Value of T2 Mapping MRI for Prostate Cancer Detection and Classification

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Background: Currently, multi-parametric prostate MRI (mpMRI) consists of a qualitative T2, diffusion weighted, and dynamic contrast enhanced imaging. Quantification of T2 imaging might further standardize PCa detection and support artificial intelligence solutions.

Purpose: To evaluate the value of T2 mapping to detect prostate cancer (PCa) and to differentiate PCa aggressiveness.

Study Type: Retrospective single center cohort study.

Population: Forty-four consecutive patients (mean age 67 years; median PSA 7.9 ng/mL) with mpMRI and verified PCa by subsequent targeted plus systematic MR/ultrasound (US)-fusion biopsy from February 2019 to December 2019.

Field Strength/Sequence: Standardized mpMRI at 3 T with an additionally acquired T2 mapping sequence.

Assessment: Primary endpoint was the analysis of quantitative T2 values and contrast differences/ratios (CD/CR) between PCa and benign tissue. Secondary objectives were the correlation between T2 values, ISUP grade, apparent diffusion coefficient (ADC) value, and PI-RADS, and the evaluation of thresholds for differentiating PCa and clinically significant PCa (csPCa).

Statistical Tests: Mann–Whitney test, Spearman’s rank (r) correlation, receiver operating curves, Youden’s index (J), and AUC were performed. Statistical significance was defined as P < 0.05.

Results: Median quantitative T2 values were significantly lower for PCa in PZ (85 msec) and PCa in TZ (75 msec) compared to benign PZ (141 msec) or TZ (97 msec) (P < 0.001). CD/CR between PCa and benign PZ (51.2/1.77), respectively TZ (19.8/1.29), differed significantly (P < 0.001). The best T2-mapping threshold for PCa/csPCa detection was for TZ 81/86 msec (J = 0.929/1.0), and for PZ 110 msec (J = 0.834/0.905). Quantitative T2 values of PCa did not correlate significantly with the ISUP grade (r = 0.186; P = 0.226), ADC value (r = 0.138; P = 0.372), or PI-RADS (r = 0.132; P = 0.392).

Data Conclusion: Quantitative T2 values could differentiate PCa in TZ and PZ and might support standardization of mpMRI of the prostate. Different thresholds seem to apply for PZ and TZ lesions. However, in the present study quantitative T2 values were not able to indicate PCa aggressiveness.

Level of Evidence: 2
Technical Efficacy: Stage 2

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Multimodal magnetic resonance imaging (mpMRI) of the prostate shows excellent sensitivity in detecting clinically significant prostate cancer (csPCa).1 Because of the dependence on reader experience, it has been an important goal to increase standardization of mpMRI examinations of the prostate.2 Besides the development of the Prostate Imaging Reporting and Data System (PI-RADS, currently version 2.1),3,4 another attempt to reduce inter-reader...
variability is to increasingly integrate quantitative parameters. $T_2$ and $T_2^*$ mapping already used in cardiac and cartilage imaging and have increasingly gained attention in prostate imaging to quantify $T_2$ signal intensities.$^{5-9}$

$T_2$-weighted sequences enable the best available anatomic image characterization of the prostate, but standard $T_2W$ signal intensities (SI) vary between sites because of varying sequence parameters, such as TR and TE, and radiofrequency inhomogeneity of the transmit and receive field and therefore cannot be used as a quantitative value. Instead, $T_2$ mapping sequences focus on mapping the $T_2$ relaxation time of the prostatic tissue. The relative percentages of stromal and glandular tissue, and therefore water components, vary between benign and cancerous prostatic tissue, which is the biophysical basis for $T_2$ mapping.$^{10}$ Using a series of spin echo (SE) sequences, a signal decay curve can be acquired. Hereby, the $T_2$ relaxation time of each voxel can be determined.$^{11}$

$T_2$ mapping in prostate imaging has already been examined in several studies with most studies focusing on the peripheral zone (PZ).$^{8,12-18}$ However, a recent study was able to show significant results for PCa detection with quantitative $T_2$ values in the transition zone (TZ) as well.$^{15}$ Furthermore, several studies showed evidence that quantitative $T_2$ values correlate with PCa aggressiveness and therefore might enable the differentiation between significant and non-significant PCAs (csPCa, nsPCa).$^{15,19}$ Recent literature concludes that further research is necessary regarding diagnostic accuracy of $T_2$ mapping in PZ as well as TZ.$^{8,9}$

Therefore, the aim of this study was to evaluate quantitative $T_2$ values for PCa detection in PZ and TZ and to examine quantitative $T_2$ values for the evaluation of cancer aggressiveness.

