HCC Surveillance: Ultrasonography vs. Abbreviated MRI

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HCC is a leading cause of cancer-related mortality worldwide, making early detection through surveillance crucial for providing curative treatments and improving overall survival. Currently, biannual ultrasonography (US) with or without alpha-fetoprotein (aFP) is the recommended standard for HCC surveillance in at-risk patients, owing to its accessibility, safety, and low cost. However, the sensitivity of US for detecting early-stage HCC is suboptimal, reported to be around 47% to 63% in meta-analyses. Surveillance failure is frequently associated with inadequate echogenic windows caused by severe steatosis, obesity, or macronodular cirrhosis.

MRI has demonstrated superior sensitivity in detecting very early-stage HCC. A prospective study showed that MRI with liver-specific contrast yielded an 84.8% detection rate for very early-stage HCC, compared to only 27.3% for US. However, despite its high diagnostic performance, full-sequence MRI is hindered by long acquisition times, high costs, and limited accessibility. Consequently, abbreviated MRI (AMRI) protocols have emerged as a practical alternative.

AMRI protocols are broadly categorized into three types: AMRI with extracellular contrast media (DCE AMRI), AMRI with the hepatobiliary contrast agent (HBP AMRI), and non-contrast AMRI (NC-AMRI). DCE AMRI includes dynamic phases, which facilitates direct noninvasive diagnosis of HCC and potentially reduces the need for recall examinations, but it lacks T2WI and DWI, and therefore, false positive such as AP shunts can be problematic. Also, it carries contrast-related risks such as gadolinium retention. HBP AMRI provides excellent tissue contrast and high sensitivity for detecting small lesions; however, it often requires additional recall examinations for definitive diagnosis due to the lack of dynamic sequences. Higher cost of HBP contrast agent can be another problem. NC-AMRI, utilizing only DWI and T2WI with/without T1 in-/opposed-phase images, has been proposed to completely eliminate contrast-related risks and further reduce scan times and costs. But relatively lower sensitivity can be the limitation of NC-AMRI. However, recent prospective trials indicate that NC-AMRI still provides significantly higher sensitivity (71.0%-79.1%) and higher diagnostic yield without increasing the false referral rate compared to biannual US

Although AMRI offer excellent diagnostic performance, their widespread implementation for all cirrhotic patients may not be cost-effective. However, risk-stratified strategies targeting high- or intermediate-risk patients have proven to be highly cost-effective.

In conclusion, while US remains the cornerstone of HCC surveillance, AMRI may represent promising, cost-effective alternatives for high-risk patients or those with suboptimal US visualization. Tailored surveillance strategies integrating these advanced imaging modalities could overcome the current limitations of US and further improve patient outcomes.