to its recent implementation.

Aim

- The aim of the present study was to evaluate the per-lesion sensitivity and specificity of the recently published KLCA-NCC 2022 criteria for the noninvasive diagnosis of HCC, with an intraindividual comparison of the diagnostic performance of ECA-MRI and HBA-MRI.

Methods I



Methods II – “Definite” HCC

- Both APHE and washout appearance on portal venous or delayed phases in ECA-MRI.
- Both APHE and washout appearance on portal venous, delayed, or hepatobiliary phases in HBA-MRI.

Methods III – “Probable” HCC

Nodule without APHE

- At least one each of the ancillary features of group A and group B

Nodule with APHE but without washout appearance

- At least one of the ancillary features in group A or B

Ancillary imaging features of HCC

Group A: Ancillary features suggesting malignancy in general

- Mild-to-moderate T2 hyperintensity
- High signal intensity on DWI
- Threshold growth*

* Threshold growth defines as the size growth of the nodule of at least 50% in the longest dimension in ≤ 6 months on CT or MRI.

Group B: Ancillary features favoring HCC in particular

- Enhancing or nonenhancing capsule
- Mosaic architecture
- Nodule-in-nodule appearance
- Fat in mass or blood products in mass

Results I – Characteristics

Characteristic	No. (%)
Sex	91
Male	76 (83.5)
Female	15 (16.5)
Age (yr), mean±SD^{a)}	58.1±10.6
Etiology of liver disease	
Hepatitis B	74 (81.3)
Hepatitis C	4 (4.4)
Alcoholic	3 (3.3)
Others	10 (11.0)
Liver cirrhosis	40 (44.0)
MELD score^{b)}, median (IQR)	7 (6-8)
Lesions	118
Size (mm)^{a)}	25.6±15.9
Final diagnosis	
HCC	93 (78.8)
Non-HCC malignancy	
cHCC-CCA	3 (2.5)
Intrahepatic cholangiocarcinoma	1 (0.9)
Benign lesion	
Hemangioma	9 (7.6)
Regenerative nodule or dysplastic nodule	12 (10.2)

Results II – “Definite” HCC category

Categorization of KLCA-NCC 2022 ^{a)}	ECA-MRI		HBA-MRI		p-value ^{b)}
	No.	% (95% CI)	No.	% (95% CI)	
“Definite” HCC					
All lesions (n=118)					
Sensitivity	54/93	58.1 (47.8-67.6)	73/93	78.5 (69.0-85.7)	< 0.001
Specificity	23/25	92.0 (73.1-98.0)	23/25	92.0 (73.1-98.0)	> 0.999
PPV	-	96.4 (87.6-99.0)	-	97.3 (90.6-99.3)	-
NPV	-	37.1 (31.1-43.5)	-	53.5 (43.4-63.3)	-
Lesions 10-19 mm (n=53)					
Sensitivity	12/33	36.4 (21.9-53.7)	24/33	72.7 (53.5-83.4)	0.005
Specificity	19/20	95.0 (71.1-99.3)	19/20	95.0 (71.8-99.3)	> 0.999
PPV	-	92.3 (62.8-98.8)	-	96.0 (77.8-99.4)	-
NPV	-	47.5 (40.7-54.4)	-	67.9 (54.5-78.8)	-
Lesions ≥ 20 mm (n=65)					
Sensitivity	42/60	70.0 (57.3-80.2)	49/60	81.7 (69.8-89.5)	0.020
Specificity	4/5	80.0 (30.9-97.3)	4/5	80.0 (30.9-97.3)	> 0.999
PPV	-	97.7 (87.8-99.6)	-	98.0 (89.4-99.6)	-
NPV	-	18.2 (11.0-28.5)	-	26.7 (15.4-42.0)	-

Results III – “Definite” or “probable” HCC categories

Categorization of KLCA-NCC 2022 ^{a)}	ECA-MRI		HBA-MRI		p-value ^{b)}
	No.	% (95% CI)	No.	% (95% CI)	
“Probable” or “definite” HCC					
All lesions (n=118)					
Sensitivity	79/93	84.9 (76.2-90.9)	79/93	84.9 (76.2-90.9)	> 0.999
Specificity	21/25	84.0 (64.3-93.9)	21/25	84.0 (64.3-93.9)	> 0.999
PPV	-	95.2 (88.9-98.0)	-	95.2 (88.9-98.0)	-
NPV	-	60.0 (47.3-71.5)	-	60.0 (47.3-71.5)	-
Lesions 10-19 mm (n=53)					
Sensitivity	28/33	84.8 (68.4-93.5)	28/33	84.8 (68.4-93.5)	> 0.999
Specificity	17/20	85.0 (62.4-95.1)	17/20	85.0 (62.4-95.1)	> 0.999
PPV	-	90.3 (76.5-96.4)	-	90.3 (76.5-96.4)	-
NPV	-	77.3 (59.8-88.6)	-	77.3 (59.8-88.6)	-
Lesions ≥ 20 mm (n=65)					
Sensitivity	51/60	85.0 (73.6-92.0)	51/60	85.0 (73.6-92.0)	> 0.999
Specificity	4/5	80.0 (30.9-97.3)	4/5	80.0 (30.9-97.3)	> 0.999
PPV	-	98.1 (98.8-99.7)	-	98.1 (98.8-99.7)	-
NPV	-	30.8 (17.4-48.4)	-	30.8 (17.4-48.4)	-

Conclusion

- The “definite” HCC category of the KLCA-NCC 2022 criteria showed higher sensitivity in diagnosing HCC on HBA-MRI compared with ECA-MRI, without compromising specificity.
- There was no significant difference in sensitivity and specificity of “probable” or “definite” HCC categories by KLCA-NCC 2022 criteria on ECA-MRI and HBA-MRI.