

PI-RADS version 2 - what we need to know

Poster No.: C-1846
Congress: ECR 2017
Type: Educational Exhibit
Authors: I. Abreu¹, D. Roriz¹, A. P. Pissarra¹, Â. Moreira¹, C. B. Marques¹,
F. Caseiro Alves²; ¹Coimbra/PT, ²Coimbra, Coimbra/PT
Keywords: Staging, Diagnostic procedure, MR-Diffusion/Perfusion,
MR, Genital / Reproductive system male, Pelvis, Oncology,
Multidisciplinary cancer care, Neoplasia
DOI: 10.1594/ecr2017/C-1846

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR's endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.

As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is strictly prohibited.

You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys' fees, arising from or related to your use of these pages.

Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.

www.myESR.org

Learning objectives

- Summarise the main features of PI-RADS v2
- Highlight the key differences between PI-RADS v1 and v2
- Describe and illustrate the technical considerations, PI-RADS v2 assessment and reporting
- Explore and discuss PI-RADS v2 limitations and future directions

Background

Multi-parametric magnetic resonance imaging (mpMRI) has been validated in the detection and characterization of prostate tumours and can help in risk stratification and treatment selection.

In 2012, the European Society of Urogenital Radiology (ESUR) established the Prostate Imaging Reporting and Data System (PI-RADS) guidelines with the aim of standardising the acquisition, interpretation and reporting of prostate MRI.

In 2014, a joint committee formed by the ACR, ESUR, and the AdMeTech Foundation announced an updated version (PI-RADS v2).

Prostatic mpMRI indications:

- Local staging
- Cancer detection (with negative biopsies and clinical suspicion)
- Better characterization of known alterations
- Biopsy guidance
- Active vigilance
- Suspicion of recurrence

Main differences between PI-RADS v1 and v2 ([Fig. 1](#) on page 3)

For PI-RADS v1, it was not specified exactly how to combine the scores from each MRI sequence, therefore variable approaches were used.

PI-RADS v2, proposes a specific algorithm for deriving an overall assessment on the basis of a lesion's individual scores on T2WI, DWI, and DCE.

MR spectroscopic imaging, which is an optional parameter in PI-RADS v1, does not influence the assessment of lesions in PI-RADS v2.

On the other hand, the interpretation of DCE-MRI was simplified and is now a binary assessment of the presence or absence of focal early enhancement. Kinetic curves, pharmacokinetic analysis, and contrast washout are no longer included.

Normal 0 false false false PT JA X-NONE

A size threshold of 15 mm is suggested for differentiating between T2WI and DWI scores of 4 and 5.

MAIN DIFFERENCES BETWEEN	
PI-RADS V1	PI-RADS V2
Sum score of 3–15 (20 with MRSI) for T2W + DWI + DCE (+ MRSI)	Stepped evaluation of 1–5 point score. Peripheral zone - DWI is dominant. Transition zone - T2WI is dominant.
Equal role for DCE (5-point scale)	DCE has a secondary role (positive or negative)
For DWI: ADC map is mandatory	For DWI: ADC map and high b-value images (b value >1400) are mandatory
27-Sector map	39-Sector map
MRSI can be included	MRSI is not included
Size is not used for T2W + DWI	Size (>15 mm) is used for T2W + DWI to differentiate PI-RADS scores 4 and 5

Fig. 1: Main differences between PI-RADS v1 and v2

References: - Coimbra/PT

PI-RADS v2 has more specific criteria and the classification is based on the individual characteristics of each lesion, simplifying and reducing the variability of its application.

Images for this section:

MAIN DIFFERENCES BETWEEN	
PI-RADS V1	PI-RADS V2
Sum score of 3–15 (20 with MRSI) for T2W + DWI + DCE (+ MRSI)	Stepped evaluation of 1–5 point score. Peripheral zone - DWI is dominant. Transition zone - T2WI is dominant.
Equal role for DCE (5-point scale)	DCE has a secondary role (positive or negative)
For DWI: ADC map is mandatory	For DWI: ADC map and high b-value images (b value >1400) are mandatory
27-Sector map	39-Sector map
MRSI can be included	MRSI is not included
Size is not used for T2W + DWI	Size (>15 mm) is used for T2W + DWI to differentiate PI-RADS scores 4 and 5

Fig. 1: Main differences between PI-RADS v1 and v2

© - Coimbra/PT

Findings and procedure details

1. Prostatic mpMRI technique

Patient preparation:

- Antispasmodic agents - recommended but not obligatory (adverse effects)
- Previous evacuation
- Ventral decubitus may be indicated in the presence of rectal gas (reduces the artifacts)

NOTE: In the case of a prior biopsy, haemorrhage may influence image interpretation, specially when the mpMRI is performed for local staging (recommended interval of 6 weeks).

Technical considerations:

- Magnetic field 1.5T or 3T (preference for the 3T)
 - Endorectal antenna is not necessary
- More time and cost
 - Deforms the gland
 - More artifacts
 - Patient discomfort
- All examinations must include: T1WI, T2WI, diffusion weighted imaging (DWI) and dynamic contrast-enhanced (DCE) sequences
 - One sequence with a large FOV
 - DWI b#1400 (RSNA recommends: b10-50, 400, 800, 1200-1400)

2. Image interpretation

T1 WI

- Determine the presence of postbiopsy haemorrhage
- Delineate the gland boundary
- Detection of nodal and skeletal metastases

T2 WI

- Zonal anatomy
- Assess abnormalities within the gland, especially in the transition zone
- Local staging (seminal vesicles invasion; extra-prostatic extension)

The quality of these images should be as high as possible because they are the key images for detecting significant cancers, especially in the TZ.

