Redefining MRI:
From Image to Insight

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Educational Session 2: Basics of Physiologic MRI

SY12-2

Basic of Perfusion MRI and Clinical Application

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Perfusion MRI provides noninvasive information on tissue vascularity and microcirculation, serving as a valuable biomarker for diagnosis, staging, and treatment monitoring across a wide range of diseases. The four principal techniques are dynamic susceptibility contrast (DSC) MRI, dynamic contrast-enhanced (DCE) MRI, arterial spin labeling (ASL) MRI, and intravoxel incoherent motion (IVIM) MRI. DSC and DCE require intravenous contrast agent administration, whereas ASL and IVIM are non-contrast techniques, making them attractive options.

This talk is intended to bridge two audiences. For those with a clinical background, it offers an accessible introduction to the basic principles and acquisition of each technique, and the perfusion parameters they yield. For those with a technical background, it offers a sense of how these methods are actually used at the bedside, where perfusion MRI helps characterize disease, distinguish one condition from another, and follow response to treatment. The brain has long been the main setting for perfusion imaging, but its use in body and oncologic applications is steadily growing, and a few examples will be shown to give a sense of how broadly these techniques can be applied.

The aim is not to cover any single aspect in depth, but to give both clinicians and researchers a shared starting point from which the principles, the limitations, and the clinical possibilities of perfusion MRI become easier to appreciate.

Keywords: *Perfusion magnetic resonance imaging, Dynamic susceptibility contrast MRI, Arterial spin labeling, Intravoxel incoherent*