Editorial

The role of in-bore magnetic resonance imaging guided biopsy for the detection of clinically significant prostate cancer

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Clinically significant prostate cancers have been rendered detectable with the advent of multi-parametric magnetic resonance imaging (mpMRI) (1). Diagnosis and spatial localization of these lesions is important in their management and/or active surveillance (2). In-bore MRI-guided biopsy (MRGB) can be performed with mpMRI localization (3), although the procedure can be difficult and time-consuming, and is not considered routine for several reasons. First, the biopsy takes at least 30 minutes, a long time for patients to lie prone. Second, MRI-safe biopsy devices are very expensive.

In this issue, Venderink *et al*. show the usefulness of the Prostate Imaging and Reporting and Data System (PI-RADS) for the classification of lesions, including significant cancers, although PI-RADS had changed from version 1 to version 2 during the study period (3). They did show that the combined use of PI-RADS and prostate-specific antigen (PSA) levels made it possible to avoid unnecessary biopsies (3). These findings would contribute to detect the significant cancer with minimum time of prostate biopsy.

A limitation of the study was that systematic biopsy was not performed in the patients, and >70% of the patients did not have follow-up histology, PSA levels, or mpMRI examinations (3). In a previous study, the detection rate of higher grade cancers [Gleason score (GS) ≥7] with systematic biopsy, excluding ROIs designating known suspicious lesions on mpMRI, was 11%, and the authors cautioned against using mpMRI alone for risk stratification because of this (4). In another study, GS concordance rates between targeted prostate biopsies and radical prostatectomy specimens were: 63%; systematic: 54%; and combined targeted + systematic: 75%; they concluded that the combined approach best predicts the highest tumor grade (5). Based on these results, follow-up information, and the comparison of the pathological findings between biopsy results and whole-gland specimens (a surrogate for systematic biopsy) would be required to evaluate the usefulness of MRGB for the detection of significant cancers.

Recently, MRI-transrectal ultrasound (TRUS) fusion image-guided prostate biopsy has become more widespread due to its ability to detect significant cancers (6). In this method, systematic biopsy is generally performed in addition to targeted biopsy (6). In the present economic situation, the MRI-TRUS fusion image-guided biopsy is more common than MRGB. MR images are the result of just as much software manipulation. Also, a fused image contains the MR image, plus an ultrasound image. Although one could question the accuracy of their superimposition, each image is the product of a different modality and is subject to that modality's inaccuracies. Multi-parametric ultrasound (mpUS), which includes grayscale, Doppler, dynamic contrast-enhanced, and elastographic imaging, has been widely used to guide prostate cancer biopsies. Using mpUS, the cancer detection rate was improved over that with grayscale only (7,8). Beyond the reproducibility of mpUS, real-time image-guided biopsies are generally easier to perform, and may become the major biopsy procedure.

Accurate localization, measurement, and Gleason scoring of significant cancers with imaging would enable tailored treatment of localized prostate cancer from active

surveillance to radical treatment.

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