T2 SCORE	TRANSITION ZONE (TZ)
1	Homogeneous intermediate signal intensity (normal)
2	Circumscribed hypointense or heterogeneous encapsulated nodule(s) (BPH)
3	Heterogeneous signal intensity with obscured margins (Includes others that do not qualify as 2, 4, or 5)
4	Lenticular or non-circumscribed, homogeneous, moderately hypointense, and <1.5 cm in greatest dimension
5	Same as 4, but ≥ 1.5 cm in greatest dimension or definite extraprostatic extension/invasive behavior

Fig. 2: T2 Score - Transition Zone

References: - Coimbra/PT

TZ lesions should be measured on T2W images.

DWI

- Peripheral zone evaluation
- Transition zone additional evaluation

DWI is a key component of prostate mpMRI examinations, specially in the detection of significant cancers in the peripheral zone. The ADC value of a focal tumour is inversely correlated with the Gleason pattern: The lower the ADC value, the higher the Gleason pattern.

DWI SCORE	PERIPHERAL ZONE (PZ)
1	No abnormality on ADC or high b-value DWI
2	Indistinct hypointense on ADC
3	Focal mildly/moderately hypointense on ADC and isointense/mildly hyperintense on high b-value DWI
4	Focal markedly hypointense on ADC and hyperintense on high b-value DWI (<1.5 cm in greatest dimension)
5	Same as 4 but ≥ 1.5 cm in greatest dimension or definite extraprostatic extension/invasive behaviour

Fig. 3: DWI Score - Peripheral Zone

References: - Coimbra/PT

PZ lesions should be measured on ADC maps.

DCE

- Provide additional information if DWI is technically limited
- Detection of noneoplastic diseases (prostatitis)
- Kinetic evaluation is not recommended
- Alterations seen on parametric maps must be confirmed with the dynamic study and subtraction images
- DCE serves primarily to help detect significant PCa and not to characterise it.

Most published studies show that the added value of DCE over the combination of T2W and DWI is modest.

DCE

Positive (+)	Focal enhancement (earlier than or contemporaneously with enhancement of adjacent prostate tissue)
Negative (-)	<ul style="list-style-type: none">- No early enhancement- Diffuse enhancement not corresponding to a focal finding on T2W and/or DWI- Focal enhancement corresponding to a lesion demonstrating features of BPH on T2WI

Fig. 4: DCE score

References: - Coimbra/PT

3. PI-RADS Assessment

PI-RADS 1 – Very low (clinically significant cancer is highly unlikely to be present)

PI-RADS 2 – Low (clinically significant cancer is unlikely to be present)

PI-RADS 3 – Intermediate (the presence of clinically significant cancer is equivocal)

PI-RADS 4 – High (clinically significant cancer is likely to be present)

PI-RADS 5 – Very high (clinically significant cancer is highly likely to be present)

Fig. 6: PI-RADS classification**References:** - Coimbra/PT

PI-RADS v2 uses a 5-point scale indicating the likelihood that mpMRI findings correlate with the presence of clinically significant PCa at a particular anatomic location ([Fig. 6](#) on page 16).

Clinically significant disease is defined as Gleason score >7 (including 3 + 4 with prominent but not predominant Gleason grade 4), and tumour volume >0.5 ml, and/or extraprostatic extension.

Assignment of a PI-RADS assessment category for each lesion is based on the scoring of T2W, DWI, and DCE sequences performed sequentially according to zonal anatomy.

For the PZ, DWI is the primary determining sequence. For the TZ, T2WI is the primary determining sequence.

The scoring for T2W and DWI uses a 5-point scale ([Fig. 2](#) on page and [Fig. 3](#) on page); for DCE, a 2-point scale (present or absent) is used ([Fig. 4](#) on page).

When T2WI and DWI are of adequate diagnostic quality, DCE plays a minor role. Although DCE has an important role in the indeterminate category 3 PZ lesions, it does not contribute to the overall assessment category when the findings suggest a low PI-RADS (1 or 2) or high PI-RADS (4 or 5).

When a PZ lesion has a DWI score of 3, a positive DCE increases the likelihood that the finding corresponds to a clinically significant PCa and upgrades the assessment category to PI-RADS 4.

Benign prostatic hyperplasia (BPH) is intrinsically heterogeneous, including ill-defined structures and those that are highly cellular and vascular. This is why tumour detection in the TZ is less accurate compared with the PZ; the normal PZ has a more homogenous appearance. Although T2W images are dominant in the TZ, any lesion with low ADC and high signal intensity on high b-value images should be regarded with caution and should be carefully evaluated and biopsied if necessary.

In clinical practice, visually bright foci in the TZ on high b-value DWI help draw the radiologist's attention to a potential lesion and trigger more detailed analysis of this area using the rest of the MR data set. In this sense, initial localisation of the suspicious region

using the b-value >1400 images can be useful in raising one's confidence regarding the presence of a lesion, even if the final PI-RADS category is largely determined by T2WI.

