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Hepatocellular Carcinoma in Chronic Hepatitis B: The Role of Ultrasound in Surveillance

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Abstract

Hepatitis B virus (HBV) infection remains one of the leading causes of hepatocellular carcinoma (HCC) worldwide and continues to represent a major global public health burden. Although HCC most commonly develops in cirrhotic liver, chronic hepatitis B (CHB) possesses direct oncogenic potential and may result in HCC development even in non-cirrhotic patients. Early detection through surveillance is essential for improving prognosis and enabling potentially curative treatment.

Ultrasound remains the primary imaging modality for HCC surveillance because of its accessibility, safety, repeatability, and cost-effectiveness. However, surveillance performance is strongly influenced by operator expertise, liver parenchymal characteristics, obesity, and visualization quality. Recent developments including the Liver Imaging Reporting and Data System (LI-RADS) US Surveillance algorithm, visualization scoring systems, transient elastography, and contrast-enhanced ultrasound (CEUS) have expanded the role of ultrasound in surveillance and lesion characterization. In addition, emerging technologies such as artificial intelligence-assisted imaging analysis and radiomics may improve early tumor detection and individualized risk stratification in the future.

This review summarizes current evidence regarding CHB-related HCC epidemiology, surveillance strategies, ultrasound-based imaging approaches, LI-RADS US Surveillance, CEUS applications, and future perspectives in personalized HCC surveillance.

Keywords: Hepatitis B virus infection; Chronic hepatitis B; hepatocellular carcinoma; ultrasound; HCC surveillance; LI-RADS; contrast-enhanced ultrasound; transient elastography; liver fibrosis; CEUS; artificial intelligence

Introduction

Hepatocellular carcinoma (HCC) is the most common primary liver malignancy and remains a major cause of cancer-related mortality worldwide. Hepatitis B virus (HBV) infection is one of the leading etiological factors for HCC, particularly in regions with intermediate or high HBV endemicity. Unlike many other chronic liver diseases, HBV-related hepatocarcinogenesis may occur not only in cirrhotic patients but also in selected non-cirrhotic individuals because of the direct oncogenic potential of HBV. Therefore, surveillance remains essential for early tumor detection and reduction of HCC-related mortality. Ultrasound is widely recommended as the primary surveillance modality because it is non-invasive, accessible, repeatable, and cost-effective; however, its diagnostic performance depends on visualization quality, liver parenchymal characteristics, patient-related factors, and operator expertise. Recent advances in LI-RADS US Surveillance, visualization scoring, and contrast-enhanced ultrasound (CEUS) have further refined the role of ultrasound-based imaging in HCC surveillance among patients with chronic hepatitis B (EASL, 2025; Singal et al., 2023; Rodgers et al., 2024; Park et al., 2024).

Epidemiology and Global Burden of HBV-Related HCC

Chronic hepatitis B (CHB), resulting from infection with the HBV, continues to represent a significant global public health burden. According to the world health organization (WHO) Global Hepatitis Report 2026, an estimated 240 million people were living with chronic HBV infection worldwide in 2024, corresponding to 2.9% of the global population, with approximately 0.9 million new infections and 1.1 million HBV-related deaths annually, primarily due to cirrhosis and hepatocellular carcinoma (WHO, 2026).

HCC represents approximately 90% of primary liver cancers and remains a major global health problem, ranking as the sixth leading cancer and the third leading cause of cancer-related mortality worldwide. Although most HCCs arise in cirrhotic liver, chronic hepatitis B represents a distinct etiological context because HCC may also develop in non-cirrhotic patients. According to the EASL 2025 Clinical Practice Guidelines, HCC surveillance does not aim to reduce cancer incidence, but rather to reduce HCC-related mortality through repeated screening and detection at an earlier, potentially treatable stage (Easl, 2025).

HBV-related hepatocellular carcinoma in non-cirrhotic liver

Although HCC most frequently develops in the setting of cirrhosis, an important subset of cases occurs in patients without cirrhosis. Aryan et al. reported that approximately 10–20% of HCC cases are diagnosed in non-cirrhotic liver, highlighting the clinical significance of non-cirrhotic hepatocarcinogenesis. Non-cirrhotic HCC is often diagnosed at a more advanced stage compared with cirrhotic HCC because patients usually retain preserved liver function, remain asymptomatic for longer periods, and are less frequently enrolled in surveillance programs. As a

result, up to 25% of non-cirrhotic HCC cases may already demonstrate metastatic disease at diagnosis.

