

ASSESSMENT OF PROSTATE LESION USING PIRADS v2.1 IN CORRELATION WITH BIOSPY FINDINGS; OUR EXPERIENCE AT SHIFA INTERNATIONAL HOSPITAL

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ABSTRACT

AIMS/OBJECTIVE: The objective of this article is to correlate and evaluate the diagnostic performance and reliability of MRI based prostate imaging reporting and data system (PI-RADS) grading with the biopsy findings.

MATERIALS AND METHODS: Total of 72 patients were selected from the radiology database retrospectively from 2020 to 2021. MRI scans were performed on Siemens 3 tesla and reviewed by consultants after which their PIRADS was calculated. **RESULT:** These patients had mean age of 64, mean prostatic volume of 54.5cm³ and mean PSA density of 0.70229. Biopsy was not performed in score 1 and 2 having 2 and 9 patients respectively. Biopsy result of 1 patient out of 3 was positive for adenocarcinoma in PIRADS 3. 10 patients opted for biopsy in PIRADS 4 and results of 3 patients turned out to be adenocarcinoma. 9 out of 14 patients biopsies were positive for adenocarcinoma in PIRADS-5. Bone metastasis was frequent and was seen in 21 % of patients followed by neurovascular bundle involvement which was seen in 18.1% of the patients. 16.7 % of patients had seminal vesicles involvement and extra-cellular spread. Internal iliac and external iliac lymph nodes were more frequently involved i.e seen in 22.2% and 20.8% patients respectively. However, para-aortic and obturator lymph nodes are very involved in very few numbers of patients. **CONCLUSION:** This PIRADS scoring system in MRI showed a statistically proven significant correlation with adverse histopathological findings. A Higher PIRADS score may help to project poor prognostic consequences like results more in favor of neoplasm, extracellular spread, bone metastasis, neurovascular bundle involvement, seminal vesicle involvement, and lymph node involvement. Thus, PIRADS scoring provides a potent substructure for evaluating the livelihood of prostate cancers on MRI.

Key Words: PIRADS, Prostate neoplasms, Adenocarcinoma, Histopathology, Radiology.

Introduction

Prostate cancer is amongst the notorious malignancies affecting the male gender in our population. It usually involves old age community. Abnormal findings on DRE with raised PSA levels raise the suspicion for prostatic cancer. This needs biopsy correlation, however ultrasound guided biopsy has low sensitivity for smaller tumours. With advancements in radiology,

multiparametric MRI has high sensitivity for diagnosing sinister prostatic lesions.¹ Advances in multiparametric magnetic resonance imaging (mpMRI) have improved detection and characterization of clinically-significant prostate cancer and PI-RADS correlates well with pathologic Gleason scoring.² Mostly peripheral zone is involved but transitional zone is also involved.³ With

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development in radiology and time, European Society of Urogenital Radiology published scoring system, the Prostate Imaging Reporting and Data system (PI-RADS).⁴ Several limitations were met in v1, thus v2.0 was launched. Intraprostatic lesions were better evaluated on v2.0.⁵ PIRADS v2.1 has better accuracy than v2.0 in diagnosing the transitional zone prostatic cancers.⁶ Mostly multiparametric MR imaging is used but few stations use biparametric MR imaging without the use of contrast.⁷ In our study, patients were also assessed on bone metastasis, neurovascular bundle, seminal vesicles involvement, rectal involvement and extra-cellular spread. Involvement of different nodal sites like internal iliac, external iliac lymph, para-aortic and obturator lymph nodes was also seen to see disease spread.

Materials and Methods

Total of 72 patients were selected from the radiology database retrospectively from 2020 to 2021. MRI scans were performed on Siemens 3 tesla and reviewed by consultants after which their PIRADS was calculated. The study was approved from ethical review board.

Result

Mean age of the patient was calculated to be 64. Mean prostatic volume of 54.5cm³ and mean PSA density of 0.70229 was noted.

2 patients were labelled with **PIRADS score 1** and biopsy wasn't performed (100%).

9 patients were labelled with **PIRADS score 2** and biopsy wasn't performed (100%).

11 patients were labelled with **PIRADS score 3** and biopsy wasn't performed in 7 patients (63.6%). 3 patients opted for biopsy but results were negative for adenocarcinoma (27.3%). 1 patient result came out positive for adenocarcinoma (9.1%).