Location

All suspicious intraprostatic lesions seen on mpMRI should be assigned to their zonal location:

- Peripheral Zone (PZ)
- Transition Zone (TZ)
- Central Zone (CZ)

CZ, like the TZ, often shows hypointensity on T2WI and ADC and high signal on the high b-value images and thus may mimic significant PCa; therefore, in PI-RADS v2, this zone is separately indicated in the 39-sector scheme.

When there is more than one lesion, the index lesion is by definition the one with the highest PI-RADS or the largest lesion if there is more than one with the same category. If there are more than four suspicious findings, only the four with the highest PI-RADS should be reported.

Reporting of additional or definitely benign findings is optional but may be helpful to compare lesions on future examinations.

If a suspicious finding extends beyond the boundaries of one sector, all neighbouring involved sectors should be indicated on the sector map as a single lesion.

A flowchart can be found on [Fig. 7](#) on page 17.

4. Limitations, frequent problems and future directions

PI-RADS v2 is exclusively based in the RM and does not evaluate detection of recurrence nor progression during active monitoring.

4.1. Interreader agreement

Two initial studies of PI-RADS v2 (Muller BG et al, 2015; Vargas HA et al, 2015) reported moderate interreader agreement among readers from the same center and limited performance in the assessment of tumors with a volume of 0.5 mL or less.

A recent study (Rosenkrantz AB et al, 2016) reports also moderate agreement between experienced radiologists, which tended to be better in PZ than TZ, although was weak for DCE in PZ.

This underscores the intrinsic robustness of the PI-RADS v2 assessment technique but also emphasises the need for specific PI-RADS v2 training, documentation of observer variability according to reader experience, and further data on intra- and interobserver variability.

4.2. Lack of experience

The inappropriate use of PI-RADS v2 by new users, without sufficient training or experience, may be damaging. Case conferences and multidisciplinary meetings with histopathologic correlation are helpful for calibrating the accuracy of PI-RADS category assessments.

Even if radiologists apply the system properly, concern remains if urologists base management decisions too strictly on the assessment categories provided.

4.3. Problematic areas

Because the dominant factors for PI-RADS v2 assessment are T2WI for the TZ and DWI for the PZ, identification of the zonal location of the lesion is vital. Areas in which this may be especially problematic include the interface of the CZ, the base of the gland, the anterior-apical region, the interface of the anterior horn of the PZ with TZ and the anterior fibromuscular stroma.

Lesions within the anterior fibromuscular stroma and the central zone (CZ) may not be optimally evaluated using current PZ and TZ criteria. DCE has little effect on the assessment of TZ lesions, however, the anterior fibromuscular stroma is usually hypovascular, and DCE may be useful for evaluating this region. On the other hand CZ commonly exhibits restricted diffusion and DCE may be important in the detection of tumors in the CZ.

4.4. Criteria ambiguity

The definition of "mild-to-moderate" vs "marked" signal abnormality on high-b-value DWI is subjective, although this differentiation is critical in determining the DWI score.

In the peripheral zone, a lesion that is interpreted as exhibiting markedly abnormal signal intensity on the ADC map or a high-b-value image, but not both, does not meet the criteria for a DWI score of either 3 ("mild-to-moderate" abnormality on both image sets) or 4 ("marked" abnormality on both image sets). This source of uncertainty can lead to variable interpretation of lesions of this nature, and clarification is necessary.

ADC values depend on the choice of b values for DW images used for calculations (hence the recommendation to use only b values < 1000 s/mm²), but it also depends on the diffusion time achieved on diffusion sequences (which is highly dependent on scanner specifications) and on a variety of other technical factors. The solution would be for each institution to determine its own ADC cutoff value based on biopsy and prostatectomy results.

4.5. Abrupt shifts

These abrupt shifts result from elevations in the assessment category that occur only at certain levels of suspicion. For example, a PZ lesion with DCE positive findings plus a DWI score of 2 leads to a PIRADS = 2 whereas a DWI score of 3 leads to a PIRADS = 4. The same may happen for a TZ lesion that measures 15 mm, with a T2WI score of 3, which leads to a PIRADS = 3 whereas a T2WI score of 4 would lead to a PIRADS = 5.

Validation of the 1.5-cm cut-off is needed.

4.6. False negatives

Although mpMRI is an accurate technique for detecting significant PCa, it misses a low percentage of significant PCa (6-25%). The missed lesions are usually invasive PCa intermixed with normal tissue, low-grade PCa or mucinous PCa. The rate at which this occurs is low for PI-RADS 1 and 2 lesions and higher for PI-RADS 3 lesions. The exact prevalence of all PCa and significant PCa for each PI-RADS v2 category has yet to be determined.

Vargas HA et al report that PI-RADSV2 correctly identified 94-95 % of PCa foci #0.5 mL, but was limited for the assessment of tumours #0.5 mL.

FAQ - What should be done when the biopsy is negative with a PI-RADS 4 or 5?

The biopsy should be repeated. *Barentsz JO et al* report that there is an important PCa in 86% of PI-RADS 4 and 93% PI-RADS 5 cases.

Anterior lesions may be a problem due to the fact that the transrectal biopsy needle has a range of 20 mm which may not be sufficient to reach anterior lesions.

In the 39 sector scheme there is a line that divides the gland into anterior and posterior by the 17-mm line, based on the likely reach of transrectal biopsy needle.