Among viral etiologies, HBV represents the leading cause of hepatotropic viral-related non-cirrhotic HCC. Unlike many other chronic liver diseases, HBV possesses direct oncogenic potential independent of advanced fibrosis or cirrhosis. HBV is a double-stranded DNA virus belonging to the Hepadnaviridae family that incorporates its DNA into the host hepatocyte genome following infection. According to Aryan et al., this integration process contributes to chromosomal instability, insertional mutagenesis, and production of mutant HBV proteins, ultimately resulting in decreased apoptosis and increased hepatocyte transformation and proliferation. These molecular mechanisms may explain why approximately 30% of HBV-related HCC cases occur in patients without cirrhosis.

The review also emphasizes that high HBV viral load and certain HBV genotypes or mutations, including the T1762/A1764 mutation, are associated with increased risk of HCC development in non-cirrhotic patients. Consequently, surveillance remains clinically important even in selected non-cirrhotic individuals with chronic HBV infection. The authors note that current surveillance strategies in high-risk non-cirrhotic HBV patients include abdominal ultrasound with or without serum alpha-fetoprotein assessment every six months. High-risk groups include individuals with a family history of HCC, patients of African descent older than 20 years, Asian men older than 40 years, and Asian women older than 50 years.

From an imaging perspective, non-cirrhotic HCC presents a particular diagnostic challenge because the absence of advanced fibrosis and cirrhotic architectural distortion may delay clinical suspicion and surveillance enrollment. Therefore, awareness of HBV-related non-cirrhotic HCC is essential for radiologists and hepatologists involved in ultrasound-based surveillance and early tumor detection (Aryan et al., 2024).

HCC surveillance in chronic HBV infection

HCC surveillance represents a fundamental strategy for reducing HCC-related mortality through early detection at a potentially curable stage. According to the EASL Clinical Practice Guidelines on the management of hepatitis B virus infection, surveillance programmes are particularly important in patients with chronic HBV infection because the risk of HCC persists despite effective antiviral therapy and may remain elevated even after HBsAg loss in selected patients. Patients with cirrhosis constitute the highest-risk group and require continued surveillance irrespective of treatment status. In addition, selected non-cirrhotic individuals with chronic HBV infection and increased HCC risk should also undergo surveillance, including patients with family history of HCC, advanced fibrosis, high liver stiffness measurements, demographic risk factors, or metabolic comorbidities.

The EASL guidelines recommend abdominal ultrasound (US) every six months as the primary surveillance modality in at-risk populations, performed by experienced operators. US remains widely used because of its accessibility, safety, repeatability, relatively low cost, and absence of ionizing radiation. Reported diagnostic performance for surveillance US demonstrates sensitivity ranging from 58% to 89% and specificity exceeding 90%, although examination quality and diagnostic accuracy strongly depend on operator expertise and patient-related factors. The guidelines further emphasize that other imaging modalities, including contrast-enhanced CT or MRI, should be considered when ultrasound cannot provide reliable information, particularly in patients with obesity, severe steatosis, bowel gas interference, or limited acoustic windows. In addition to imaging, serum alpha-fetoprotein (AFP) may be combined with US to improve sensitivity for early-stage HCC detection compared with US alone.

Recent EASL recommendations also highlight the growing importance of individualized risk stratification using HCC prediction models such as PAGE-B and mPAGE-B, particularly in patients receiving long-term nucleos(t)ide analogue therapy. These approaches may improve identification of patients at highest risk and optimize surveillance strategies in chronic HBV infection (EASL, 2025).

In addition to the EASL recommendations, the American Association for the Study of Liver Diseases (AASLD) Practice Guidance also emphasizes the central role of surveillance in reducing HCC-related mortality through early tumor detection and timely curative treatment. According to the AASLD guidance, surveillance should be performed in populations at increased risk for HCC, including patients with cirrhosis and selected non-cirrhotic individuals with HBV CHB. The guideline highlights that HBV-related hepatocarcinogenesis may occur even in the absence of cirrhosis because of the direct oncogenic mechanisms of HBV, supporting continued surveillance in high-risk non-cirrhotic patients.

