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前列腺12针系统穿刺在重复靶向穿刺中的应用价值研究

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摘　要

目的：探讨重复前列腺穿刺中12针系统穿刺联合超声磁共振靶向融合穿刺的临床应用价值。方法：回顾性分析2019年6月~2021年9月烟台毓璜顶医院泌尿外科收治的既往活检阴性但PSA > 4 ng/ml患者的临床资料，进一步筛选出PI-RADS > 2分的患者。收集并比较患者前列腺系统穿刺和前列腺靶向穿刺的结果。结果：本研究共纳入211顺利完成穿刺的患者，穿刺针数为18.3 ± 3.1，共诊断出98 (46.4%)例前列腺癌组织，其中临床有意义前列腺癌组织69例(70.4%)。靶向穿刺检出前列腺癌72例(34.1%)，临床有意义前列腺癌58例(80.6%)，添加系统穿刺后，前列腺癌的检出率增加26例(12.3%, p < 0.001)，临床有意义前列腺癌的检出人数增加11例(5.2%, p < 0.001)。结论：对于MRI提示可疑病灶的前列腺重复穿刺患者，靶向穿刺后添加系统穿刺能有效提高前列腺癌的检出率。

关键词

前列腺癌，前列腺穿刺术，经会阴，磁共振，前列腺特异性抗原

The Research Application Value of 12-Core System Prostate Biopsy in Repeated Targeted Biopsy

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Abstract

Objective: To investigate the clinical application value of 12-core system biopsy combined with

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targeted fusion ultrasound magnetic resonance biopsy in repeated prostate biopsy. Methods: A retrospective analysis of the clinical data of patients admitted to Yantai Yuhuangding Hospital of Urology between June 2019 and September 2021 with previous negative biopsy but PSA > 4 ng/ml was performed, and patients with PI-RADS > 2 points were further screened. The results of prostatic system biopsy and targeted prostatic biopsy were collected and compared. Results: A total of 211 patients who completed biopsy were included in this study, and the number of cores was 18.3 ± 3.1. A total of 98 (46.4%) cases of prostate cancer were diagnosed, including 69 (70.4%) cases of clinically significant prostate cancer. Targeted biopsy detected prostate cancer in 72 cases (34.1%) and clinically significant prostate cancer in 58 cases (80.6%). After systematic biopsy, the detection rate of prostate cancer increased by 26 cases (12.3%, p < 0.001), and clinically significant prostate cancer was increased by 11 cases (5.2%, p < 0.001). Conclusion: For patients with repeated prostate biopsy indicated by MRI as suspicious lesions, systematic biopsy followed by targeted biopsy can effectively improve the detection rate of prostate cancer.

Keywords

Prostate Cancer, Prostate Biopsy, Transperineal, MRI, PSA

1. 引言

随着 PSA 筛查的普及，我国早期前列腺癌(prostate carcinoma, PCa)的发现率逐步增加[1]。但对于初次前列腺穿刺活检阴性但持续怀疑 PCa 的患者(PSA > 4 ng/ml)，后续前列腺穿刺方法的选择仍存在争议。前列腺多参数磁共振成像(MRI)提示无可疑病灶的患者在检测 Gleason 评分(GS) ≥ 7 的 PCa 具有较高的阴性预测值(NPV) [2] [3] [4] [5]。当采用根治性前列腺切除术的标本作为确诊方法时，MRI 参与的前列腺靶向穿刺可能会漏诊 8%~24%的 GS ≥ 7 的 PCa [6] [7] [8]。为提高诊断不明确患者的穿刺精确性，本研究旨在评估靶向联合系统穿刺活检在既往重复穿刺患者中的应用价值。

2. 资料与方法

2.1. 一般资料

收集本院自 2019 年 6 月至 2021 年 9 月行前列腺穿刺活检患者 211 例，定义 GS ≥ 7 为临床有意义 PCa (csPCa)。纳入标准为：1) PSA > 4 ng/ml；2) 至少一次既往穿刺活检阴性。排除标准为：1) MRI 未发现可疑病灶(PI-RADS 1~2 分)；2) 穿刺操作前已发现远处转移。本研究经烟台毓璜顶医院伦理委员会批准。

2.2. MR 检查

应用荷兰 Ingenia CX 3.0T MR 进行扫描，扫描序列包括 T2 加权成像(T2WI)、扩散加权成像(DWI)和动态对比增强成像(DCE)。磁共振结果将基于 PI-RADS v2 进行主观评分[9]，可疑病灶(PI-RADS 3~5 分)由具有 5 年前列腺 MRI 阅片经验的泌尿放射科医生标记，磁共振影像分析以盲法为前提进行。