The future directions will be in the direction to continuous improvement, reaching a PI-RADS v3 that will probably be more objective, including:

- ADC, volumetry
- Include recommendations on approaching the patient
- Structured report (under development)
- PI-RADS Atlas (in development)

5. Examples from our hospital

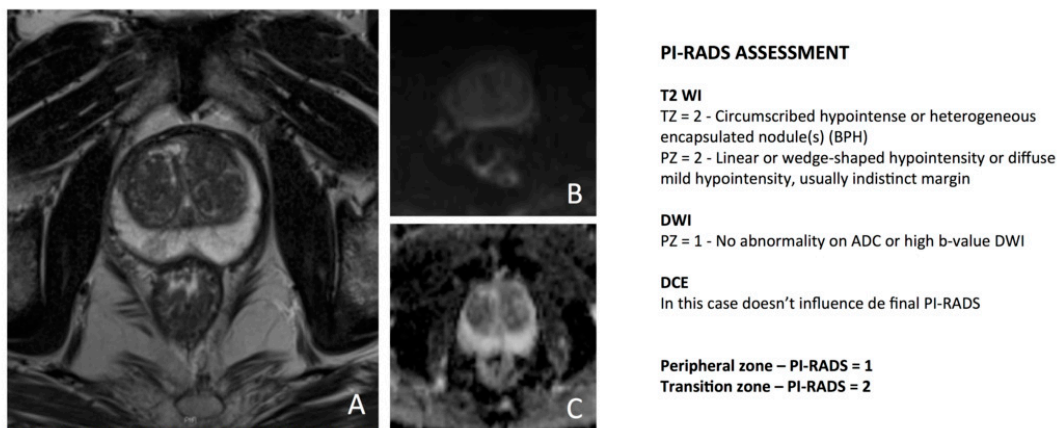


Fig. 8: 59-year-old man with prostate-specific antigen level of 6,68 ng/mL and prior negative prostate biopsy. Axial T2-weighted MR image (A) shows circumscribed hypointense and heterogeneous nodules on transition zone, typical of benign prostate hypertrophy (BPH). The peripheral zone is hyperintense and homogeneous except for a slightly hypointense area that is not evident on DWI (B and C).

References: - Coimbra/PT

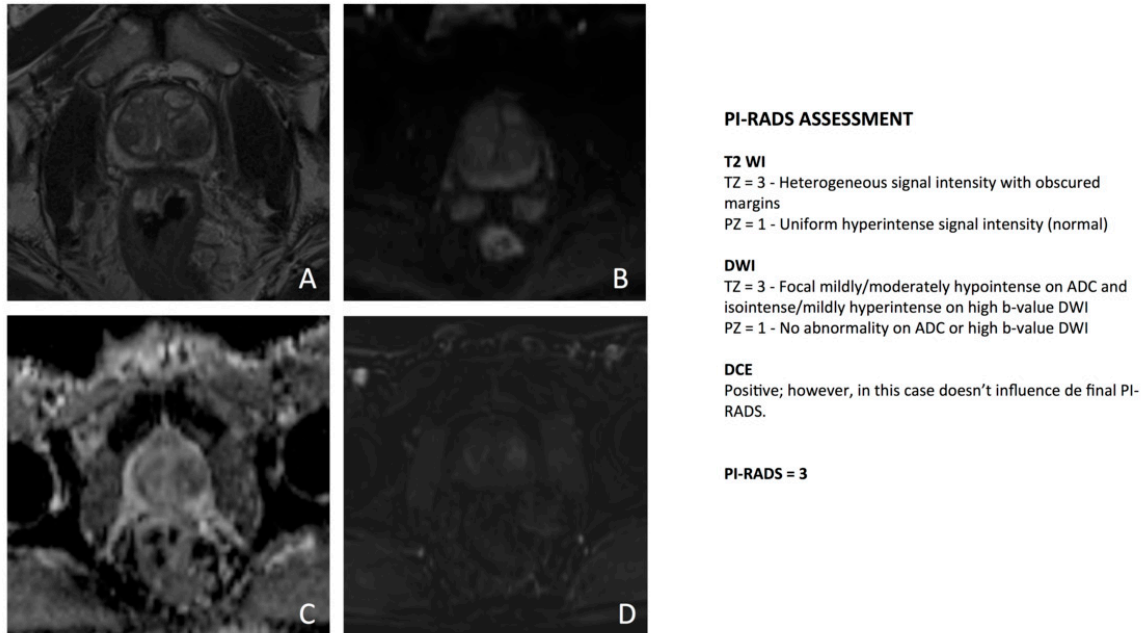


Fig. 9: 62-year-old man with elevation prostate-specific antigen and two prior negative prostate biopsies. Axial T2-weighted MR image (A) shows approximately 5-mm hypointense area of moderately decreased T2 signal within left transition zone. Lesion shows slight heterogeneity, with small foci of mildly increased T2 signal. DWI (B and C) shows corresponding moderate hyperintensity for high-b-value (B = 1400s/mm²) (B) and moderate hypointensity on ADC map (C). DCE was positive, as demonstrated with subtraction (D) but not relevant for the final PI-RADS. Prostate biopsy revealed benign prostate hypertrophy (BPH), with no signs of malignancy.

