A SIMPLIFICATION OF LI-RADS V2018 THAT IMPROVES SENSITIVITY WHILE MAINTAINING POSITIVE PREDICTIVE VALUE FOR HCC ON GADOXETATE DISODIUM-ENHANCED MRI

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INTRODUCTION

• Gadexetate disodium (EOB)-enhanced MRI is a first-line diagnostic modality for HCC.

• The integration of LI-RADS in some practices has been hampered in part due to limited diagnostic sensitivity (~62%) and complex ancillary feature system.

• Due to challenges in depicting several Liver Imaging Reporting and Data System (LI-RADS) major features, it has suboptimal diagnostic performance compared with MRI using extracellular contrast agents.

• This study aimed to develop a modified LI-RADS (mLI-RADS) based on EOB-MRI and to compare its performance with the current LI-RADS version 2018 and other established HCC diagnostic algorithms.

METHODS

• Consecutive high-risk patients with LR-3 to LR-5 observations were retrieved from a prospectively-collected cohort and divided into training and testing sets.

• In the training set, the optimal LI-RADS version 2018 features were selected by Random Forest analysis to develop mLI-RADS via decision tree analysis.

• mLI-RADS assigned based on PPV: mLI-RADS 5 PPV > 90%, mLI-RADS 3 PPV < 40%, mLI-RADS 4 PPV 40-90%.

• For the independent testing set, diagnostic performances of mLI-RADS and other established HCC schemes were computed using a generalized estimating equation model and compared with McNemar’s test.

RESULTS

• Five features were included in mLI-RADS, as opposed to 26 features in LI-RADS v2018.

• mLR-5 was defined as nonperipheral "washout" coupled with either nonrim arterial phase hyperenhancement OR restricted diffusion.

• In the testing set, mLI-RADS was more sensitive (72% vs. 61%, P<.001) than LI-RADS v2018, without significant sacrifice in PPV (94% vs. 94%, P =.56) or specificity (92% vs. 94%, P=.22).

• Use of mLI-RADS resulted in category migration of 241 observations among three readers from LR-4 to mLR-5 (99% were HCC) in the training set, and of 47 observations among three readers (89% were HCC) in the testing set.

CONCLUSIONS

• In high-risk patients, the EOB-MRI-based mLI-RADS is simpler as it constitutes only 5 features compared to LI-RADS v2018, which includes as many as 26 features.

• mLI-RADS demonstrated significantly improved diagnostic sensitivity, NPV, and accuracy for HCC than LI-RADS v2018, while maintaining comparably high PPV and specificity.