

Prostate MRI Analysis and Intervention Following Multiple Negative TRUS Biopsies: A Case Study

Background

Prostate disease is primarily evaluated by using digital rectal examination (DRE) in combination with other clinical data including prostate-specific antigen (PSA) tests and pathologic information. These commonly used diagnostic tests have been shown to result in both high false positive and high false negative results. Additionally, the use of trans-rectal ultrasound-guided (TRUS) biopsy techniques for cancer detection can miss 20 percent or more of prostate cancers^{1,2}

The use of DynaCAD for Prostate for image analysis and DynaTRIM (Trans-Rectal Interventional (MRI) is a new option for evaluation of prostate disease, providing radiologists and urologists with another tool to diagnosis their patients.

Clinical Case Study with Elevated PSA

A 67 year-old man presented with a PSA level of 5.4 ng/ml and no palpable abnormality on DRE. The first of two TRUS biopsies was performed with eight (8) core samples. No malignancy was found. Due to elevated PSA, follow up was recommended.

Six months later, the second TRUS biopsy was performed with twelve (12) core samples. Again, no malignancy was found and follow up was once again recommended. DRE was also performed with no palpable abnormalities.

Since his PSA levels remained elevated, the patient was referred for a diagnostic MRI study. The examination was performed on a 3.0 T MRI scanner with the body array coil in a dual-coil setup. Multi-parametric imaging sequences were acquired including high resolution multi-planar T2-weighted anatomical images (figure 1).

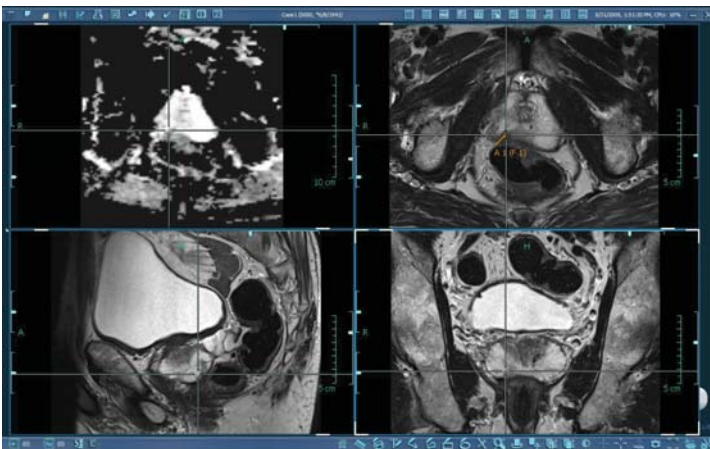


Figure 1: Multi-planar T2-weighted images and ADC map

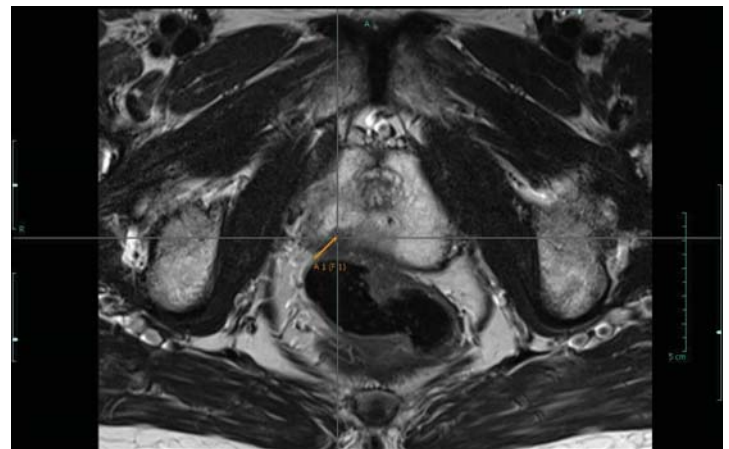


Figure 2: T2-weighted axial image highlighting area of suspicion

Diffusion-weighted images with b-values of 50, 500 and 800 were acquired and an ADC map was generated. The dynamic contrast-enhanced (DCE) images were acquired with a temporal resolution of approximately 3.1 seconds. The study was then imported to DynaCAD for Prostate for analysis and interpretation.