Materials and Methods

Study Design

This trial was approved by the institutional review board (Medical Faculty of the Heinrich-Heine-University Düsseldorf; Study-Nr: 5910R). All patients provided informed consent. Patients with elevated prostate-specific antigen (PSA) levels, mpMRI of the prostate including a $T_2$-mapping sequence, and subsequent transrectal ultrasound-guided biopsy (TRUS-GB) plus magnetic resonance imaging-guided biopsy (MRI/US fusion-guided) from 02/2019 to 12/2019 were included. Patients had to have no prior surgery or radiation treatment. This study includes only patients with histopathologically proven PCa.

Study Objectives

The primary endpoint was the analysis of quantitative $T_2$ values, contrast differences (CD) and contrast ratios (CR) between PCa and benign PZ, TZ, anterior fibromuscular stroma (AFS), and musculus obturatorius internus (MOI). Secondary objectives were analyses of correlation of quantitative $T_2$ values with International Society of Urological Pathology (ISUP) grade, apparent diffusion coefficient (ADC) value, PI-RADS overall classification, and PI-RADS $T_2$ single score. Furthermore, thresholds of quantitative $T_2$ values for

| TABLE 1. MRI Parameter | $T_2$ Mapping | $T_2$ TSE | rs-EPI-DWI |
|------------------------|---------------|-----------|-----------|
| **Scanner**            | Siemens MAGNETOM Prisma 3 Tesla |           |           |
| **Coil**               | 60-channel phased-array surface coil |           |           |
| **Orientation**        | Axial         | Axial     | Axial     |
| **TR (msec)**          | 3900–9030     | 3990      | 4540      |
| **TE (msec)**          | 10.8, 21.6, …, 172.8 (16 echoes) | 102       | 50        |
| **Slice thickness (mm)** | 3          | 3         | 3         |
| **Voxel size (mm³)**   | $0.8 \times 0.8 \times 3$ | $0.5 \times 0.5 \times 3$ | $1.4 \times 1.4 \times 3$ |
| **Field of view (mm²)** | $247 \times 220$ | $130 \times 130$ | $200 \times 200$ |
| **Matrix**             | $320 \times 270$ | $256 \times 256$ | $140 \times 140$ |
| **Number of averages** | 1             | 3         | 3, 1      |
| **Number of slices**   | 18–34         | 30        | 30        |
| **Acquisition Time (minutes:seconds)** | 3:26–7:58 | 5:19      | 6:38      |
| **$b$-values (seconds/mm²)** | NA         | NA        | 0, 1000   |
| **Calculated $b$-value** | NA         | NA        | 1800      |

$TR =$ repetition time, $TE =$ echo time.
differentiation between all PCa, csPCA, and benign tissue in PZ and TZ were analyzed.

**Imaging**

MPMRI of the prostate was performed on a 3 T MRI scanner (MAGNETOM Prisma, Siemens Healthcare, Erlangen, Germany) with a phased-array surface coil in the supine position. The MRI protocol is in accordance with the recommendations of PI-RADS version 2.1,3,4,20 It included T1WI (repetition time/echo time 870 msec/13 msec; slice thickness 5 mm; matrix 576 × 576; FOV 350 × 350 mm²) and T2WI turbo-spin-echo (TSE; 3990 msec/102 msec; 3 mm; 256 × 256; 130 × 130 mm²), dynamic contrast-enhanced (DCE; 3.87 msec/1.46 msec; 3 mm; 256 × 256; 200 × 200 mm²), diffusion-weighted imaging (DWI; 4540 msec/50 msec; 3 mm; 140 × 140; 200 × 200 mm²), and a prototype T2 mapping sequence (3900–9030 msec/16 echoes between 10.8–172.8 msec; 3 mm; 320 × 270; 247 × 220 mm²).21 The detailed parameters of the T2-mapping, T2 TSE, and DWI sequences are shown in Table 1. The readout segmented-DWI (re: DWI; REadout Segmentation Of Long Variable Echo trains [RESOLVE]) was used for ADC value correlation.