The AASLD recommends abdominal ultrasound with or without serum AFP measurement every six months as the standard surveillance strategy. Ultrasound remains the preferred first-line modality because of its accessibility, safety profile, repeatability, and relatively low cost. However, the guideline also acknowledges important limitations of ultrasound-based surveillance, particularly reduced sensitivity for early-stage HCC in patients with obesity, hepatic steatosis, nodular cirrhosis, or poor acoustic windows. The authors note that surveillance effectiveness may vary substantially according to visualization quality and operator expertise.

The guidance further emphasizes the importance of individualized risk assessment in CHB. Specific high-risk populations include patients with cirrhosis, Asian men older than 40 years, Asian women older than 50 years, individuals of African ancestry at younger age, and patients

with a family history of HCC. Importantly, the risk of HCC may persist despite effective antiviral therapy, indicating that viral suppression does not completely eliminate the need for surveillance.

In addition, the AASLD guidance discusses the growing role of risk-stratified surveillance strategies and acknowledges that alternative imaging modalities such as CT or MRI may be appropriate in selected patients with inadequate ultrasound visualization or persistently limited surveillance quality. The guideline also recognizes the emerging value of biomarkers, risk prediction models, and standardized imaging systems in improving surveillance performance and optimizing individualized HCC screening approaches (Singal et al., 2023).

Diagnostic Performance of Ultrasound Surveillance

US remains the cornerstone imaging modality for HCC surveillance in patients at risk because of its wide availability, safety, repeatability, and relatively low cost. However, its diagnostic performance varies considerably according to tumor stage, patient characteristics, and examination quality. Early detection is critically important because curative treatment options, including surgical resection, liver transplantation, and local ablative therapies, are most effective when HCC is diagnosed at an early stage.

One of the most influential analyses evaluating surveillance performance was the meta-analysis conducted by Katerina Tzartzeva and colleagues. This systematic review assessed the effectiveness of US with or without AFP for early HCC detection in patients with cirrhosis. The authors demonstrated that US alone showed acceptable sensitivity for detecting HCC overall; however, sensitivity for early-stage HCC was substantially lower. Importantly, the addition of AFP significantly improved early-stage detection compared with ultrasound alone. These findings support the growing concept that combined surveillance strategies may improve detection of potentially curable tumors, particularly in patients with suboptimal ultrasound visualization or elevated HCC risk.

The study further emphasized the considerable heterogeneity in surveillance performance across different clinical settings. Factors associated with lower sensitivity included obesity, advanced cirrhosis, hepatic steatosis, nodular liver morphology, and operator dependency. Small lesions and infiltrative tumors were particularly difficult to identify during routine surveillance examinations. Despite these limitations, US continues to represent the recommended first-line surveillance modality in major international guidelines because it remains the most practical and accessible imaging tool for repeated population-based screening.

More recent evidence has additionally highlighted that US sensitivity is strongly influenced by examination quality and visualization adequacy. In clinical practice, poor acoustic windows, rib shadowing, bowel gas, and heterogeneous cirrhotic parenchyma may substantially reduce lesion

conspicuity and increase false-negative examinations. Consequently, current surveillance strategies increasingly emphasize standardized reporting systems, quality assessment, and individualized imaging approaches to improve surveillance effectiveness (Tzartzeva et al., 2018; Singal et al., 2020).

LI-RADS US Surveillance and Visualization Score

The American College of Radiology developed the Liver Imaging Reporting and Data System (LI-RADS) US Surveillance algorithm to standardize US-based HCC surveillance in at-risk patients. Initially introduced in 2017 and subsequently updated as LI-RADS US Surveillance v2024, the system provides a structured framework for ultrasound acquisition, interpretation, reporting, and follow-up recommendations. The updated version incorporates both surveillance findings and examination quality assessment, reflecting the growing recognition that visualization adequacy significantly influences diagnostic performance.

The LI-RADS US Surveillance system includes two major components: the US category and the Visualization Score. The US category reflects surveillance findings and is classified as US-1 (negative), US-2 (subthreshold observation smaller than 10 mm), or US-3 (positive surveillance examination with suspicious observation ≥10 mm or vascular thrombus). In parallel, the Visualization Score evaluates the expected sensitivity of the US examination and is categorized as VIS-A, VIS-B, or VIS-C. VIS-A indicates minimal or no visualization limitations, VIS-B indicates moderate limitations that may obscure small lesions, and VIS-C reflects severe limitations with substantially reduced expected sensitivity for HCC detection.