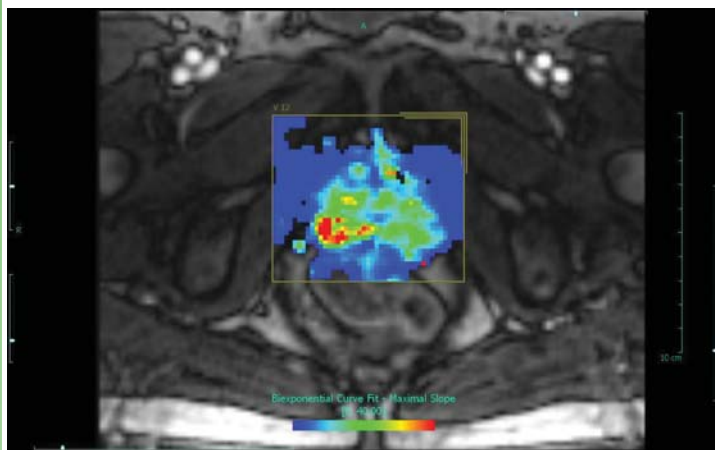


Figure 3: DCE axial with parametric overlay

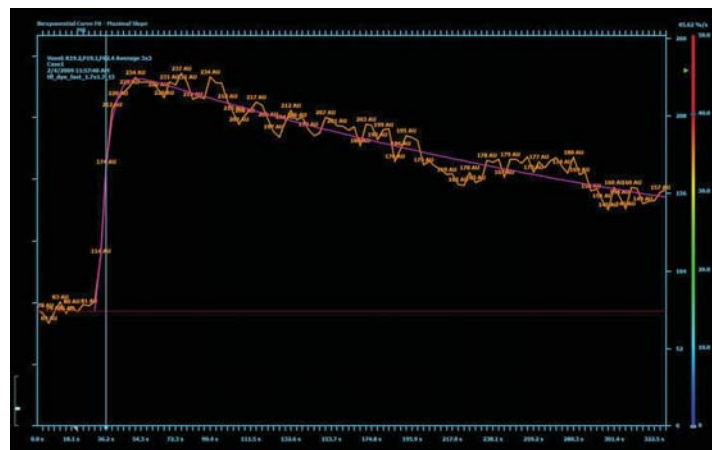


Figure 4: Bi-exponential curve set with 3.1 sec. temporal resolution

Image Results: A suspicious area was identified on axial T2 that correlated with DCE (figures 2-4). Based on these findings, MR-guided biopsy was recommended. MR-guided prostate biopsy was performed with DynaCAD for Prostate and DynaTRIM (figure 5,6).

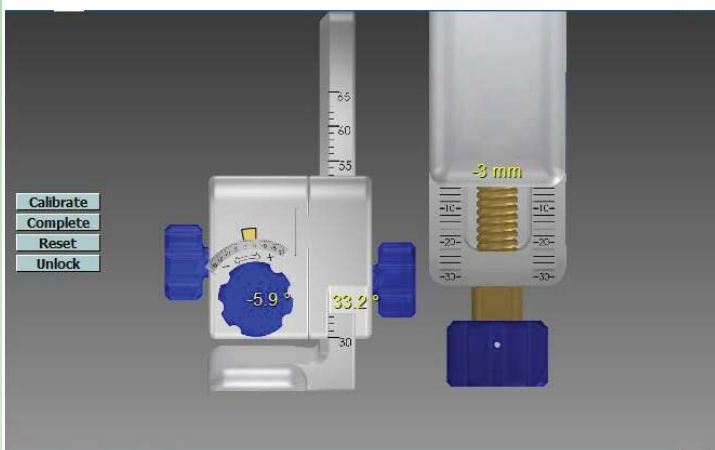


Figure 5: DynaCAD for Prostate interventional planning



Figure 6: DynaCAD for Prostate interventional planning

Diagnosis: Confirmed Prostate Cancer - Gleason 7 (75% in one core).

Summary: This patient, presenting with an elevated PSA, was able to benefit from this new imaging and interventional option where multiple TRUS-guided biopsies were performed with negative results. The clinician utilized DynaCAD for Prostate for the image analysis, which drew attention to suspicious areas and DynaTRIM for the targeted biopsy which resulted in a confirmed diagnosis.

1. www.admetech.org
2. http://urology.jhu.edu/newsletter/prostate_cancer58.php



12501 Research Pkwy Orlando, FL 32826 407.275.3220
 info@invivocorp.com www.invivocorp.com