**Biopsy and Histopathology**

After mpMRI, all patients underwent targeted MRI/US fusion-guided and additional systematic (12-core) biopsy.22–24 An experienced urologist performed all biopsies (5–10 years of experience in targeted prostate biopsy). All cancer-suspect regions (CSR) were marked with a three-dimensional region of interest (ROI) for biopsy targeting using DynaCAD Invivo (version 4, Philips Healthcare). Elastic MRI/US fusion was performed using UroNAV (Philips Healthcare). For targeted biopsy, two cores were obtained from each CSR. All biopsy cores were histopathologically evaluated in accordance with the recommendations of the ISUP by a pathologist. CsPCA was defined as ISUP grade ≥2.25

**Image Analysis**

ROIs were defined by M.K. and L.S. (4 and 10 years of experience) in the T2 map for the PCa index lesion, PZ, TZ, AFS, and MOI. PCa ROIs were selected according to the histopathologic report and corresponding lesion in ADC/DWI and T2W images. ROIs covered the center of the PCa lesion visible on MRI. In case a lesion involved more than one region, we decided on the main localization based on the main tumor volume. For PZ, TZ, AFS, and MOI, ROIs were drawn as large as possible around the tissue. ROIs were copied in each sequence to ensure matching sizes. An example of the

| TABLE 2. Patient Characteristics |
|---------------------------------|
| Total number of patients with PCA included | 44 |
| Age (years), mean ± SD | 67 ± 8.4 |
| PSA (ng/mL), median (IQR) | 7.9 (6.0–13) |
| Prostate volume (mL), median (IQR) | 36 (29–49) |
| PI-RADS % (N) | |
| 1 | 7 (17) |
| 5 | 61 (27) |
| ISUP Grade Group % (N) | |
| 1 | 41 (18) |
| 2 | 23 (10) |
| 3 | 6.8 (3) |
| 4 | 25 (11) |
| 5 | 4.5 (2) |
| PCa Localization % (N) | |
| PZ | 68 (30) |
| TZ | 20 (9) |
| AFS | 11 (5) |
| Maximum diameter of PCa index lesion (mm), median (IQR) | 16 (12–20) |

SD = standard deviation; PSA = prostate-specific antigen; IQR = interquartile range; PCa = prostate carcinoma; ISUP = International Society of Urological Pathology; PZ = peripheral zone; TZ = transition zone; AFS = anterior fibromuscular stroma.

**FIGURE 1:** ROI measurements of benign tissue in the peripheral zone (PZ; purple ROI) and transition zone (TZ; orange ROI), and PCa (red ROI). Quantitative T2 map (a), T2 TSE (b), and calculated ADC map of rs-DWI (c). On radical prostatectomy (RPE), an ISUP grade 5 PCa was confirmed.

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**TABLE 3. Quantitative T2 Values**

| ROI Size | T2 Value | ADC Value | PI-RADS |
|----------|----------|-----------|---------|
| **All (N = 44)** | | | |
| PCa | 0.66 (0.46–0.87) | 79.9 (75.2–88.2) | 869 (774–968) | 5 (4–5) |
| PZ | 1.35 (1.08–1.74) | 136 (117–161) | | |
| TZ | 1.31 (1.01–1.57) | 102 (89.2–115) | | |
| AFS | 0.78 (0.66–1.13) | 87.5 (79.4–98.0) | | |
| MOI | 0.95 (0.7–1.31) | 47.3 (43.8–52.6) | | |
| **PCa in PZ (N = 30)** | | | |
| PCa | 0.64 (0.44–0.84) | 84.6 (79.1–96.2) | 898 (779–969) | 5 (4–5) |
| PZ | 1.32 (1.08–1.73) | 141 (119–171) | | |
| **PCa in TZ (N = 14)** | | | |
| PCA | 0.66 (0.53–0.92) | 74.8 (70.4–77.7) | 835 (780–877) | 5 (4–5) |
| TZ | 1.32 (1.0–1.46) | 96.8 (90.9–113) | | |
| **ISUP 1 (N = 18)** | | | |
| PCa | 0.59 (0.46–0.92) | 76.5 (71.5–87.3) | 898 (839–987) | 4 (4–5) |
| PZ | 1.56 (1.14–1.94) | 129 (109–159) | | |
| TZ | 1.4 (0.97–1.58) | 102 (87.9–109) | | |
| AFS | 1.03 (0.74–1.25) | 87.1 (79.5–92.4) | | |
| MOI | 1.2 (0.72–1.55) | 48.8 (44.9–54.7) | | |
| **ISUP ≥2 (N = 26)** | | | |
| PCa | 0.70 (0.45–0.92) | 80.4 (77.4–90.3) | 846 (708–918) | 5 (4–5) |
| PZ | 1.24 (1.06–1.65) | 136 (119–161) | | |
| TZ | 1.24 (1.02–1.55) | 102 (90.9–115) | | |
| AFS | 0.72 (0.63–0.86) | 89.9 (71.5–105) | | |
| MOI | 0.88 (0.72–1.28) | 46.9 (43.5–51.1) | | |
| **ISUP ≥3 (N = 16)** | | | |
| PCa | 0.74 (0.58–1.12) | 84.6 (79.6–92.2) | 822 (688–913) | 5 (5–5) |
| PZ | 1.28 (1.07–1.69) | 135 (117–167) | | |
| TZ | 1.29 (1.14–1.68) | 103 (91.1–116) | | |
| AFS | 0.72 (0.65–0.78) | 105 (85.8–106) | | |
| MOI | 0.84 (0.77–1.21) | 48.0 (45.2–50.4) | | |