Recent studies have demonstrated the important clinical value of visualization scoring. Rodgers and colleagues emphasized that poor visualization quality is associated with decreased HCC detection sensitivity and increased risk of false-negative surveillance examinations. Multiple factors contribute to limited visualization, including obesity, hepatic steatosis, advanced cirrhosis, bowel gas, rib shadowing, and difficult lesion location. Patients with metabolic dysfunction-associated steatotic liver disease (MASLD), alcohol-related liver disease, or elevated body mass index are particularly prone to VIS-C examinations.

The clinical relevance of visualization quality was further investigated by Min Kyung Park and colleagues in patients with CHB. Their study demonstrated that poor visualization scores were associated with decreased surveillance effectiveness and higher rates of false-negative examinations. VIS-C examinations showed markedly lower sensitivity for HCC detection compared with VIS-A studies, supporting the concept that visualization scoring may help identify patients who require alternative imaging strategies.

An important contribution of LI-RADS US Surveillance v2024 is the increasing emphasis on quality optimization and structured acquisition protocols. The updated recommendations encourage standardized cine sweeps, comprehensive liver coverage, and technical optimization strategies to improve lesion detection. Furthermore, the visualization score provides clinically actionable information because repeated VIS-C examinations may justify surveillance with contrast-enhanced CT or MRI instead of ultrasound alone.

The growing implementation of LI-RADS surveillance protocols also improves communication between radiologists and hepatologists by providing standardized terminology and management recommendations. Structured reporting may reduce interobserver variability, improve longitudinal comparison of examinations, and facilitate individualized surveillance strategies in high-risk HBV populations (Rodgers et al., 2024; Park et al., 2024; American College of Radiology, 2024; Kamaya et al., 2024).

Limitations of Ultrasound Surveillance

Despite its central role in HCC surveillance, US possesses several important limitations that may reduce diagnostic performance, particularly for early-stage tumors. US is highly operator dependent, and examination quality may vary considerably according to operator experience, patient body habitus, liver morphology, and technical factors. Consequently, surveillance sensitivity remains inconsistent across different patient populations and clinical settings.

One of the major limitations of ultrasound surveillance is reduced sensitivity for early-stage HCC. Small lesions, infiltrative tumors, and isoechoic nodules may be difficult to distinguish from background cirrhotic parenchyma. Lesions located in anatomical blind spots, including the hepatic dome, caudate lobe, or subdiaphragmatic regions, are particularly challenging to visualize. Infiltrative HCC may additionally mimic heterogeneous cirrhotic liver tissue and therefore remain occult during surveillance examinations.

Visualization quality represents another major challenge. Obesity, hepatic steatosis, bowel gas, rib shadowing, and advanced parenchymal heterogeneity may significantly impair acoustic penetration and lesion conspicuity. Several studies have shown that severe visualization limitations are associated with markedly lower sensitivity and increased false-negative rates. In particular, patients with metabolic dysfunction-associated steatotic liver disease and advanced cirrhosis frequently demonstrate suboptimal surveillance quality.

Another important limitation is interobserver variability. Since ultrasound interpretation depends heavily on operator expertise and scanning technique, differences in acquisition quality and lesion recognition may influence surveillance outcomes. This limitation highlights the

importance of dedicated training, standardized acquisition protocols, quality assurance programs, and structured reporting systems such as LI-RADS.

Furthermore, ultrasound does not provide the same comprehensive lesion characterization as multiphasic CT or MRI. Suspicious findings identified during surveillance typically require additional cross-sectional imaging for definitive diagnosis and staging. Current guidelines therefore recommend alternative imaging modalities in patients with repeatedly inadequate ultrasound examinations or persistently poor visualization scores.

Given these limitations, contemporary surveillance strategies increasingly focus on individualized and risk-adapted approaches. Patients with consistently inadequate ultrasound quality may benefit from MRI-based surveillance protocols or combined ultrasound and biomarker strategies to improve early tumor detection (Rodgers et al., 2024; Kang et al., 2023; Schoenberger et al., 2021).

Contrast-Enhanced Ultrasound in HCC Assessment

CEUS has emerged as an important adjunctive imaging modality in the assessment of focal liver lesions and hepatocellular carcinoma. Unlike conventional B-modeUS, CEUS enables real-time evaluation of lesion vascularity following administration of intravascular microbubble contrast agents. This technique improves characterization of focal liver lesions by assessing dynamic arterial enhancement and venous washout patterns, which are essential imaging features of HCC.

