Prostate Cancer DFP
Teaching Case of the Week

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Case history

60 yo man presents to urology with a screening PSA of 4.2 ng/ml (May 2013) and no palpable nodules. He then underwent a 3 Tesla endorectal MR scan of the prostate for further evaluation and in preparation for a fusion biopsy (representative images are shown below).
Axial T2-weighted FSE MR image

High B value (1350) diffusion-weighted MR image

DCE (parametric map) – enhancement slope

ADC map

Date of scan: June 2013
Case history

Images obtained at the level of the prostate apex to midgland are unremarkable. A focal area of low T2 signal intensity seen in the left transition zone demonstrates restricted diffusion and represents a small BPH nodule with predominance of stromal tissue.

Differences in the signal intensity of the right and left sides of the peripheral zone seen on the T2WI and DWI are due to improper position of the endorectal coil, which is rotated and faces the left side.
Axial T2-weighted FSE MR image

High B value (1350) diffusion-weighted MR image

DCE (parametric map) – enhancement slope

ADC map

Date of scan: June 2013
Case history

A systematic TRUS-guided biopsy was performed, but no cancer was detected and the patient continued surveillance with PSA.

In December 2015 the total serum PSA increased to 6.7 ng/ml. Digital rectal examination was still normal. A new 3-Tesla endorectal MR scan was performed.
Axial T2-weighted FSE MR image

High B value (1350) diffusion-weighted MR image

DCE (parametric map) – enhancement slope

ADC map

Date of scan: March 2016
Case history

The new scan showed two new findings:

- a small focus of decreased signal intensity in the anterior peripheral zone of the right apex to midgland associated with restricted diffusion, but no clear early enhancement (circles).

- ill-defined decreased T2 signal intensity in the postero-lateral peripheral zone of the right apex to midgland. A small focus of mild decreased signal is also noted in the ADC map. DWI is negative and there is no clear early enhancement (arrows).
Axial T2-weighted FSE MR image

High B value (1350) diffusion-weighted MR image

DCE (parametric map) – enhancement slope

ADC map

Date of scan: March 2016
Case history

The anterior abnormality was characterized as a PI-RADS v2 4 lesion.

The postero-lateral abnormality was characterized as a PI-RADS v2 3 lesion.
Case history

A MRI/US fusion biopsy was performed and revealed prostate cancer Gleason 3+3 (antero lesion) and chronic inflammation (postero-lateral lesion).

The patient was offered the options of active surveillance and definitive treatment with RALP, and opted for active surveillance. His PSA has remained stable and no nodules have been palpable on DRE. If his clinical status remains unchanged, he will undergo a repeat MRI in early 2017.
Discussion

This case illustrates the identification of disease progression on MRI and the value of MRI for diagnosing (targeting) disease. While the initial scan and biopsy were negative, it is quite possible that cancer was already present at that time. Multiparametric MRI has a very high negative predictive value for clinically significant disease, and if tumor was present it was small and low grade, a fact confirmed on subsequent targeted biopsy. Because of its high NPV, MRI has increasingly being used to assist with management decision, in particular for men under AS.
In addition, this case shows the typical findings of chronic inflammation, a well known mimic of prostate cancer. It often presents as an ill-defined area of low T2 signal intensity, associated with variable enhancement, and little to no restricted diffusion.
Thank you!

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