EDITORIAL OPEN

Perilesional sampling: the new standard for imaging-targeted prostate biopsies?

Prostate Cancer and Prostatic Diseases (2023) 26:439–440; https://doi.org/10.1038/s41391-022-00634-2

Christian Thomas [1]✉
[1]*Department of Urology, Technische Universität Dresden, Dresden, Germany.* ✉*email: Christian.Thomas@uniklinikum-dresden.de*

Magnetic resonance imaging-guided prostate biopsies have revolutionized the detection of clinically significant prostate cancer (csPCa) within the last decade [1]. Using a combined approach by targeted biopsies (TB) plus systemic biopsies (SB), the detection of csPCa significantly increases [2]. It is still under debate how SB add sensitivity to TB and might be even omitted in selected cases, but the risk of detecting up to 15% of csPCa outside the region of interest (ROI) favors the combined approach in current guidelines [1, 3].

The authors of the study presented here have done a well thought out analysis to determine the distance between systematic cores containing csPCa and the ROI in 505 consecutive patients undergoing TB plus SB [4]. This promising approach is based on the hypothesis that a so called "penumbra", a radius around the ROI, bears a high likelihood of cancer detection and will be sufficient for additional biopsies outside the ROI. Noujeim et al. showed that perilesional sampling plus TB was non-inferior to SB plus TB in the detection fo csPCa (32% vs. 37%). The cumulative cancer distribution rate for csPCa reached 86% for the 10 mm margin. These data confirm the results of Brisbane et al., who demonstrated in a series of 2048 men undergoing MRGB plus SB that 90% of csPCa were located within an 10 mm radius from the ROI [5]. While Hansen et al. already showed in 2020 that a targeted saturation biopsy ipsilateral to the ROI is most effective for cancer diagnosis, the diameter of the "penumbra" in relation to the PIRADS-score of the ROI is a matter of debate [6].

In 2019, the PIRADS-committee recommend TB of the ROI and a 5-mm penumbra for PIRADS 4 and 5 lesions [7]. Moreover, Tafuri et al. found that for PIRADS 5 lesions with a PSA density of >0.15 ng/ml, systematic samples did not provide additional diagnostic yield [8]. Contrary, the presented study demonstrates that perilesional detection of csPCa not only depends on PIRADS-score but also on PSA density. Using a chi-square automated interaction detector (CHAID) machine learning algorithm and defining three risk groups by PIRADS-score and PSA density, the risk of missing csPCa beyond the 10 mm "penumbra" was 2%, 8%, and 29% for low-, intermediate- and high-risk groups, respectively. While in men with PIRADS 3–5 lesions and a PSA density <0.15 ng/ml biopsies outside the 10 mm "penumbra" can be omitted, standard TB plus SB is needed for PIRADS 4/5 lesions with a PSA density >0.15 ng/ml.

In conclusion, this study significantly contributes to the understanding of perilesional sampling in men undergoing prostate biopsy. However, confirmatory studies are needed to show if a risk-group based approach by PIRADS-score and PSA density has the potential to set up TB plus perilesional sampling biopsies as a new standard.

REFERENCES

1. Mottet N, van den Bergh RCN, Briers E, den Broeck T, Cumberbatch MG, De Santis M, et al. EAU-EANM-ESTRO-ESUR-SIOG guidelines on prostate cancer—2020 update. Part 1: screening, diagnosis, and local treatment with curative intent. Eur Urol. 2021;79:243–62.
2. Kasivisvanathan V, Rannikko AS, Borghi M, Panebianco V, Mynderse LA, Vaarala MH, et al. MRI-targeted or standard biopsy for prostate-cancer diagnosis. N Engl J Med. 2018;378:1767–77.
3. Drost FJH, Osses DF, Nieboer D, Steyerberg EW, Bangma CH, Roobol MJ, et al. Prostate MRI, with or without MRI-targeted biopsy, and systematic biopsy for detecting prostate cancer. Cochrane Database Syst Rev. 2019;4:CD012663. https://doi.org/10.1002/14651858.CD012663.pub2.
4. Noujeim JP, Belahsen Y, Lefebvre Y, Lemort M, Deforche M, Sirtaine S, et al Optimizing multiparametric magnetic resonance imaging-targeted biopsies and detection of clinically significant prostate cancer: the role of perilesional sampling. Prostate Cancer Prostatic Dis. 2022. https://doi.org/10.1038/s41391-022-00620-8.
5. Brisbane WG, Priester AM, Ballon J, Kwan L, Delfin MK, Felker ER, et al. Targeted prostate biopsy: umbra, penumbra, and value of perilesional sampling. Eur Urol. 2022;82:303–10.
6. Hansen NL, Barrett T, Lloyd T, Warren A, Samel C, Bratt O, et al. Optimising the number of cores for magnetic resonance imaging-guided targeted and systematic transperineal prostate biopsy. BJU Int. 2020;125:260–9.
7. Padhani AR, Weinreb J, Rosenkrantz AB, Villeirs G, Turkbey B, Barentsz J. Prostate imaging-reporting and data system steering committee: PI-RADS v2 status update and future directions. Eur Urol. 2019;75:385–96.
8. Tafuri A, Iwata A, Shakir A, Iwata T, Gupta C, Sali A, et al. Systematic biopsy of the prostate can be omitted in men with PI-RADS 5 and prostate specific antigen density greater than 15%. J Urol. 2021;206:289–97.

AUTHOR CONTRIBUTIONS

All contributions were from CT.

FUNDING

Open Access funding enabled and organized by Projekt DEAL.

COMPETING INTERESTS

The author declares no competing interests.

ADDITIONAL INFORMATION

Correspondence and requests for materials should be addressed to Christian Thomas.

Received: 28 November 2022 Revised: 1 December 2022 Accepted: 9 December 2022
Published online: 11 January 2023