The WFUMB and EFSUMB 2020 guidelines emphasize that CEUS provides several advantages in liver imaging, including absence of ionizing radiation, real-time dynamic assessment, high temporal resolution, and favorable safety profile. CEUS may be particularly useful in patients with contraindications to iodinated CT contrast agents or gadolinium-based MRI contrast media. Additionally, CEUS allows targeted evaluation of lesions detected during surveillance ultrasound and may improve diagnostic confidence in indeterminate observations.

Typical imaging features of HCC on CEUS include non-rim arterial phase hyperenhancement followed by mild and late washout. These enhancement characteristics form the basis of CEUS LI-RADS classification systems developed for standardized lesion characterization. CEUS LI-RADS aims to improve diagnostic consistency and facilitate communication between radiologists and hepatologists.

A large multicenter retrospective study by Elisabetta Terzi and colleagues demonstrated that CEUS LI-RADS LR-5 observations show very high specificity for HCC in cirrhotic patients. The authors reported excellent positive predictive value for LR-5 lesions, supporting the reliability of

CEUS for non-invasive HCC diagnosis in appropriately selected patients. These findings contributed significantly to the growing acceptance of CEUS in liver imaging algorithms.

Nevertheless, CEUS also has limitations. The method remains operator dependent, examination quality may be impaired in obese patients or deeply located lesions, and evaluation of the entire liver during arterial phase may be challenging. In addition, CEUS is generally used as a problem-solving or characterization tool rather than as a primary surveillance modality. Current guidelines therefore position CEUS as a complementary technique within multimodality liver imaging strategies rather than a replacement for conventional surveillance ultrasound.

Overall, CEUS represents a valuable imaging technique for characterization of focal liver lesions detected during surveillance and may improve diagnostic accuracy when integrated into standardized imaging algorithms and LI-RADS-based assessment systems (Dietrich et al., 2020; Terzi et al., 2018).

Risk Prediction Models in HBV-Related HCC Surveillance

Recent advances in hepatocellular carcinoma surveillance increasingly emphasize individualized and risk-stratified surveillance strategies in patients with CHB. Since HCC risk is heterogeneous among HBV-infected individuals, several prediction models have been developed to identify patients at highest risk and optimize surveillance allocation.

One of the most widely validated models is the PAGE-B score, developed by George Papatheodoridis and colleagues. The PAGE-B model incorporates platelet count, age, and sex to predict the risk of HCC development in Caucasian patients receiving long-term antiviral therapy. The study demonstrated that PAGE-B effectively stratifies patients into low-, intermediate-, and high-risk categories for HCC development during five years of treatment. Importantly, the model highlighted that despite effective viral suppression, clinically significant HCC risk persists in selected patients, supporting the need for continued surveillance in high-risk groups (Papatheodoridis et al., 2016).

Subsequently, Kim and colleagues proposed the modified PAGE-B (mPAGE-B) score for Asian populations with CHB undergoing antiviral therapy. In addition to age, sex, and platelet count, the modified score incorporates serum albumin levels to improve predictive performance. The authors demonstrated that mPAGE-B showed good discrimination for HCC risk prediction and may improve identification of patients who require intensified surveillance strategies. These findings support the growing role of personalized surveillance algorithms based on demographic, laboratory, and fibrosis-related parameters rather than universal surveillance approaches alone (Kim et al., 2018).

In addition to clinical risk stratification, increasing attention has been directed toward integration of advanced ultrasound-based techniques into HCC surveillance pathways. Monitoring of liver fibrosis using transient elastography (TE) may further improve assessment of HCC risk in chronic HBV infection. Wong and colleagues demonstrated that longitudinal liver stiffness evaluation during antiviral therapy may provide important prognostic information regarding fibrosis progression and long-term clinical outcomes. Since advanced fibrosis and cirrhosis remain major risk factors for HCC development, elastography-based monitoring may contribute to future risk-adapted surveillance algorithms (Wong et al., 2022).

