Words of Wisdom

Re: Comparative Analysis of Transperineal Template Saturation Prostate Biopsy Versus Magnetic Resonance Imaging Targeted Biopsy with Magnetic Resonance Imaging-Ultrasound Fusion Guidance
Radtke JP, Kuru TH, Boxler S, et al
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Experts’ summary:
The current article adds to the body of evidence evaluating the effectiveness of magnetic resonance imaging (MRI) and ultrasound (US)-fusion targeted biopsies (TBs) to increase the detection rate of clinically significant prostate cancer (PCa) while decreasing the proportion of patients diagnosed with indolent disease relative to a randomized transperineal saturation biopsy (SB) protocol.

According to the study results, PCa was diagnosed in 150 of 294 men (51.0%). Of those, 86 (29.2%) had Gleason score (GS)/7 cancer. The proportion of GS 6 or >7 PCa that would have been diagnosed with SB only was 26% and 12.8%, respectively, compared with 14% and 20.9% for TB. Diagnostic efficiency, defined as the proportion of cores positive for GS >7 PCa, was 7.5% for SB versus 46.0% for TB. In addition, the use of TB only would have avoided the diagnosis of 43.8% clinically indolent (GS 6) PCa. Although the performance of TB was optimal in the repeat biopsy group, with no GS 7 PCa missed, its diagnostic ability in the initial biopsy setting was still suboptimal, with 11 GS ≥7 cancers that would have been missed with TB only.

Experts’ comments:
MRI/US-fusion guided biopsies have emerged as an effective strategy to increase the ability to detect clinically significant PCa with fewer biopsy cores while decreasing overdiagnosis of indolent PCa. These data have been confirmed recently by a meta-analysis based on 2293 patients in which TB diagnosed 33.6% (range: 13.2–50%) of GS 7 cancers, using a median of 9.2 cores to detect one significant PCa, compared with 23.6% (range: 4.8–52%), with 37.1 cores taken for the SB approach [1].

The current study is important because it compares the diagnostic accuracy of TB with a transperineal saturation technique (median number of cores taken: 24), which may be considered the gold standard technique to provide the most accurate sampling of the whole prostate gland. According to the study results, only a few clinically significant (GS ≥7) PCas would have been missed using TB (12.8%) compared with 20.9% using SB. Interestingly, the suboptimal performance of TB was observed in the repeat biopsy setting only. However, the sensitivity of multiparametric MRI was not perfect, as limiting prostate biopsies to patients with Prostate Imaging and Reporting and Data System (PI-RADS) 3–5 lesions only would have missed 17 (19.8%) GS ≥7 tumors.

Despite the fact that the study by Radtke et al overcame most of the limitations of the previously published papers, especially regarding the appropriateness of the randomized prostate biopsy sampling, some issues should be taken into account when interpreting the results. The study population was extremely heterogeneous, including both initial and repeat biopsy patients, and inclusion and exclusion criteria were not accurately reported. Ideally, a prospective study with strict selection criteria randomizing patients to either receive a standard extended biopsy or MRI/US-fusion biopsy is required to evaluate the clinical utility of this procedure [2]. In addition, as correctly reported by the authors, only one experienced radiologist reviewed the MRI images using the first version of the PI-RADS scoring system. It is possible that MRI review by two or more uroradiologists as well as adoption of the new PI-RADS scoring system (v2.0) would result in better diagnostic performance of TB, even in the initial biopsy setting [3]. Another issue that may limit the clinical significance of these findings is the fact that different instruments and technologies (eg, elastic vs rigid fusion systems) are currently available on the market, and no comparative studies to determine the most effective MRI/US-fusion biopsy option are currently available. Finally, cost-effectiveness of MRI/US biopsy was not adequately determined. Issues related to the routine use of general anesthesia to perform the procedure in this study as well as consideration of time and resources require further investigation.

