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Plenary Lecture-MD

PL02

Prostate MR Imaging: Beyond PI-RADS and Where is Headed

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Multiparametric MRI (mpMRI) has become a cornerstone in the detection, risk stratification, and management of prostate cancer, with the Prostate Imaging Reporting and Data System (PI-RADS) providing a structured and standardized approach. While PI-RADS has significantly improved the reproducibility of prostate MRI interpretation and its integration into clinical workflows, limitations remain. Inter-reader variability, challenges in evaluating PI-RADS 3 lesions, and questions regarding its applicability in active surveillance and post-treatment response or recurrence assessment underline the need to move beyond the existing framework.

In this lecture, we will review the current role of PI-RADS in prostate cancer diagnosis and management while critically appraising areas where it falls short. We will then highlight emerging innovations that promise to expand the scope of prostate MRI. These include bi-parametric MRI protocols that reduce scan time and cost without compromising diagnostic performance, and integration with clinical factors to guide biopsy decision flows and improve cancer detection and localization. Beyond diagnosis using PI-RADS, recently, new MRI scoring systems are briefly reviewed, and current limitations are delineated: Prostate Cancer Radiological Estimation of Change in Sequential Evaluation (PRECISE), Prostate Imaging after Focal Ablation (PI-FAB), Prostate Magnetic Resonance Imaging for Local Recurrence (PI-RR), and Prostate Imaging Quality (PI-QUAL). Advances in artificial intelligence (AI) and deep learning are reshaping both image acquisition—through acceleration and motion robustness—and interpretation. Recent update of AI application and limitations are addressed. Finally, recent emerging tools in prostate MRI, such as electrical properties tomography or sodium MRI are introduced briefly.

Keywords: *Prostate MRI, PI-RADS, Scoring systems, Artificial intelligence*