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Should a Targeted Prostate Biopsy be Performed for Every PI-RADS 3 Lesion Found on Multiparametric MRI of the Prostate?

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Abstract

Introduction: Currently prostatic biopsy on target found at the multiparametric MRI of the prostate is the best way to diagnose prostate cancer.

The European Association of Urology guidelines, updated to 2022, recommend to perform MRI-targeted prostate biopsy plus standard prostate biopsy when a PI-RADS 3 to 5 lesion is detected.

The aim of the study is to establish if there is a real benefit of perfoming MRI-targeted prostate biopsy plus standard sampling when every PI-RADS 3 lesion is detected.

Case study: We performed a retrospective monocentric study at "San Pio" Hospital of Castellaneta, Italy.

76 patients underwent MRI-targeted prostatic biopsy with fusion or cognitive approach, associated with random sampling.

Results: Among the 124 biopsies on PI-RADS 3 lesions of our study only two PI-RADS 3 reported a positive outcome for not significant PCa detection.

Conclusion: Our results do not show a sure and real advantage in performing targeted prostate biopsy in all the patients with only PI-RADS 3 lesions and it may be appropriate to evaluate biopsy performance in these patients from case to case.

Keywords: Transperineal Prostate Biopsy; Fusion-Targeted Biopsy; Cognitive-targeted biopsy; Magnetic Resonance Imaging; PI-RADS 3; Prostate Cancer; Detection Rate

Introduction

MRI-targeted prostate biopsy plus random sampling is considered the best tool for diagnosing significant Prostate Cancer (PCa) [1].

The cognitive technique, consisting in sampling a lesion found with mpMRI, but without employing a Fusion software, is not inferior than the Fusion approach in detecting significant prostate cancer [2].

MRI-targeted prostate biopsy, under transrectal ultrasound guidance, can be performed through the transperineal or the transrectal way, but the transperineal approach has shown better outcomes than the transrectal way both for the lower rate of infections and for the higher detection rate of prostate cancer [3].

Both for the Fusion prostatic biopsy and for the cognitive procedure we used Esaote MyLab™9 System®. In case of fusion biopsy the system allows to fuse real-time transrectal USD and MRI images with the help of a magnetic tool put near the patient's pubis and a tracking device which is placed on the probe [4].

PI-RADSv2 and PI-RADSv2.1 are two systems used to classify the lesions found by a prostatic mpMRI scan and subclassifies the lesions in PI-RADS 1-2 (benign) and PI-RADS 3-5 (currently classified as suspicious for PCa in various degrees) [5, 6].

About PI-RADS 3 lesions a new subclassification based on volume calculated in T2w and DWI divided the lesions in: PI-RADS 3a (volume <0,5 ml and classified as low-risk) and PI-RADS 3b (volume >= 0,5 ml and classified as high risk) [7].

The aim of the study is to assess if there is a real advantage of running the targeted prostate biopsy in all patients where a PI-RADS 3a, 3b or 3 (not sub-classified) lesion is found on the MRI imaging of the prostate.

Case Study

Study Design and Patient Population

From January 2021 to January 2023, 76 men with at least one prostatic PI-RADS 3 lesion based on multiparametric MRI underwent a targeted biopsy and have been included in our study. The sampling protocol is based on biopsying the targeted lesion (3 cores for each lesion) and combining a random 12 cores biopsy. Two urologists with experience in the field of transperineal targeted prostatic biopsy performed the procedures.

Each man could have more targets (PI-RADS 3-5). The MRI-targeted prostate biopsies were performed by employing the Esaote MyLab™9 System®, and combining targeted sampling and random biopsies, using a transperineal approach.

The targeted prostatic biopsies were performed using a cognitive or fusion technique [2].

The procedures were performed under local anesthesia (peri-prostatic block, injecting lidocaine under ultrasound vision) or under deep sedation (with propofol), according to patient's comorbidities, susceptibility to pain and will.

There is no solid evidence about the detection rate difference between these two approaches but there does not seem to be a better detection rate of one over the other [8].

Clinical Assessments

The patients were evaluated according to their history of hemospermia or other PCa related symptoms, physical examination (including Digital Rectal Examination), PSA values and PSA density [9-11].

In case of suspicion of PCa the patients underwent multiparametric prostatic MRI.

The patients underwent transperineal MRI-targeted prostatic biopsy after a detection of a PI-RADS 3 lesion on the multiparametric MRI of the prostate, using a PI-RADSv2 and PI-RADSv2.1 system to classify the lesions [5, 12] (Figure 1).

It should be specified that also the men with PI-RADS 4 and 5 lesions were subjected to MRI-targeted prostatic biopsy, as the latest updated EAU guidelines recommend, but they are not the target of the study [7].