References: - Coimbra/PT

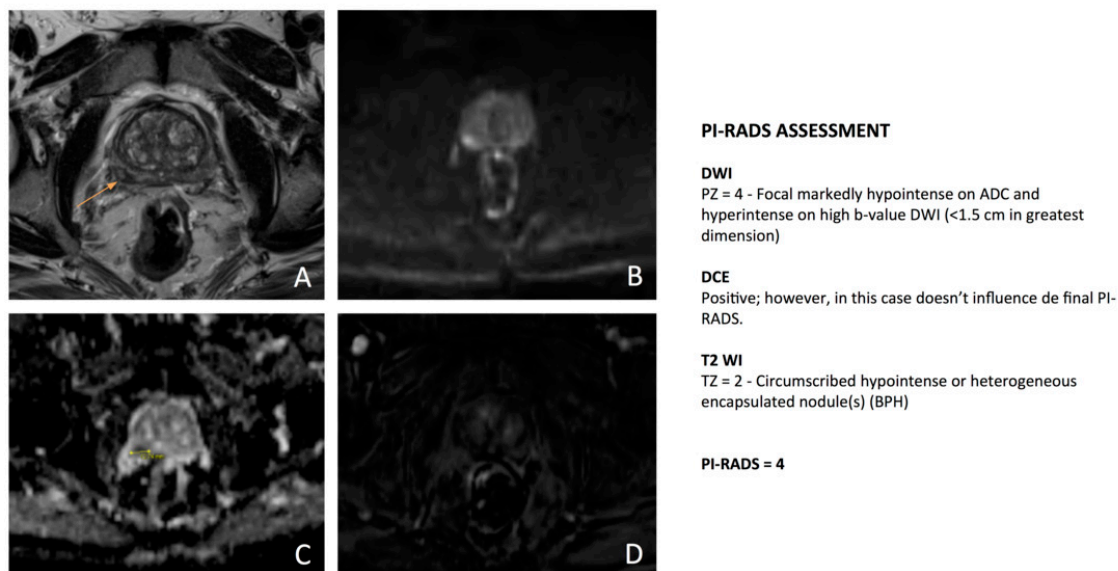


Fig. 10: 62-year-old man with elevated prostate-specific antigen level and prior negative prostate biopsy. Axial T2-weighted MR image (A) shows focal decreased T2 signal (arrow) in right peripheral zone. DWI (B and C) shows corresponding marked hyperintensity for high-b-value (B = 1400s/mm²) (B) and marked hypointensity on ADC map (C). DCE was positive, as demonstrated with subtraction (D) but not relevant for the final PI-RADS. Although Prostate Imaging Reporting and Data System, version 2 (PI-RADS v2), advises comparing signal of lesion on ADC map and high-b-value DW image with signal of normal tissue in same histologic zone, differentiation between mild-to-moderate and marked signal abnormality remains subjective, which in turn leads to potential variation in whether both lesion's DWI score and overall PI-RADS assessment category is 3 or 4. Biopsy revealed the presence of prostate adenocarcinoma Gleason score of 4 + 3.

References: - Coimbra/PT

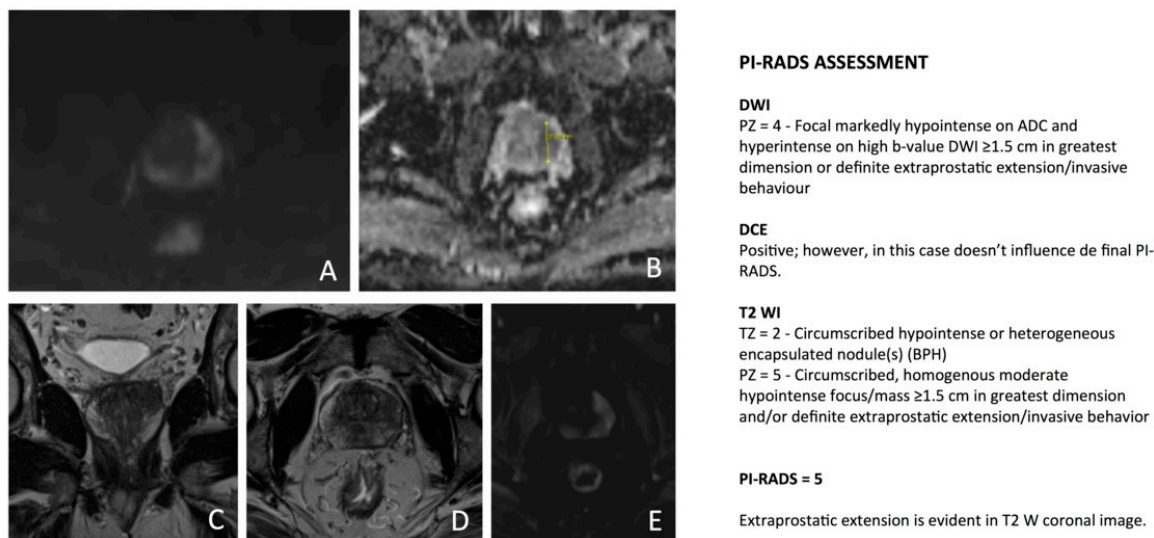


Fig. 11: 57-year-old man with prostate-specific antigen level of 8,98 ng/mL and two prior negative prostate biopsies. DWI shows an area in the left peripheral zone with marked hyperintensity for high-b-value ($B = 1400 \text{ s/mm}^2$) (B) and marked hypointensity on ADC map (C) measuring 20 mm. Coronal (C) and axial (D) T2-weighted MR images show an area of decreased T2 signal (arrow) that occupies most of the left lobe and extends to the right lobe (C) and with extraprostatic extension (C). DCE was positive, as demonstrated with subtraction (E) but not relevant for the final PI-RADS. The patient underwent a radical prostatectomy that revealed the presence of a prostate adenocarcinoma Gleason 3 + 4, in the left lobe, with extraprostatic extension, without involvement of the seminal vesicles. T3aN0.

