Redefining MRI:
From Image to Insight

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Perfusion MRI: Clinical Applications in Veterinary Medicine

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Perfusion-weighted imaging (PWI) is an advanced MRI technique that provides functional information on tissue vascularity, hemodynamics, and vascular permeability beyond conventional anatomical imaging. The main PWI techniques include dynamic susceptibility contrast MRI (DSC-MRI), dynamic contrast-enhanced MRI (DCE-MRI), and arterial spin labeling (ASL). In human medicine, PWI has been widely applied for differential diagnosis, tumor grading, prognostic assessment, radiation therapy and chemotherapy planning, and post-treatment evaluation.

In veterinary medicine, the clinical use of PWI remains limited but is gradually expanding. However, standardized imaging protocols, contrast injection methods, post-processing techniques, and species-specific reference values are still lacking. This presentation will introduce the basic principles, indications, and clinical value of PWI, practical DSC- and DCE-MRI imaging protocols, and present representative veterinary cases applying PWI to both neurologic and non-neurlogic diseases.

Future development of veterinary PWI will require protocol standardization, multicenter validation, integration with diffusion MRI, MR spectroscopy, radiomics, artificial intelligence and nanomaterials. Despite current limitations, PWI has strong potential to become a valuable imaging biomarker for diagnosis, treatment planning, and therapeutic response assessment in veterinary medicine.

Keywords: *Veterinary medicine, Perfusion-weighted imaging (PWI), Dynamic susceptibility contrast MRI (DSC-MRI), Dynamic contrast-enhanced MRI (DCE-MRI), Arterial spin labeling (ASL)*