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Abdomen 1

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Recent Advances and Updates in Abdominal MRI

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Magnetic resonance imaging (MRI) is an indispensable tool for abdominal imaging, offering superior soft-tissue contrast and the ability to detect and characterize focal lesions. However, clinical implementation has long been challenged by lengthy acquisition times, motion artifacts, and the need for optimal arterial-phase timing in contrast-enhanced studies.

Recent advances in imaging acceleration and motion management have significantly reshaped abdominal MRI practice. Parallel imaging and three-dimensional acceleration techniques enable faster acquisitions, while compressed sensing provides higher acceleration factors with preserved signal-to-noise ratio. Deep-learning–based reconstruction has emerged as a transformative advance, enabling substantial denoising, super-resolution, and improved sharpness across T2-weighted, diffusion-weighted, and dynamic T1-weighted sequences. Early clinical experiences demonstrate that DL techniques reduce the need for multiple breath-holds and improve lesion conspicuity, offering robust solutions for patients with limited breath-hold capacity. Furthermore, free-breathing dynamic contrast-enhanced methods, such as XD-VIBE, GRASP, LAVA Star, and DISCO Star, have expanded clinical applicability for patients with limited breath-holding capacity or under sedation. These approaches improve robustness against respiratory motion and facilitate multiphase arterial imaging.

This lecture will review these state-of-the-art strategies, emphasizing their clinical feasibility, benefits, and limitations. By understanding and applying these techniques, radiologists can optimize protocols, improve diagnostic confidence, and enhance patient care in abdominal MRI.

Keywords: *MRI, Abdomen, Deep-learning*