23 patients were labelled with **PIRADS score 4** and biopsy wasn't performed in 13 patients (56.5%). 10 patients opted for biopsy, results were negative for adenocarcinoma for 7 patients (30.4%) while results of 3 patients turned out to be adenocarcinoma (13%).

24 patients were labelled with **PIRADS score 5** and biopsy wasn't performed in 10 patients (41.7%). 14 patients opted for biopsy, results were negative for adenocarcinoma for 5 patients (20.8%) while results of 9 patients turned out to be adenocarcinoma (37.5%).

Bone metastasis was frequent and was seen in 21% of patients followed by neurovascular bundle involvement which was seen in 18.1% of the patients. 16.7% of patients had seminal vesicles involvement and extra-cellular spread. Internal iliac and external iliac lymph nodes were more frequently involved i.e. seen in 22.2% and 20.8% patients respectively. However, para-aortic and obturator lymph nodes are very involved in very few numbers of patients.

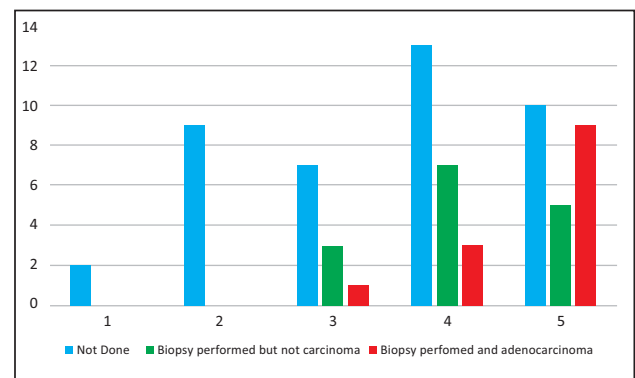


Figure 1: Biopsy correlation and outcome with increasing PIRADS score.

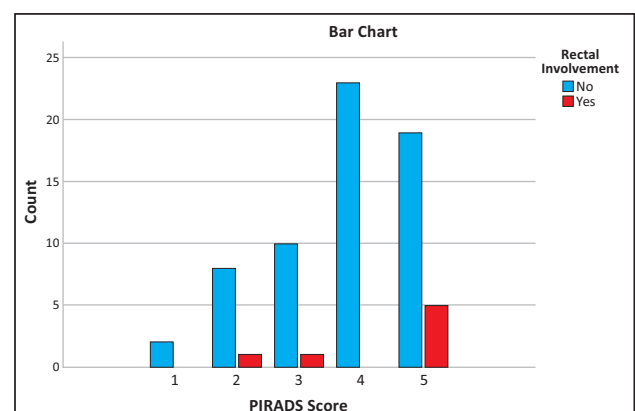


Figure 2: Rectal involvement with increasing PIRADS score.

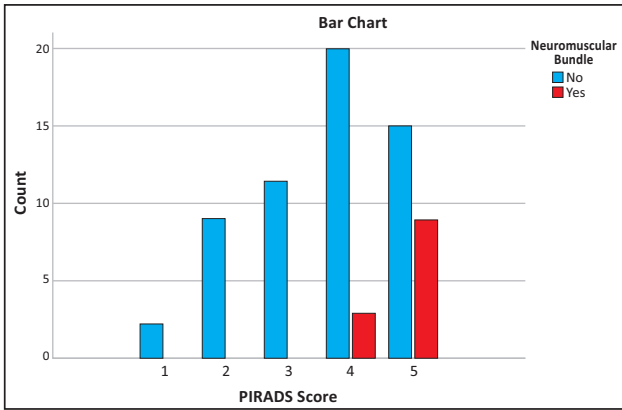


Figure 3: Neurovascular bundle involvement with increasing PIRADS score.

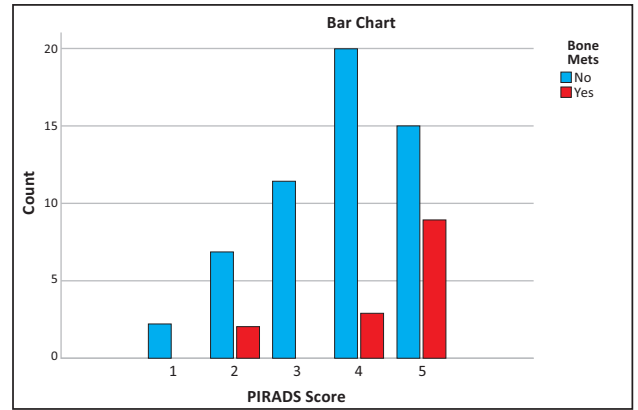


Figure 6: Bone metastasis with increasing PIRADS score.

