

Interpretation on MR Value consensus by ISMRM Experts

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MR imaging has traditionally been used as a high-end modality, and although shown extremely important for many types of clinical scenarios, it has been suggested as too expensive by some. ISMRM Value Initiative Committee organized the international experts to write a report to explain how value should be addressed and gives some insights and practical examples of how value of MR imaging can be increased. It is a global effort to increase both accessibility, value for money and improved patient management and give some indications of where the field may wish to address some of its research to proactively demonstrate the value of MRI.

High Spatiotemporal DCE MRI for Detection of Blood-Brain-Barrier Leakage

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To comprehensively assess vascular pathologies that may result from either large or small vessel diseases, it is desirable to investigate both macroscopic arterial and microscopic vascular information. To this end, contrast-enhanced magnetic resonance angiography (MRA) and perfusion were typically performed in separate exams, which requires injection of contrast agent twice and may correspondingly increase a contrast dose. Furthermore, low temporal resolution (4~6 sec) in conventional DCE MRI precludes accurate estimation of arterial input function (AIF), making it difficult to quantify perfusion/permeability related parameters. Given the above considerations, in this work we develop a high spatiotemporal resolution (spatial ~ 1.0 mm³, temporal ~ 1.6 sec) simultaneous DCE MRA and perfusion within a single 4D acquisition exploiting kinetic model based signal priors. It is demonstrated that the proposed, high spatiotemporal resolution DCE MRI, which enables rapid sampling of AIF, depicts microvascular permeability in pathological tissues (e.g., tumor) much more accurately than conventional DCE MRI (temporal resolution: 5.0 sec).

Keywords : DCE MRI

Focal Hepatic Lesions in Gd-EOB-DTPA Enhanced MRI: the Atlas

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To review the different technical aspects of Gd-EOB-DTPA and the advantages of the hepatocellular phase (HCP) and the specific MRI imaging features of focal hepatic lesions.

Fifty patients with focal hepatic lesions underwent unenhanced T1- and T2-weighted MR imaging and Gd-EOB-DTPA-enhanced MRI, including dynamic phase and HCP imaging between May 2010 and December 2017.

Gd-EOB-DTPA is a contrast agent with combined properties of a non-specific extracellular and a hepatocyte-specific contrast agent. Hepatocellular carcinomas (HCCs) usually show hyperenhanced in the arterial phase, wash out in the portal vein phase and hypointensity in the HCP. Among other characteristic findings, other features, mosaic pattern, capsules, “nodule in nodule” and satellite nodules can be found. Approximately 2.5%~8.5% well or moderately differentiated HCCs will uptake Gd-EOB-DTPA and show hyperintensity in the HCP. The classical type of combined hepatocellular cholangiocarcinoma (cHCC-CC) is characterized by the presence of typical HCC-like and CC-like areas within the same tumor. Adenoma and focal nodular hyperplasia (FNH) are frequently occur in the young woman with arterial enhancement, differentiated by the scar and uptake of Gd-EOB-DTPA in the HCP. Acquire FNH-like lesions are described in the cirrhotic livers, identical to classic FNH in non-cirrhotic livers, and usually show hyperintensity in the HCP. Delayed enhancement is one of characteristic findings of intrahepatic cholangiocarcinoma (ICC) when using Gd-DTPA due to its abundant fibrosis. Hepatic metastases show low hypointensity in the HCP. And Gd-EOB-DTPA is very helpful to detect much more small metastases in the HCP.

Gd-EOB-DTPA is comparable to extracellular agents, and uptake by functioning hepatocytes in the HCP, providing additional information to improve detection and characterization of many focal hepatic lesions. Gd-EOB-DTPA offers advantages for the imaging of many focal hepatic lesions, including HCC, FNH, adenoma and ICC.

Keywords : MRI, Gd-EOB-DTPA, Liver