Less Is More: Enhancing Prostate MRI Without Intravenous Contrast

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Multiparametric MRI (mpMRI) using the Prostate Imaging Reporting and Data System (PI-RADS) scoring system has become the gold standard for prostate cancer (PCa) detection. The current version, PI-RADS v2.1, recommends T2-weighted imaging, diffusion-weighted imaging (DWI), and dynamic contrast enhancement (DCE) sequences.[1] However, its role is limited to the assessment of peripheral zone lesions that receive a score of 3 based on DWI and apparent diffusion coefficient (ADC) mapping. These lesions are upgraded to a PI-RADS 4 if they show early enhancement on DCE.

In this issue of CARJ, Wagner et al aimed to evaluate the proportion of patients whose PI-RADS scores were upgraded by DCE given the secondary role of this sequence.[2] Their study reveals that DCE upgrades impacted only a small fraction of patients within a large cohort of 2742 patients. Specifically, DCE upgraded just 3.2% of cases to PI-RADS 4, and only 0.66% of patients were ultimately diagnosed with clinically significant prostate cancer (csPCa).

These findings align with recent studies comparing the performance of mpMRI and MRI without intravenous contrast.[3,4] For instance, a retrospective study by Kuhl et al demonstrated that the diagnostic accuracy for detecting csPCa was nearly identical between MRI without intravenous contrast (89.1%) and mpMRI (87.2%). While mpMRI detected one additional case of csPCa (139 vs 138), it also resulted in 11 more false-positive diagnoses. This suggests that MRI without intravenous contrast offers comparable diagnostic accuracy while reducing the likelihood of unnecessary biopsies. Meta-analyses further support these conclusions,[5] and the ongoing multicenter PRIME trial is expected to provide more robust data upon publication.[6]

The shift toward MRI without intravenous contrast presents several advantages, especially in resource-limited environments where pre-biopsy MRI access is constrained. Eliminating DCE not only shortens scan times but also reduces costs and eliminates the need for healthcare staff to manage potential gadolinium-related allergic reactions. This streamlining could enhance MRI accessibility, particularly in high-demand regions, without compromising diagnostic efficacy.

It is important to recognize, however, that there are scenarios where mpMRI may be preferable. For instance, DCE proves particularly useful when DWI quality is compromised by artifacts, such as rectal air or hip prostheses, making optimal imaging quality essential for the success of MRI without intravenous contrast, as recently outlined in the Prostate Imaging Quality (PI-QUAL) v2 document.[7] Also, it has been observed that biparametric (bp) MRI could lead to an increase of indeterminate MRI findings (PI-RADS 3),[8] and that its diagnostic performance could be reduced if interpreted by inexperienced readers.[9] Finally, DCE remains vital in post-treatment evaluations (ie, after prostatectomy, radiation therapy, or focal therapy), where it plays a key role in detecting residual/recurrent disease.

In conclusion, Wagner et al's study adds to the growing evidence that DCE has a limited role in the current PI-RADS classification scheme. It is likely that adopting bpMRI could enhance MRI accessibility, reduce costs, and maintain diagnostic accuracy, making it a viable approach for PCa detection in the future. A revised protocol that omits or selectively employs DCE imaging could achieve similar diagnostic outcomes while optimizing resource utilization and patient care. As the field of prostate cancer imaging continues to advance, it is crucial that protocols are continually refined to balance clinical efficacy, cost-effectiveness, and patient safety provided that the images are of optimal diagnostic quality and interpreted by radiologists with expertise in prostate MRI reporting.

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