

Prostate Carcinoma: Case Studies

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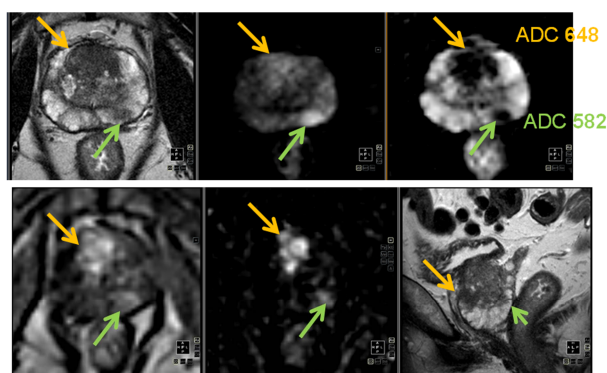
There is growing consensus regarding the approach to performing and interpreting prostate MRI. A multiparametric approach combining T2, DWI and DCE-MRI is pragmatic and is currently advocated [1]. A European Society of Uroradiology (ESUR) guideline has been published [2]. Early validation studies showing the good performance of these guidelines have been performed [3]. The interpretation scheme is referred to as "Pi-Rads". Further work is underway by the American College of Radiology (ACR) and the ESUR to develop international consensus and further refine these guidelines. The scheme comprises an initial 5 point scoring of each sequence independently and then a summing of the 5 point scores to determine an overall 5 point score of likelihood of cancer. The interpretation of each data set (DWI, T2 and DCE-MRI) completely independently however is unnatural. The interpretation of prostate MRI is performed by looking for concordance between these parameters to strengthen confidence in diagnosis with most weight given to T2 and DWI features.

Urologists are interested in location for targeted biopsy, size, and Gleason grade (aggressiveness) of tumors in addition to the standard assessment of extraprostatic spread. ADC values $<1000 \times 10^{-6} \text{mm}^2/\text{s}$ are considered more indicative of cancer and the lower the value the more likely Gleason 4 or higher components are present [4].

It should be kept in mind that our ability to determine the presence and location of cancer is affected by tumor location. In particular our ability to localize cancer in the peripheral zone is better than in the transition zone. Stromal hyperplasia and inflammatory nodules can mimic cancer in the transition zone. Shape, texture and boundary appearance are additional features used to diagnose transition zone cancers and are assessed on T2 weighted images [5]. Consensus criteria that perform well in the transition zone is a continued work in progress and further work in this area is needed

An approach to MRI interpretation will be illustrated through case examples. Window level and width setting for display of ADC maps are $1400-1600 \times 10^{-6} \text{mm}^2/\text{s}$ by $1400-1600 \times 10^{-6} \text{mm}^2/\text{s}$

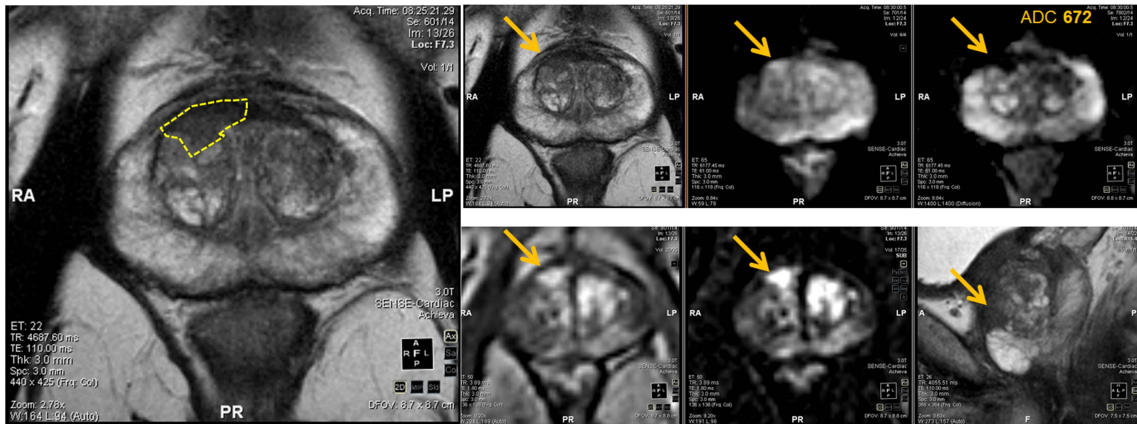
Case 1



Midline TZ, aFMS (anterior fibromuscular stroma), anterior 5/5, GS ≥ 7
Left medial mid PZ, posterior 5/5, GS ≥ 7

Case 2

Subtle Gleason 3+4 tumor in right anterior transition zone showing texture change, irregular border with some lenticular shape, restricted diffusion and early enhancement. Score 4/5 (probable cancer)



References

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3. Portalez D, Mozer P, Cornud F, et al. Validation of the European Society of Urogenital Radiology scoring system for prostate cancer diagnosis on multiparametric magnetic resonance imaging in a cohort of repeat biopsy patients. *Eur Urol* 2012; 62:986-996
4. Hambrock T, Somford DM, Huisman HJ, et al. Relationship between apparent diffusion coefficients at 3.0-T MR imaging and Gleason grade in peripheral zone prostate cancer. *Radiology* 2011; 259:453-461
5. Oto A, Kayhan A, Jiang Y, et al. Prostate cancer: differentiation of central gland cancer from benign prostatic hyperplasia by using diffusion-weighted and dynamic contrast-enhanced MR imaging. *Radiology* 2010; 257:715-723

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