2.3. 前列腺穿刺

穿刺前将患者置于截石位，用医用胶带将生殖器固定在远离手术野的地方。将超声探头与肛周进行

消毒，在丹麦 BK3000 超声诊断仪的辅助下，2%利多卡因对会阴周围皮肤及双侧前列腺基底区域行局部浸润麻醉。穿刺活检均采用经会阴入路。穿刺设备为美国 Bard 公司的 18G 全自动活检针。穿刺前通过 MIM Software Inc 公司的融合软件将磁共振影像和超声影像图片进行叠加，对每个可疑病灶行 2~4 针前列腺穿次。随后从超声扫描中图像中移除 MRI 影像图片，由同一名泌尿科医生在超声引导下行 12 针系统穿刺活检。将 GS > 6 定义为临床意义显著的 PCa [10]。

2.4. 统计学分析

本研究应用 SPSS 22.0 统计学软件。计数资料采取配对卡方检验，选择百分率(%)进行表达，计量资料采取配对 t 检验，选择($x \pm s$)表达，$p < 0.05$ 具有统计学意义。

3. 结果

3.1. 基线资料

本研究共纳入 211 名患者，表 1 为患者的临床病理基线资料及整体穿刺结果。从末次活检阴性到纳入研究的活检时间间隔为 8.4 ± 3.6 个月。穿刺针数为 18.3 ± 3.1。患者对穿刺过程耐受(VAS 疼痛评分 2.9 ± 1.2)。仅有 2 例(0.9%)患者出现血尿，17 例(8.1%)患者出现尿潴留，上述症状均在 2~3 天内缓解。

Table 1. Comparison of clinical baseline data of patients with prostate biopsy
表 1. 前列腺穿刺患者的临床基线资料比较

组别	总例数(n = 235)	非 csPCa (n = 161)	csPCa (n = 74)	p
年龄(岁)	65.4 ± 7.9	64.3 ± 8.1	67.5 ± 6.9	0.005
PSA (ng/ml)	10.1 ± 4.0	9.7 ± 4.0	11.1 ± 4.0	0.016
前列腺体积(ml)	48.5 ± 12.1	50.6 ± 12.7	44.3 ± 9.5	<0.001
PI-RADS 评分(%)				
3	120/211 (56.9%)	97/142 (68.3%)	23/69 (33.3%)	
4	57/211 (27.0%)	38/142 (26.8%)	19/69 (27.5%)	
5	34/211 (16.1)	7/142 (4.9%)	27/69 (39.1%)	

3.2. 靶向穿刺和系统穿刺结果

靶向穿刺与系统穿刺结果比较如表 2 所示。靶向穿刺检出前列腺癌 72 例(34.1%)，添加系统穿刺后，前列腺癌的检出率增加 26 例(12.3%, $p < 0.001$)。联合穿刺 csPCa 的结果为 69 例(32.7%)，高于靶向穿刺 58 例(27.5%, $p < 0.001$)和系统穿刺 39 例(18.5%, $p < 0.001$)。靶向穿刺和系统穿刺分别漏诊 11/69 例(15.9%)和 30/69 例(43.5%) csPCa ($p < 0.001$)。共 37 例患者检出临床无意义 PCa (cisPCa)，其中 32 例(86.4%)被系统穿刺检出，而只有 8 例(21.6%)被靶向穿刺检出，添加系统穿刺后，PCa 的检出率增加 26 例(12.3%, $p < 0.001$)，cisPCa 的检出人数增加 11 例(5.2%, $p < 0.001$)。

Table 2. Comparison of results of target biopsy and systemic result
表 2. 靶向穿刺与系统穿刺结果比较

靶向穿刺	系统穿刺		
	Negative	cisPCa	csPCa
Negative	113	21	5
cisPCa	5	3	6
csPCa	15	15	28

4. 讨论

前列腺癌作为男性的常见恶性肿瘤之一，由于其症状不典型且常与前列腺增生等其他病症并发存在，许多前列腺癌患者发现时已属晚期[1]。前列腺穿刺活检是诊断早期前列腺癌的关键操作。对于既往活检阴性但 PSA 持续升高的患者，单独重复 12 针系统穿刺对 PCa 检出率的提升有限。且随着前列腺活检穿刺次数的增加，患者的诊断阳性率也随之降低。为提高早期前列腺癌的穿刺检出率，MRI-超声融合靶向穿刺因其可直接对可疑病灶进行靶向取样而被提出。尽管既往经直肠活检均为阴性，但仍有 51%的患者在经会阴靶向活检检出 PCa，其中 csPCa 占 31% [11] [12] [13] [14]。相比较传统经直肠超声引导的前列腺穿刺，经会阴多参数磁共振成像－超声融合靶向穿刺的败血症的风险更低，前列腺癌的检出率较高[15] [16]。

