

## Session overview: MRI value

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Magnetic resonance imaging (MRI) has been considered as a high-end comprehensive problem solving tool in radiology. Not only diagnosis, but it also provides highly refined research potentials to highlight human pathophysiology. Although it has such a definite strength, it has a limited accessibility due to high cost, long examination time compared with other imaging modalities such computed tomography or ultrasonography. And recent changes in healthcare system and continuously increased healthcare cost have led re-consideration of effectiveness of MRI in terms of its benefit, outcome, and potential solutions. Now we need to prove whether MRI could provide such clinical benefit at the expense of the cost and time patients.

In my talk, I would briefly mention the concept of MRI value and the background of this session. Then, we would discussed abbreviated liver MRI in terms of protocols or scan acquisition for variable indications including 'new' indication of surveillance using MRI.

Keywords : MRI; Liver; Value; Abbreviated

## Lessons from experience: cost, time, and efforts for HCC surveillance using full-protocol MRI

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I'd like to go over the concept of full-protocol MRI as a surveillance tool for patients with high-risk for HCC, and its clinical application and diagnostic performance., Then I will summarize the key sequences and their diagnostic values, and discuss potential future research topics.

HCC is the fifth most common cancer and one of the leading causes of cancer-related death worldwide.

The most common risk factor of HCC is liver cirrhosis caused by viral hepatitis followed by alcoholic liver disease and nonalcoholic fatty liver disease.

HCC imposes a severe economic burden on patients and society and with annual economic burden reaching 454.9 million US dollars in 1991 to 1999.

The benefit of HCC screening comes from detecting early-stage disease at a potentially curable stage.

It is supported by the results from a randomized controlled trial of HCC where a biannual screening of patients with serum AFP and ultrasonography resulted in a 37% decrease in mortality from HCC.

HCC surveillance should be performed in a group of patients whose risk for HCC development is sufficiently high to make it cost-effective.

In patients with cirrhosis at high-risk of HCC, screening that used MRI with liver-specific contrast resulted in a higher HCC detection rate and lower false-positive findings compared with US.

With MRI screening, most of the cancers detected were at very early stage, which was associated with a high chance of curative treatments and favorable survival of patients.

Keywords : Full-sequence liver MRI, HCC, Surveillance

## Abbreviated Liver MRI: Surveillance and diagnosis for HCC

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Ultrasonography is the modality currently recommended by most scientific organizations for HCC surveillance. However, per-patient sensitivity for early stage, curative HCC is reported as 60-63%, which indicates the need for alternative surveillance strategies. There are reports dealing with alternative imaging techniques other than ultrasonography for HCC surveillance. These techniques are 1) dynamic CT, 2), contrast enhanced US, 3) full sequence dynamic MRI, and 4) abbreviated MRI. Although full-sequence MRI has a high reported sensitivity for HCC detection (1), its routine use in surveillance is limited by high cost and therefore, abbreviated MRI protocols have a potential as an alternative imaging technique for HCC surveillance. Abbreviated liver MRI can be divided into two protocols; 1) dynamic sequences only and 2) hepatobiliary phase imaging using hepatocyte-specific contrast agents without dynamic sequence. T2WI and DWI could be accompanied for both protocols. There are some reports for the performance of abbreviated liver MRI protocols for HCC surveillance. Lee, et al. reported that the diagnostic performance of an abbreviated MRI protocol (only dynamic sequences using extracellular contrast agent) to that of full sequence MRI (2). Some authors reported the good performance of abbreviated MRI protocols using hepatobiliary phase with or without T2WI and/or DWI (3-5). Noncontrast MRI using T2WI, DWI and precontrast T1 in/opposed phase is an extreme form of abbreviated MRI protocols and have some pros; ie, low cost, short imaging time and no contrast agent related complications and can be a very attractive option for HCC surveillance (6).

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Keywords : MRI, Liver, Surveillance, Hepatocellular carcinoma

# Abbreviated liver MRI: liver metastasis- diagnosis & treatment response monitoring

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The MR arterial phase is essential for an initial diagnosis of the hepatic metastasis in the oncologic patient. However, it is unclear that the hepatic arterial phase will be always necessary in the treatment response evaluation of the presumed hepatic metastatic nodule. The patient may be inconvenient because an average time can reach to half an hour for an achievement of hepatobiliary phase (using Gadoxetic acid). Even though the dynamic phase is mandatory, arterial phase may suffer from transient severe motion around 10 %. Therefore there has been an attempt for the skip of dynamic phase during treatment response evaluation MR examination. The classical arterial phase can be skipped for 10 minutes treatment response MR evaluation. The recipe is the use of the second shot arterial phase and the subtraction. In this presentation, we will provide the concept of the new 10 minutes abbreviated gadoxetic acid enhanced liver MRI.

## Learning objectives

- To introduce what is the New Abbreviated gadoxetic acid enhanced liver MRI for the Oncologic patient
- To provide optimal sequence and imaging parameter when the New Abbreviated gadoxetic acid enhanced liver MRI is used
- To explain the concept of the second shot arterial phase in the new abbreviated gadoxetic acid enhanced liver MRI

Keywords : Abbreviated MRI