ROI = region of interest; IQR = interquartile range; ADC = apparent diffusion coefficient; PCa = prostate carcinoma; PZ = peripheral zone; TZ = transition zone; AFS = anterior fibromuscular stroma; MOI = musculus obturatorius internus; ISUP = International Society of Urological Pathology.

*In square centimeters.

**In milliseconds.**
selected ROIs is shown in Fig. 1. CD was calculated as difference and CR as ratio between quantitative T2 values in PZ, respectively TZ, and PCa in the anatomic zone. Quantitative T2 values of the PCa index lesion were compared with the respective ISUP grade.

**Statistical Analysis**

Data were presented as mean ± standard deviation or median and interquartile range (IQR). SPSS (version 2019) was used for analysis of non-parametric data with Mann–Whitney test and Spearman (r) for correlation analysis. Statistical significance was defined as P-value <0.05. Cut-off values were determined using Youden’s index (J) and Area under the curve (AUC). Boxplots were created using Microsoft Excel (version 2019).

**Results**

**Patient Population**

Forty-four male patients (67 ± 8.4 years) were included in this study. Details of patient population are shown in Table 2. Time interval between mpMRI and biopsy was 20 days median (IQR 19–26 days).

**Analysis of PCa Detection**

Analysis showed that PCa T2 values (80 msec, IQR 75–88 msec; ROI size median 0.66 cm², IQR 0.46–0.87 cm²) were significantly lower than benign PZ (136 msec, IQR 117–161 msec; ROI size median 1.35 cm², IQR 1.08–1.74 cm²) and/or TZ (102 msec, IQR 89–115 msec; ROI size median 1.31 cm², IQR 1.01–1.57 cm²) (P < 0.001). T2 values of MOI compared to PCa were significantly lower (48 msec, IQR 44–53 msec; ROI size median 0.95 cm², IQR 0.7–1.3 cm²) (P < 0.001). No significant differences were detected between PCa and AFS (88 msec, IQR 79–98 msec; ROI size median 0.78 cm², IQR 0.66–1.13 cm²) (P = 0.984).

Quantitative T2 values analysis is shown in Table 3 and Fig. 2.

The T2 values of PCa in PZ (85 msec, IQR 79–96 msec; ROI size median 1.32 cm², IQR 1.08–1.73 cm²) and PCa in TZ (75 msec, IQR 70–78 msec; ROI size median 1.32 cm², IQR 1.00–1.46 cm²) showed significantly lower quantitative T2 values compared to the respectively benign PZ (141 msec, IQR 119–171 msec) and TZ (97 msec, IQR 91–113 msec) (P < 0.001). CD/CR for PCa in PZ (51.2; IQR 31.7–83.2) as well as PCa in TZ (19.8; IQR 7.68–30.3) and the benign tissue were significantly different (P < 0.001). CD/CR values are shown in Table 4, pointing out the highest CD/CR between PCa and PZ. Figure 3 shows boxplots for PCa in PZ and TZ.