而靶向穿刺作为新的穿刺技术在重复前列腺穿刺中被提出后，其中一个关键问题在于是否应该添加传统的 12 针系统穿刺。本组资料主要介绍了 MRI-超声融合图像引导穿刺后添加系统穿刺在既往活检阴性的患者中的临床意义。对于 MRI 提示可疑病灶的患者(PIRADS 3~5)，联合穿刺结果优于单独穿刺活检结果($p < 0.05$)。而基于前列腺穿刺结果，添加系统穿刺后 csPCa 的检出率更高($p < 0.05$) [17]。这些结果强调了系统穿刺的必要性，避免遗漏可疑的前列腺癌患者。其他研究通过比较 MRI-超声靶向活检和系统超声引导穿刺活检结果，发现融合靶向活检可增加 csPCa 检出率并降低了 cisPCa 的检出率，但 csPCa 漏检率同样高达 6% [18] [19]。提示靶向和系统联合穿刺明显优于单一种方法检测 csPCa ($p < 0.05$) [18]。因此基于现有数据，对于既往活检阴性但 PSA 持续升高的患者，推荐联合穿刺活检的方法来提高前列腺癌的检出率[20]。

本研究未纳入无可疑病灶的 MRI (PIRADS 1~2)患者，现有研究证据表明阴性 MRI 结果排除 csPCa 的癌症的阴性预测值最高可达 92%。因此，对于 MRI 结果足够明确的基础上，无可疑病灶的患者可以用定期随访来替代穿刺活检[5]。

目前前列腺靶向穿刺已广泛应用于 PCa 的检测，但相比较系统穿刺，二者的联合应用的临床价值仍存在争议，一是穿刺并发症的可能随着穿刺针数的增加而增加，二是增加 cisPCa 的检出率。本研究中穿刺并发症与其它单独靶向穿刺结果的并发症发生率相似[21]，且检出 caPCa 的带来的临床获益高于检出 cisPCa 带来的临床减益。但由于是回顾性，单中心研究，仍需要展开进一步的前瞻性，多中心的研究来进一步确定系统穿刺添加于靶向穿刺中的临床应用价值。

参考文献

[1] 中国抗癌协会泌尿男生殖系统肿瘤专业委员会前列腺癌学组. 前列腺癌筛查中国专家共识(2021 年版) [J]. 中国癌症杂志, 2021, 31(5): 435-440.

[2] Turkbey, B., *et al*. (2011) Multiparametric 3T Prostate Magnetic Resonance Imaging to Detect Cancer: Histopathological Correlation Using Prostatectomy Specimens Processed in Customized Magnetic Resonance Imaging Based Molds. *Journal of Urology*, **186**, 1818-1824. https://doi.org/10.1016/j.juro.2011.07.013

[3] Haffner, J., *et al*. (2011) Role of Magnetic Resonance Imaging before Initial Biopsy: Comparison of Magnetic Resonance Imaging-Targeted and Systematic Biopsy for Significant Prostate Cancer Detection. *BJU International*, **108**, E171-E178. https://doi.org/10.1111/j.1464-410X.2011.10112.x

[4] Yerram, N.K., *et al*. (2012) Low Suspicion Lesions on Multiparametric Magnetic Resonance Imaging Predict for the Absence of High-Risk Prostate Cancer. *BJU International*, **110**, E783-E788. https://doi.org/10.1111/j.1464-410X.2012.11646.x

[5] Hansen, N., *et al*. (2016) Magnetic Resonance and Ultrasound Image Fusion Supported Transperineal Prostate Biopsy Using the Ginsburg Protocol: Technique, Learning Points, and Biopsy Results. *European Urology*, **70**, 332-340. https://doi.org/10.1016/j.eururo.2016.02.064

[6] Tan, N., *et al*. (2015) Characteristics of Detected and Missed Prostate Cancer Foci on 3-T Multiparametric MRI Using

an Endorectal Coil Correlated with Whole-Mount Thin-Section Histopathology. *American Journal of Roentgenology*, **205**, W87-W92. https://doi.org/10.2214/AJR.14.13285

[7] Le, J.D., *et al*. (2015) Multifocality and Prostate Cancer Detection by Multiparametric Magnetic Resonance Imaging: Correlation with Whole-Mount Histopathology. *European Urology*, **67**, 569-576. https://doi.org/10.1016/j.eururo.2014.08.079