References: - Coimbra/PT

Images for this section:

PI-RADS 1 – Very low (clinically significant cancer is highly unlikely to be present)

PI-RADS 2 – Low (clinically significant cancer is unlikely to be present)

PI-RADS 3 – Intermediate (the presence of clinically significant cancer is equivocal)

PI-RADS 4 – High (clinically significant cancer is likely to be present)

PI-RADS 5 – Very high (clinically significant cancer is highly likely to be present)

Fig. 6: PI-RADS classification

© - Coimbra/PT

PIRADS v2 assessment – step by step

TZ lesion

PZ lesion

DWI SCORE	PERIPHERAL ZONE / TRANSITION ZONE
1	No abnormality on ADC or high b-value DWI
2	Indistinct hypointense on ADC
3	Focal mildly/moderately hypointense on ADC and isointense/mildly hyperintense on high b-value DWI
4	Focal markedly hypointense on ADC and hyperintense on high b-value DWI (<1.5 cm in greatest dimension)
5	Same as 4 but ≥1.5 cm in greatest dimension or definite extraprostatic extension/invasive behaviour
T2 SCORE	PERIPHERAL ZONE (PZ)
1	Uniform hyperintense signal intensity (normal)
2	Linear or wedge-shaped hypointensity or diffuse mild hypointensity, usually indistinct margin
3	Heterogeneous signal intensity with non-circumscribed margins, rounded, moderate hypointensity (includes others that do not qualify as 2, 4, or 5)
4	Circumscribed, homogenous moderate hypointense focus/mass confined to prostate and <1.5 cm in greatest dimension
5	Same as 4, but ≥1.5 cm in greatest dimension or definite extraprostatic extension/invasive behavior
T2 SCORE	TRANSITION ZONE (TZ)
1	Homogeneous intermediate signal intensity (normal)
2	Circumscribed hypointense or heterogeneous encapsulated nodule(s) (BPH)
3	Heterogeneous signal intensity with obscured margins (includes others that do not qualify as 2, 4, or 5)
4	Lenticular or non-circumscribed, homogenous, moderately hypointense, and <1.5 cm in greatest dimension
5	Same as 4, but ≥1.5 cm in greatest dimension or definite extraprostatic extension/invasive behavior
DCE	
Positive (+)	Focal enhancement (earlier than or contemporaneously with enhancement of adjacent prostate tissue)
Negative (-)	<ul style="list-style-type: none"> - No early enhancement - Diffuse enhancement not corresponding to a focal finding on T2W and/or DWI - Focal enhancement corresponding to a lesion demonstrating features of BPH on T2WI

TRANSITION ZONE		PERIPHERAL ZONE
T2		DWI / ADC
1	PI-RADS 1 – Very low (clinically significant cancer is highly unlikely to be present)	1
2	PI-RADS 2 – Low (clinically significant cancer is unlikely to be present)	2
3	PI-RADS 3 – Intermediate (the presence of clinically significant cancer is equivocal)	3
4	PI-RADS 4 – High (clinically significant cancer is likely to be present)	4
5	PI-RADS 5 – Very high (clinically significant cancer is highly likely to be present)	5