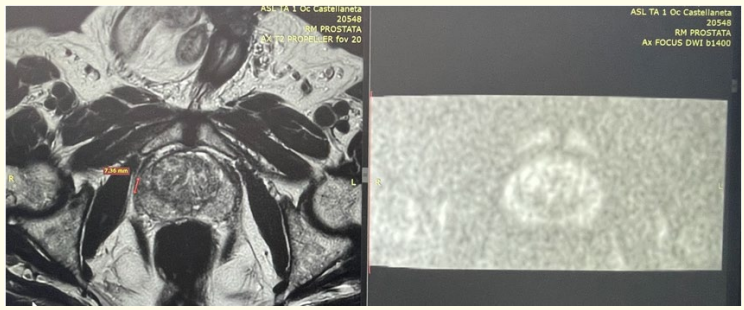

Figure 1: Axial T2 (on left) and Axial DWI (on right) sequences showing a PI-RADS 3b lesion detected on mpMRI of the prostate.

Statistical Analysis

Windows Excel for macOS was used to conduct all the statistical analyses, such as mean values, median, maximum and minimum values and other statistical analyses.

Result

Patient Characteristics

76 patients, from 51 to 83 years old (mean age ± SD: 65,5 years ± 8,1; median age: 67 years) (Table 1).

We found it misleading to include data about mean and median total PSA values, mean and median PSA density values, mean DRE positivity values, because some patients could have more than one PI-RADS lesion, including PI-RADS 4 and 5, so these latest could influence those values.

	MEAN ± SD	***MEDIAN***
Age	65,5 ± 8,1	67

Table 1: Personal data of patients.

Bx detection rate of PI-RADS 3 lesions

Among the 124 prostate PI-RADS 3 lesions sampled, 18 (14,5%) were classified as PI-RADS 3a, 62 (50%) were PI-RADS 3b and 44 (35,5%) were PI-RADS 3 not better sub-classified at mpMRI (Figure 2).

All the PI-RADS 3a and PI-RADS 3 (not underclassified) lesions came out negative for PCa detection, 2 PI-RADS 3b lesions (1,6% of the total) were positive for not clinically significant PCa [13] (Figure 3).

Specifically the two PI-RADS 3b lesions found positive reported to the histological examination a ISUP grade group 1 PCa in less than 60% of all the specimens of the biopsy and the positive result is reported in both target and random specimens.

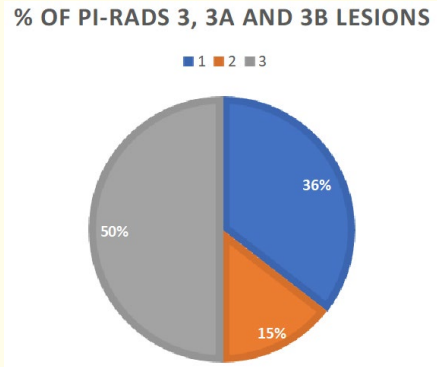

Figure 2: The table shows the percentage of PI-RADS 3a (in orange), 3b (in grey) and 3 (not better sub-classified; in blue) lesions.

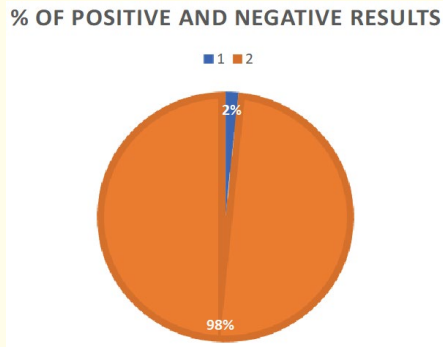

Figure 3: The table shows the % of positive (in blue) and negative (in orange) biopsies.

Discussion

Currently the European Association of Urology guidelines updated on 2022 still recommend to perform MRI-targeted prostatic biopsy plus random sampling in all the patients with PI-RADS 3-5 lesions. The results, obtained from our study, although monocentric and on a not large group of patients, advise a non-execution of MRI-targeted prostatic biopsy of the PI-RADS 3 lesions on a large-scale, but probably to better sub-categorised the patients where it should be carried out.

Conclusion

Our results do not show a sure and real advantage in performing targeted prostate biopsy in all the patients with PI-RADS 3 lesions.

It may be appropriate to evaluate the choice of performing prostate biopsy in well selected patients with only PI-RADS 3 lesions, according to their risk factors and after a proper counseling with the patients.

In patients with only PI-RADS 3 lesions and without a high risk of PCa, if the total PSA is less than 10 ng/ml and digital rectal examination is negative we could do a tight follow-up of the patient, including total PSA dosing, DRE and possible re-execution of mpMRI of the prostate through time to avoid an immediate prostate biopsy.

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