Youden’s index (J) showed that the best cut-off T2 value was 92 msec (specificity 86%, sensitivity 80%) for PCa and 99 msec (specificity 79%, sensitivity 89%) for csPCa with an AUC value of 0.90, respectively (Fig. 4). For PCa/csPCa in TZ 81/86 msec (AUC 0.99) and for PCa/csPCa in PZ of 110/110 msec (AUC 0.98) (Table 5).

**Table 4. Contrast Difference (CD) and Contrast Ratio (CR) of Quantitative T2 Values**

|                      | CD, Median (IQR) | CR, Mean ± SD |
|----------------------|------------------|---------------|
| All (N = 44)         |                  |               |
| PZ and PCa           | 51.2 (31.7 to 83.2) | 1.77 ± 0.49   |
| TZ and PCa           | 19.8 (7.68 to 30.3) | 1.29 ± 0.33   |
| AFS and PCa          | 5.3 (−3.1 to 16.2) | 1.14 ± 0.34   |
| MOI and PCa          | −31.3 (−40.4 to −23.6) | 0.61 ± 0.12   |

| PCA in PZ and TZ     |                  |               |
| PZ and PCa in PZ (N = 30) | 51.1 (29.2–84.7) | 1.75 ± 0.53   |
| TZ and PCa in TZ (N = 14) | 24.5 (18.0–35.8) | 1.35 ± 0.14   |

PCa = prostate carcinoma; PZ = peripheral zone; TZ = transition zone; AFS = anterior fibromuscular stroma; MOI = musculus obturatorius internus.
Analysis of PCa Classification

T2 values did not significantly correlate with the ISUP grade ($P = 0.226$). Figure 5 shows boxplots for all ISUP grades and demonstrates a substantial overlap for the quantitative T2 values of all groups. Quantitative T2 values of PCa/csPCa also did not significantly correlate with ADC ($P = 0.372/0.534$). Moreover, there was no significant correlation between quantitative T2 values of PCa/csPCa and PI-RADS ($P = 0.392/0.534$) and T2 score ($P = 0.371/0.951$) (Table 6).

Discussion

The results show that quantitative T2 values were significantly lower in both PZ and TZ compared to benign tissue and therefore enabled the detection of PCa. Quantitative T2 values may be a valuable addition to the standard mpMRI protocol striving to increase standardization. However, different thresholds seem to be required for PZ and TZ. Tumor grading seems limited with quantitative T2 values.

Current studies show that MR plays an important role in PCa grading, particularly by combining quantitative and qualitative parameters. A large meta-analysis by Meyer et al. including 26 studies has recently again confirmed that ADC values correlate with the Gleason score. Yamauchi et al. demonstrated a specificity of 92% and specificity of 99% for a threshold of 99 msec. This study showed significantly lower quantitative T2 values for PCa in PZ compared to benign tissue and a higher CR in PZ. Moreover, these results are comparable regarding specificity and sensitivity using a higher threshold. However, prostatitis may lead to masked or missed detection of PCa in PZ on T2W images. Cases with prostatitis may lead to a PI-RADS 3 classification and have not been included in the study. Therefore, further studies are necessary in order to discover whether quantitative T2 values can solve this predicament.

Current literature reports a significantly lower quantitative T2 relaxation time in TZ compared to PZ, which can be caused by for example, stromal hyperplasia. Most of the previous studies focused on PZ PCa or showed limited results for TZ PCa detection. However, Mai et al showed significant differences between benign tissue and PCa in TZ. These results are comparable to the present study. The present data even suggest a substantially lower threshold that leads to an even higher specificity. Besides stromal hyperplasia further reasons for different T2 relaxation times for PCa in PZ and TZ could include different ISUP grading or different tumor cell type. These hypotheses need to be further evaluated in larger
studies. Nevertheless, quantitative T2 mapping is supposed to be used in addition to the standard mpMRI protocol according to the PI-RADS recommendation.\(^{3,4,30}\)

There were no significant differences of quantitative T2 values between PCa and AFS, which might underline the benefit of DWI and/or DCE to detect anterior PCa. Furthermore, we could show that T2 values of MOI are significantly lower compared to PCa. Therefore, MOI signal intensity might be used as a reference signal intensity.