Fig. 7: PI-RADS assesment flowchart

© - Coimbra/PT

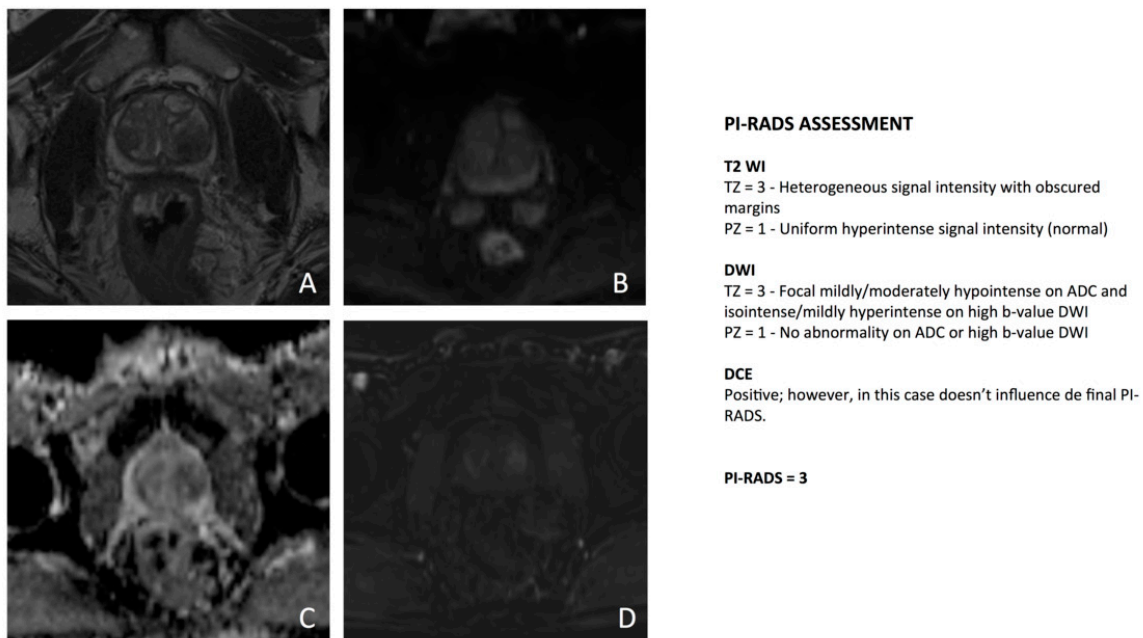


Fig. 9: 62-year-old man with elevation prostate-specific antigen and two prior negative prostate biopsies. Axial T2-weighted MR image (A) shows approximately 5-mm hypointense area of moderately decreased T2 signal within left transition zone. Lesion shows slight heterogeneity, with small foci of mildly increased T2 signal. DWI (B and C) shows corresponding moderate hyperintensity for high-b-value (B = 1400s/mm²) (B) and moderate hypointensity on ADC map (C). DCE was positive, as demonstrated with subtraction (D) but not relevant for the final PI-RADS. Prostate biopsy revealed benign prostate hypertrophy (BPH), with no signs of malignancy.

© - Coimbra/PT

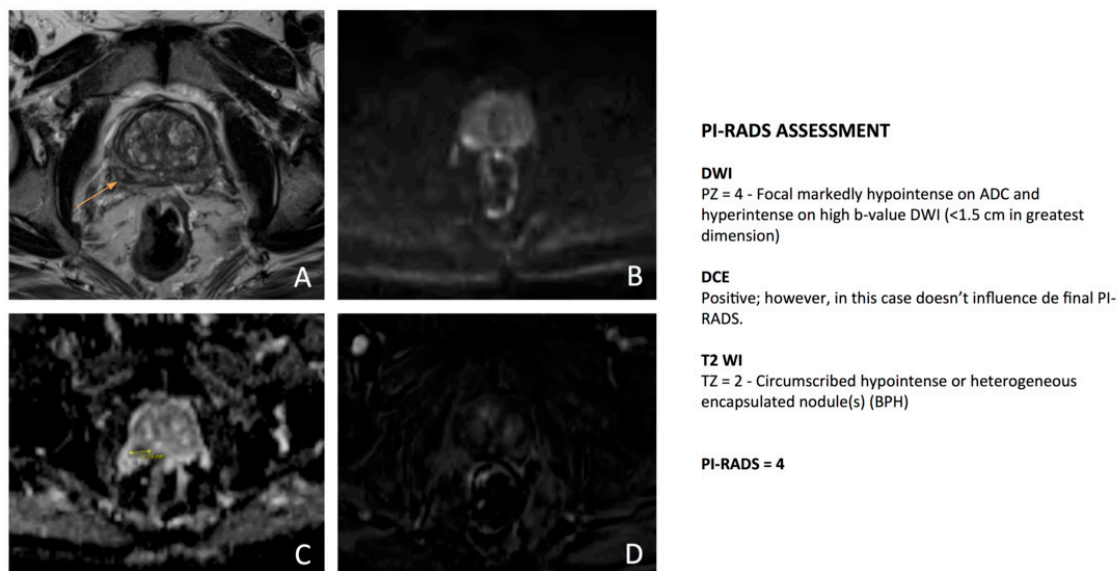


Fig. 10: 62-year-old man with elevated prostate-specific antigen level and prior negative prostate biopsy. Axial T2-weighted MR image (A) shows focal decreased T2 signal (arrow) in right peripheral zone. DWI (B and C) shows corresponding marked hyperintensity for high-b-value (B = 1400s/mm²) (B) and marked hypointensity on ADC map (C). DCE was positive, as demonstrated with subtraction (D) but not relevant for the final PI-RADS. Although Prostate Imaging Reporting and Data System, version 2 (PI-RADS v2), advises comparing signal of lesion on ADC map and high-b-value DWI image with signal of normal tissue in same histologic zone, differentiation between mild-to-moderate and marked signal abnormality remains subjective, which in turn leads to potential variation in whether both lesion's DWI score and overall PI-RADS assessment category is 3 or 4. Biopsy revealed the presence of prostate adenocarcinoma Gleason score of 4 + 3.

