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Breast 1

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Clinical Application of Ultrafast MRI in Breast Imaging

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Ultrafast dynamic contrast-enhanced (UF-DCE) MRI is a high-temporal-resolution technique that captures the rapid inflow of contrast agent within the first minute after injection, providing early kinetic insights into lesion vascularity and permeability while maintaining reasonable spatial resolution. Compared to conventional DCE-MRI, which evaluates contrast enhancement over a longer period, UF-DCE MRI allows extraction of early-phase parameters such as maximum slope and time to enhancement.

These kinetic biomarkers have shown promise not only in differentiating benign from malignant lesions but also in reflecting tumor biology, including aggressiveness, molecular subtype, and response to neoadjuvant therapy. Beyond diagnostic differentiation, recent studies have applied these parameters to develop prediction models and nomograms to guide clinical decision-making in breast imaging.

In this lecture, we will review the clinical applications of UF-DCE MRI in breast cancer evaluation, with a focus on evidence from recent studies. We will also discuss ongoing challenges in protocol standardization, practical limitations in clinical implementation, and future directions for integrating UF-DCE MRI into personalized breast cancer screening and management.

Keywords: *Breast MRI, Ultrafast sequence, Clinical application*