Establishing a reliable cut-off for T2 values has been a challenging task. Current literature has reported thresholds for quantitative T2 values in a range between 99 msec\(^{16}\) to 134 msec\(^{15}\) in PZ. The presence of (stromal) hyperplasia and/or prostatitis next to a possible variability of T2 values depending on the scanner vendor and sequence type makes it difficult to establish generally usable cut-off values.\(^{13,28}\) Nonetheless, Hoang et al. concluded that T2 values were robust to scanner and vendor changes.\(^{13}\)

**Limitations**

Limitations of this study include the single center and single scanner/field strength design with a small sample size. Furthermore, signs of hyperplasia and prostatitis may have an impact of the ability to differentiate PCa from benign tissue using quantitative T2 values. However, since almost all patients have some degree of benign hyperplasia and often
additional signs of prostatitis, exact histological localization of the PCa allowed placing the ROI in the PCa lesion correlated in all available sequences and other ROIs in regions that showed benign histological results. Thus, overlaying hyperplasia and prostatitis may have influence on the signal, because of their ubiquitous presence, these effects counterbalanced themselves and differentiation of PCa and benign tissue was still possible within the same patients. In addition, it is very difficult to confirm how much calcification in the TZ affects the \( T_2 \) relaxation time. No patients without PCa were included. Also, a study control group analysis is warranted. Moreover, since the exact size of the lesion was not confirmed with the surgical specimen, the degree of agreement between PCa and ROI could not be confirmed. Due to these

### TABLE 5. Sensitivity, Specificity, and Youden Index for PCa/csPCa Detection in PZ and TZ

| \( T_2 \) Value | Sensitivity | Specificity | Youden Index (J) |
|-----------------|-------------|-------------|------------------|
| **PCa in TZ**   |             |             |                  |
| 73.9 msec       | 0.429       | 1           | 0.429            |
| 77.6 msec       | 0.714       | 1           | 0.714            |
| 79.3 msec       | 0.857       | 1           | 0.857            |
| **80.9 msec**   | **0.929**   | 1           | **0.929**        |
| 81.6 msec       | 0.929       | 0.929       | 0.858            |
| 87.3 msec       | 0.929       | 0.786       | 0.715            |
| 94.3 msec       | 1           | 0.571       | 0.571            |
| **csPCa in TZ** |             |             |                  |
| 71.7 msec       | 0.4         | 1           | 0.4              |
| 75.7 msec       | 0.6         | 1           | 0.6              |
| 79.3 msec       | 0.8         | 1           | 0.8              |
| **85.5 msec**   | **1**       | 1           | **1**            |
| 91.6 msec       | 1           | 0.8         | 0.8              |
| 93.3 msec       | 1           | 0.6         | 0.6              |
| 104.8 msec      | 1           | 0.4         | 0.4              |
| **PCa in PZ**   |             |             |                  |
| 82.9 msec       | 0.467       | 1           | 0.467            |
| 93.3 msec       | 0.7         | 1           | 0.700            |
| 106.7 msec      | 0.933       | 0.900       | 0.833            |
| **109.9 msec**  | **0.967**   | **0.867**   | **0.834**        |
| 112.0 msec      | 0.967       | 0.833       | 0.800            |
| 120.0 msec      | 0.967       | 0.733       | 0.700            |
| 134.8 msec      | 1           | 0.567       | 0.567            |
| **csPCa in PZ** |             |             |                  |
| 82.9 msec       | 0.476       | 1           | 0.476            |
| 95.9 msec       | 0.762       | 1           | 0.762            |
| 106.0 msec      | 0.952       | 0.905       | 0.857            |
| **109.9 msec**  | **1**       | **0.905**   | **0.905**        |
| 112.0 msec      | 1           | 0.857       | 0.857            |
| 121.5           | 1           | 0.667       | 0.667            |
| 134.8           | 1           | 0.524       | 0.524            |

PCa = prostate carcinoma; csPCa = clinically significant prostate carcinoma; PZ = peripheral zone; TZ = transition zone; bold = highest Youden Index (J).
limitations further larger (multi-center) studies are needed to approach the problem of determining a threshold.

Conclusion
Quantitative T2 values seem promising for standardization of PCa detection on T2 images. Different thresholds seem needed to apply for PCa detection in PZ and TZ. PCa detection in AFS was limited with only the use of T2 images and the present study found no significantly different quantitative T2 values between non-significant and significant PCa. This underlines the current recommended multiparametric setting for PCa detection with MRI.

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Conflict of Interest
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