CEUS has also gained increasing importance as a complementary imaging modality in HCC assessment because it enables real-time evaluation of tumor vascularity without ionizing radiation. CEUS may improve characterization of indeterminate focal liver lesions detected during surveillance ultrasound and facilitate earlier HCC diagnosis in selected patients. Furthermore, implementation of CEUS LI-RADS algorithms has contributed to increasing standardization of CEUS interpretation and reporting. Wilson and colleagues emphasized the clinical role of CEUS LI-RADS and highlighted its practical implementation and complementary role alongside CT- and MRI-based LI-RADS systems in liver lesion assessment (Wilson et al., 2021).

Artificial Intelligence and Radiomics in HCC Imaging

Artificial intelligence (AI) and radiomics are emerging as promising technologies in the diagnosis, surveillance, and prognostication of HCC. These approaches aim to improve lesion detection, reduce operator dependency, and enhance risk stratification using quantitative imaging analysis and machine learning algorithms.

Bo and colleagues reviewed the expanding role of AI radiomics in HCC management, emphasizing its potential applications in lesion detection, treatment planning, prognosis prediction, and therapeutic response assessment. The authors describe radiomics as a technique that extracts large quantities of quantitative imaging features from radiological studies, allowing identification of imaging patterns that may not be visually appreciable to radiologists. AI-assisted radiomics models demonstrated promising results for differentiating benign and malignant liver lesions, predicting microvascular invasion, evaluating treatment response, and estimating patient prognosis. The review additionally highlights the growing integration of deep learning algorithms into multimodality liver imaging, includingUS, CT, and MRI-based HCC assessment (Bo et al., 2024).

Similarly, Heo and colleagues discussed the role of AI in prognostication of HCC. Their review emphasized that AI-based models may improve prediction of tumor recurrence, survival outcomes, and treatment response by integrating imaging findings with clinical and pathological

data. The authors also highlighted the potential of AI systems to support clinical decision-making and facilitate precision medicine approaches in HCC management. Importantly, the review notes that AI may contribute to future surveillance strategies by improving lesion detection sensitivity and reducing interobserver variability in imaging interpretation (Heo et al., 2024).

Further evidence supporting AI-assisted liver imaging was provided by Choi and colleagues, who developed and validated a deep learning system for staging liver fibrosis using contrast-enhanced CT imaging. Their study demonstrated that AI-based analysis could accurately assess fibrosis severity and potentially assist in risk stratification for chronic liver disease. Since fibrosis stage represents one of the strongest predictors of HCC development, AI-assisted fibrosis assessment may contribute to future risk-adapted surveillance algorithms in patients with CHB (Choi et al., 2020).

Conclusion

HCC remains one of the most serious complications of CHB infection and continues to represent a major global health burden. Although cirrhosis is the principal risk factor for HCC development, CHB infection possesses direct oncogenic potential and may lead to HCC even in non-cirrhotic patients. Consequently, effective surveillance strategies remain essential for early tumor detection and improved patient outcomes.

US continues to serve as the primary imaging modality for HCC surveillance because of its accessibility, safety, and cost-effectiveness. However, surveillance performance is strongly influenced by visualization quality, operator expertise, liver parenchymal characteristics, and patient-related factors. Recent advances including LI-RADS US Surveillance, visualization scoring systems, transient elastography, contrast-enhanced ultrasound, and artificial intelligence-assisted imaging analysis may improve surveillance standardization and diagnostic accuracy.

Future surveillance approaches will likely incorporate individualized risk stratification, advanced US techniques, and multimodality imaging strategies to optimize early HCC detection in patients with CHB. Continued development of standardized surveillance protocols and emerging imaging technologies may further contribute to reduction of HCC-related mortality worldwide.

Abbreviations

AFP - Alpha-fetoprotein

AI - Artificial intelligence

APHE - Arterial phase hyperenhancement

CEUS - Contrast-enhanced ultrasound

CHB - Chronic hepatitis B

CT - Computed tomography

DCEUS - Dynamic contrast-enhanced ultrasound

EASL - European Association for the Study of the Liver

HBV - Hepatitis B virus

HCC - Hepatocellular carcinoma

ICC - Intrahepatic cholangiocarcinoma

LI-RADS - Liver Imaging Reporting and Data System

MASLD - Metabolic dysfunction-associated steatotic liver disease

MRI - Magnetic resonance imaging

PAGE-B - Platelets, Age, Gender–Hepatitis B score

mPAGE-B - Modified PAGE-B score

TE - Transient elastography

UCA - Ultrasound contrast agent

US - Ultrasound

VIS - Visualization score

WFUMB - World Federation for Ultrasound in Medicine and

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