[8] Radtke, J.P., *et al*. (2016) Multiparametric Magnetic Resonance Imaging (MRI) and MRI-Transrectal Ultrasound Fusion Biopsy for Index Tumor Detection: Correlation with Radical Prostatectomy Specimen. *European Urology*, **70**, 846-853. https://doi.org/10.1016/j.eururo.2015.12.052

[9] Weinreb, J.C., *et al*. (2016) PI-RADS Prostate Imaging-Reporting and Data System: 2015, Version 2. *European Urology*, **69**, 16-40. https://doi.org/10.1016/j.eururo.2015.08.052

[10] Ahmed, H.U., *et al*. (2011) Characterizing Clinically Significant Prostate Cancer Using Template Prostate Mapping Biopsy. *Journal of Urology*, **186**, 458-464. https://doi.org/10.1016/j.juro.2011.03.147

[11] Siddiqui, M.M., *et al*. (2015) Comparison of MR/Ultrasound Fusion-Guided Biopsy with Ultrasound-Guided Biopsy for the Diagnosis of Prostate Cancer. *JAMA*, **313**, 390-397. https://doi.org/10.1001/jama.2014.17942

[12] Radtke, J.P., *et al*. (2015) Comparative Analysis of Transperineal Template Saturation Prostate Biopsy versus Magnetic Resonance Imaging Targeted Biopsy with Magnetic Resonance Imaging-Ultrasound Fusion Guidance. *Journal of Urology*, **193**, 87-94. https://doi.org/10.1016/j.juro.2014.07.098

[13] Moore, C.M., *et al*. (2013) Image-Guided Prostate Biopsy Using Magnetic Resonance Imaging-Derived Targets: A Systematic Review. *European Urology*, **63**, 125-140. https://doi.org/10.1016/j.eururo.2012.06.004

[14] Filson, C.P., *et al*. (2016) Prostate Cancer Detection with Magnetic Resonance-Ultrasound Fusion Biopsy: The Role of Systematic and Targeted Biopsies. *Cancer*, **122**, 884-892. https://doi.org/10.1002/cncr.29874

[15] Wegelin O., *et al*. (2017) Comparing Three Different Techniques for Magnetic Resonance Imaging-Targeted Prostate Biopsies: A Systematic Review of In-Bore versus Magnetic Resonance Imaging-Transrectal Ultrasound Fusion versus Cognitive Registration. Is There a Preferred Technique? *European Urology*, **71**, 517-531. https://doi.org/10.1016/j.eururo.2016.07.041

[16] Marra G., *et al*. (2021) Transperineal Freehand Multiparametric MRI Fusion Targeted Biopsies under Local Anaesthesia for Prostate Cancer Diagnosis: A Multicentre Prospective Study of 1014 Cases. *BJU International*, **127**, 122-130. https://doi.org/10.1111/bju.15121

[17] Monni, F., *et al*. (2017) Magnetic Resonance Imaging in Prostate Cancer Detection and Management: A Systematic Review. *Minerva Urology and Nephrology*, **69**, 567-578. https://doi.org/10.23736/S0393-2249.17.02819-3

[18] Arsov, C., *et al*. (2015) Prospective Randomized Trial Comparing Magnetic Resonance Imaging (MRI)-Guided In-Bore Biopsy to MRI-Ultrasound Fusion and Transrectal Ultrasound-Guided Prostate Biopsy in Patients with Prior Negative Biopsies. *European Urology*, **68**, 713-720. https://doi.org/10.1016/j.eururo.2015.06.008

[19] Tonttila, P.P., *et al*. (2016) Prebiopsy Multiparametric Magnetic Resonance Imaging for Prostate Cancer Diagnosis in Biopsy-Naive Men with Suspected Prostate Cancer Based on Elevated Prostate-Specific Antigen Values: Results from a Randomized Prospective Blinded Controlled Trial. *European Urology*, **69**, 419-425. https://doi.org/10.1016/j.eururo.2015.05.024

[20] Thompson, J.E., *et al*. (2016) The Diagnostic Performance of Multiparametric Magnetic Resonance Imaging to Detect Significant Prostate Cancer. *Journal of Urology*, **195**, 1428-1435. https://doi.org/10.1016/j.juro.2015.10.140

[21] Lundström, K.J., *et al*. (2014) Nationwide Population Based Study of Infections after Transrectal Ultrasound Guided Prostate Biopsy. *Journal of Urology*, **192**, 1116-1122. https://doi.org/10.1016/j.juro.2014.04.098