In conclusion, we believe that is paramount that urologists investigated this new frontier of MRI-assisted PCa detection by understanding the fundamentals of prostate imaging and TB techniques. They will have the duty in the future to set TB in adequate contexts: PCa screening, reassessment of previously detected high-grade prostatic intraepithelial neoplasia and atypical small acinar proliferation, follow-up of men under active surveillance, and delivery of focal therapies. Given the growing interest...
in TB, it will be essential to obtain consensus regarding best practice through investigative trials with the highest level of evidence. A critical key to developing solutions for the current PCs challenges might be the combination or alignment of clinical practice, technology, research, education, and scholarship through global collaboration and harmonization of competencies among urologists, radiologists, pathologists, and industry. This approach would generate a cycle in which research, education, and clinical care under new technology become increasingly interdependent and make each other better for our patients.

Conflicts of interest: The authors have nothing to disclose.

References


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Re: Comparison of MR/Ultrasound Fusion–guided Biopsy with Ultrasound-guided Biopsy for the Diagnosis of Prostate Cancer

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Experts’ summary:
Siddiqui and colleagues examined the performance of targeted magnetic resonance imaging (MRI)/ultrasound (US) biopsy, standard 12-core biopsy, and the combination of the two in detecting prostate cancer in a prospective cohort of 1003 men. Importantly, targeted and standard biopsies were performed sequentially by two urologists, with the urologist performing the standard biopsy blinded to MRI results. Prostate cancer was diagnosed in a nearly equivalent proportions of patients by targeted biopsy alone and standard biopsy—461 and 469 patients, respectively—but the risk category was discordant for 31% of patients. Specifically, targeted biopsy diagnosed 51 (30%) more high-risk cancers but 45 (17%) fewer low-risk cancers compared to standard biopsy.

When the two biopsy schemes were combined, an additional 103 (22%) cancers were detected, but 86 of these were of low risk. With the combination biopsy scheme, 200 men would need to undergo biopsy to diagnose one additional high-risk tumor compared to targeted biopsy alone, with concomitant diagnosis of 17 additional low-risk cancers. Of the three approaches, targeted biopsy demonstrated the best discrimination for detection of intermediate- and high-risk disease at prostatectomy, and had the greatest net benefit in decision curve analysis.

Experts’ comments:
Overdiagnosis of prostate cancer is estimated to occur in 23–42% of screen-detected cancers [1] and has increasingly been recognized as a significant limitation of prostate-specific antigen screening [2]. To this end, the study by Siddiqui et al suggests that targeted biopsy represents one strategy to improve detection of clinically significant prostate cancer while reducing the detection of low-risk disease. For instance, screening of patients using multiparametric MRI may avoid morbidity associated with biopsy if no lesions are seen [3], and restriction of biopsy to a targeted approach would reduce overdiagnosis of low-risk disease [4]. The present study also has implications for active surveillance protocols because improved detection of intermediate- and high-risk prostate cancer may facilitate better selection of patients for initial biopsy [5].

The issue of whether targeted biopsy should be combined with systematic biopsy remains unresolved, as does the setting (initial evaluation vs follow-up of a previously negative biopsy). A limitation of the study reported by Siddiqui et al is the large number of men who had prior biopsies in which the peripheral zone was sampled. Thus, it would make sense that MRI-directed biopsy might detect a lesion previously not sampled by the “standard” approach. While combination biopsy had superior sensitivity, discrimination for intermediate- and high-risk disease was actually worse, probably because of lower specificity. It is also unlikely that targeted biopsy alone will replace systematic biopsy in the immediate future given the heterogeneity in MRI performance [4], a reluctance to miss even a few cases of significant cancer, and the higher cost. In the future, targeted biopsy may, together with emerging molecular frameworks such as genomic classifiers, optimize diagnosis and risk stratification. Further studies will provide the necessary validation and define the optimal integration of image-guided biopsy into current clinical paradigms.

Conflicts of interest: The authors have nothing to disclose.

References