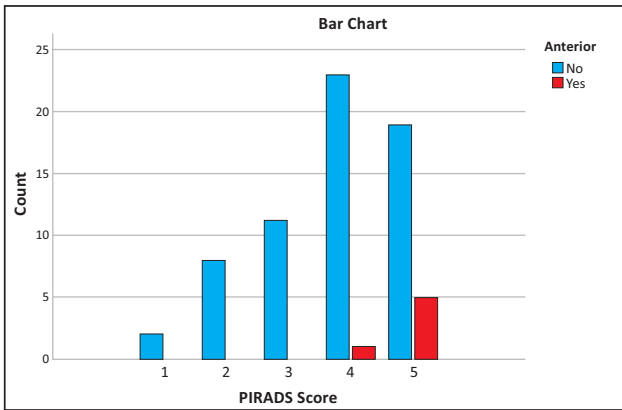


Figure 4: Anterior fibromuscular stroma involvement with increasing PIRADS score.

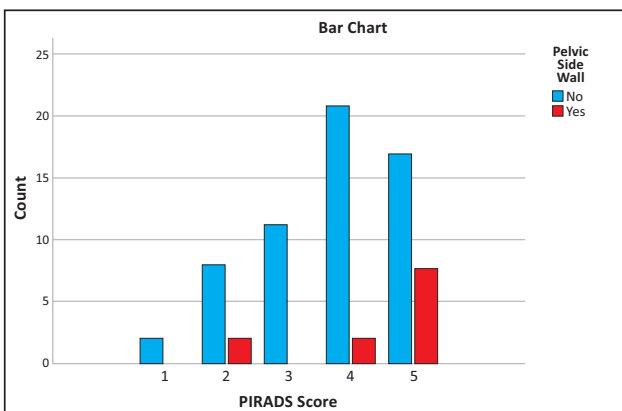


Figure 5: Pelvic side wall involvement with increasing PIRADS score.

Discussion

Prostate malignancies are one of the leading malignancies involving the male community in our part of world. This requires urgent and accurate diagnosis. Mostly these patients present to our outpatient department with abnormal findings on DRE and later correlation with PSA levels is done. If PSA is abnormally high, ultrasound guided biopsies are done because of its simple nature and cost issues but ultrasound has low sensitivity for diagnosing small tumors.¹ PIRADS scoring is correlated with pathological Gleason scoring to better evaluation.² Different zones are invaded by these malignancies. Although the majority of cases of prostate cancer originate in the peripheral zone (PZ), however 25-40% of tumors arise in the transition zone (TZ).³

The European Society of Urogenital Radiology published a unified scoring system, the Prostate Imaging Reporting and Data system (PI-RADS), that is based on expert consensus for mpMRI of the prostate, PI-RADS V1 in 2012 and in 2014 PI-RADS V2. Individual scoring for each single MRI sequence was done in PIRADS v1, however many limitations were encountered. To address these limitations, PIRADS v2.0 was launched, which used dominant sequences for determining the category of V2 depending on the location of the specific lesion rather than the sum of each component score. MRS was also not included in the PI-RADS V2 score.⁴ PIRADS v2.0 reported less false results than v1 and improved grading of intraprostatic notorious lesions.⁵ With advancements in radiology, PIRADS also evolved

from v1 to v2.0 and later to v2.1, which in fact is superior to prior known versions.⁶ Biparametric 3T magnetic resonance imaging protocol (BP-MRI) prostate protocol is also used in few stations because of its feasibility for prostatic cancer detection and short acquisition/ interpretation time and without the administration of gadolinium-based contrast agent.⁷ But, in most stations multiparametric MR imaging is used.

Rectal involvement by the primary prostatic disease is also seen and is associated with LN involvement.⁸ In diagnosed prostatic malignancy patients, the detection of extracapsular extension (ECE) and seminal vesicle invasion (SVI) is not only important for selecting the appropriate therapy but also for preoperative planning of the surgical strategy and for patient prognosis.⁹ Prostatic lesions metastasis to bones is frequently seen and is with advancing PIRADS score.¹⁰

Conclusion

Significant correlation was seen in aforementioned PIRADS scoring system and biopsy findings. Poor prognosis is seen with higher PIRADS score and vice versa. Its use can help in diagnosing the notorious lesions at a very early age and help save the patient from morbidity and mortality.

Conflict of interest: None

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