CANADIAN JOURNAL OF UROLOGY

Tech Science Press

Doi:10.32604/cju.2025.073363
EDITORIAL

Current practices and future directions in prostate biopsy techniques: insights from a meta-analysis and european multicenter survey

Xingkang Jiang,* Jing Tian, Yong Xu
Department of Urology, The Second Hospital of Tianjin Medical University, Tianjin, 300211, China

JING X, TIAN J, XU Y. Current practices and future directions in prostate biopsy techniques: insights from a meta-analysis and european multicenter survey. *Can J Urol* 2025;32(6):539–540.

Key Words: prostatic neoplasms, prostate biopsy, targeted biopsy, systematic biopsy, regional saturation biopsy, perilesional biopsy

Dr. Wu's recent systematic review and network meta-analysis—encompassing 211 studies and over 74,000 MRI-positive patients—establishes an evidence-based benchmark for prostate biopsy strategies.[1] Utilizing Bayesian methodologies, the study demonstrated that ipsilateral systematic biopsy combined with targeted biopsy (ips-SB+TB) or saturated targeted biopsy (saturated TB) achieves comparable detection rates of clinically significant prostate cancer (csPCa; Gleason $\geq 3+4$) to traditional combined biopsy (SB+TB), while significantly reducing detection of clinically insignificant disease (ciPCa; Gleason $\leq 3+3$). These findings challenge the conventional paradigm equating higher biopsy core numbers with improved diagnostic yield, proving that sampling within a 10–15 mm radius around MRI-suspicious lesions optimizes csPCa detection while mitigating overdiagnosis. Our group's 2024 prospective RCT validated this approach, demonstrating that 9-core regional saturation biopsy (RSB) using brachytherapy grid guidance improved csPCa detection (44.1%) while reducing biopsy cores by 40% compared to traditional methods, thus providing robust support for the EAU 2024 guideline strategy: *"When MRI is positive (PI-RADS $\geq$4), combine targeted biopsy with perilesional sampling"* (Strength rating: Weak).[2]

Paradoxically, despite guideline recommendations, a European cross-sectional survey reveals a substantial implementation gap: 84% of clinicians continue to perform "MRI-targeted + bilateral systematic biopsy." This discrepancy reflects persistent concerns regarding MRI's false-negative rate for csPCa (15–20%) and the indispensable role of systematic biopsy in multidisciplinary care—particularly for baseline data in active surveillance and neurovascular bundle mapping during surgery.[3] This clinical reliance on systematic sampling underscores the tension between current technical limitations of MRI-TRUS fusion (registration errors >1.5 mm in 40% of grassroots institutions) and complex real-world diagnostic needs. Although targeted biopsy with perilesional sampling represents a precision-sampling advancement, its adoption faces significant barriers: ambiguous anatomical definitions of "surrounding areas" (e.g., 10 mm vs. 15 mm radii), absence of standardized fusion training, and limited evidence in high-risk subgroups (e.g., bilateral lesions, repeat biopsies).

Optimizing biopsy strategies requires addressing three critical barriers: Firstly, inconsistent precision and accessibility of fusion technology (grassroots freehand techniques yield 12–15% lower csPCa detection vs. grid-guided methods);[4] Secondly, lack of consensus on zone-specific sampling protocols (inter-clinician diagnostic consistency: 68–75%); Thirdly, insufficient long-term pathological validation (grade

Received date 16 September 2025
Accepted for publication 17 October 2025
Published online 30 December 2025

*Corresponding Author: Xingkang Jiang.
Email: Jiangx@tmu.edu.cn

upgrade rates: 18% regional vs. 22% traditional biopsy). Future efforts should prioritize multicenter collaborations to: Develop standardized biopsy templates integrating PI-RADS v2.1 and PSA density; Combine PSMA-PET/CT with mpMRI to enhance detection of small lesions (>3 mm; accuracy ≥90%); Leverage AI-driven needle trajectory planning for complex anatomies (e.g., prostate volume >80 mL).[5] Achieving end-to-end standardization across imaging, procedural, and pathological domains is essential to transition from "experience-driven systematic sampling" to "evidence-driven precision diagnosis." This evolution will minimize overdiagnosis while providing reliable pathological foundations for focal therapy and active surveillance.

Acknowledgement

None.

Funding Statement

This work was supported by the Tianjin Science and Technology Project (Nos. KJ20169 and 24JCYBJC01040), and The Second Hospital of Tianjin Medical University (No. MYSRC202306).

Author Contributions

The authors confirm contribution to the paper as follows: Conceptualization, Xingkang Jiang; writing—original draft preparation, Xingkang Jiang; writing—review and editing, Jing Tian and Yong Xu. All authors reviewed the results and approved the final version of the manuscript.

Availability of Data and Materials

Not applicable.

Ethics Approval

Not applicable.

Conflicts of Interest

The authors declare no conflicts of interest to report regarding the present study.

References

1. Wu Q, Wang J, Tu X et al. Optimizing the strategies to perform prostate biopsy in MRI-positive patients: a systematic review and network meta-analysis. *EClinicalMedicine* 2025 Mar 22;82(3):103164. doi:10.1016/j.eclinm.2025.103164.
2. Jiang X, Chen M, Tian J et al. Comparison of regional saturation biopsy, targeted biopsy, and systematic biopsy in patients with prostate-specific antigen levels of 4–20 ng/ml:A prospective, single-center, randomized controlled trial. *Eur Urol Oncol* 2024 Aug 7;(4):944–953. doi:10.1016/j.euo.2023.12.002.
3. Uleri A, Diamand R, Fiard G et al. Clinical practices and perspectives on prostate biopsy techniques among urologists: a european survey. *Eur Urol Oncol* 2025 May 26;8(4):1213–1214. S2588-9311(25)00134-8. doi:10.1016/j.euo.2025.05.009.
4. Nalavenkata SB, Vertosick E, Briganti A et al. Variation in prostate magnetic resonance imaging performance: data from the prostate biopsy collaborative group. *Euro Urol Oncol* 2025 May 2;4:519. S2588-9311(25)00047-1. doi:10.1016/j.euo.2025.02.007.
5. Guo S, Jiang X. Personalized prostate biopsy protocols: enhancing cancer detection through tailored approaches-a narrative review. *Transl Androl Urol* 2025 Mar 30;14(3):831–840. doi:10.21037/tau-24-619.