© - Coimbra/PT

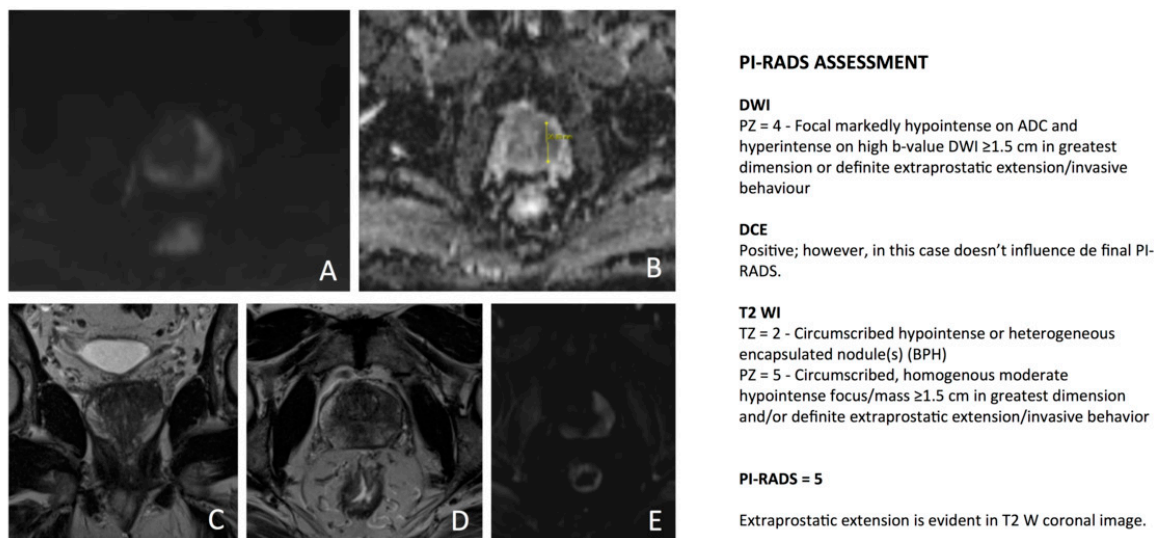


Fig. 11: 57-year-old man with prostate-specific antigen level of 8,98 ng/mL and two prior negative prostate biopsies. DWI shows an area in the left peripheral zone with marked hyperintensity for high-b-value ($B = 1400 \text{ s/mm}^2$) (B) and marked hypointensity on ADC map (C) measuring 20 mm. Coronal (C) and axial (D) T2-weighted MR images show an area of decreased T2 signal (arrow) that occupies most of the left lobe and extends to the right lobe (C) and with extraprostatic extension (C). DCE was positive, as demonstrated with subtraction (E) but not relevant for the final PI-RADS. The patient underwent a radical prostatectomy that revealed the presence of a prostate adenocarcinoma Gleason 3 + 4, in the left lobe, with extraprostatic extension, without involvement of the seminal vesicles. T3aN0.

© - Coimbra/PT

Conclusion

PI-RADS v2 should be used in conjunction with other resources in the evaluation and risk assessment of patients with suspected PCa prior to or after transrectal ultrasound biopsy.

Improved risk management with better identification of significant versus insignificant cancers may lead to more specific and individualised treatment options and less overtreatment of indolent disease.

Outcome data derived from MRI-targeted biopsies are needed to develop new nomograms that define patients' risk on the basis of clinical variables in combination with overall PI-RADS v2 assessment categories.

PI-RADS v2 needs to be tested and validated in different clinical scenarios. Validation should be undertaken using MR-targeted biopsy, systematic biopsy (saturation or template techniques), and whole-mount histopathology. Long-term follow-up data are also needed before we can conclude that PI-RADS v2 is effective in directing patient management and for improving outcomes of patients with suspected PCa.

Radiologists must be properly trained to use PI-RADS v2 and the system must be tested and validated in different clinical scenarios, including its sensitivity and specificity for clinically significant disease, its reproducibility among readers with different experience levels and between centres, and its role in clinical decisions.

Personal information

References

1. Auer T, Edlinger M, Bektic J, Nagele U, Herrmann T, Schäfer G, Aigner F, Junker D. Performance of PI-RADS version 1 versus version 2 regarding the relation with histopathological results. *World J Urol.* 2016 Aug 10
2. Barentsz JO, Weinreb JC, Verma S, Thoeny HC, Tempany CM, Shtern F et al. Synopsis of the PI-RADS v2 Guidelines for Multiparametric Prostate Magnetic Resonance Imaging and Recommendations for Use. *Eur Urol.* 2016 Jan;69(1):41-9
3. Barrett T, Turkbey B, Choyke PL. PI-RADS version 2: what you need to know. *Clin Radiol.* 2015 Nov;70(11):1165-76
4. PI-RADS™ Prostate Imaging and Reporting and Data System: 2015, version 2. American College of Radiology Website. <http://www.acr.org#/>

5. Steiger P, Thoeny HC. Prostate MRI based on PI-RADS version 2: how we review and report. *Cancer Imaging*. 2016 Apr 11;16:9.
6. Muller BG, Shih JH, Sankineni S, et al. Prostate cancer: interobserver agreement and accuracy with the revised prostate imaging reporting and data system at multiparametric MR imaging. *Radiology* 2015; 277:741-750
7. Vargas HA, Hotker AM, Goldman DA, et al. Up- dated prostate imaging reporting and data system (PIRADS v2) recommendations for the detection of clinically significant prostate cancer using mul- tiparametric MRI: critical evaluation using whole-mount pathology as standard of reference. *Eur Radiol* 2015 Sep 22
8. Rosenkrantz AB, Ginocchio LA, Cornfeld# D et al. Interobserver reproducibility of the PI-RADS Version 2 lexicon: A Multicenter Study of Six Experienced Prostate Radiologists. *Radiology* 2016; 280:793-804
9. Rosenkrantz AB, Otto A, Turkbey# B et al. Prostate Imaging Reporting and Data System (PI-RADS), version 2: A Critical Look. *AJR* 2016; 206:1179-1183
10. Purysko AS, Rosenkrantz AB, Barentsz JO et al. PI-RADS Version 2: A Pictorial Update. *RadioGraphics* 2016; 36:1354-1372