allow tissue sampling of discrete regions of interest identified from MR images. These early results have provided proof-of-principle support to many of the design elements of these devices as well as allowed for validation studies of MRI in the characterization of prostate pathology. The true benefits of these endeavors have yet to be realized.

Development of MR-compatible instrumentation for imaging guided procedures provides a springboard for a myriad of diagnostic and therapeutic interventions for both benign and malignant diseases of the gland. Aside from biopsy, needle-based procedures, such as focal tissue ablation or injection-based therapeutics with monitoring of treatment effects, are possible when complemented with sophisticated imaging techniques, such as MR thermography. Similarly, other endocavity-based pelvic procedures, including gynecologic and colorectal procedures, may be adapted using these devices. The addition of remote actuation, or "robotic" automation, further expands the potential of these approaches to include other forms of procedures and use in other organ systems.

What is clear is that success in this field hinges on the combined work of dedicated researchers from a variety of clinical, biomedical, and engineering backgrounds. The results from this level of cooperative multidisciplinary effort bode well for the future of these techniques and for the future of translational biomedical/bioengineering research in image-guided procedures.

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Editorial Comment on: MR-Guided Biopsy of the Prostate: An Overview of Techniques and a Systematic Review

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A large number of studies [1,2] have recently shown that magnetic resonance (MR), in addition to proton 1H-spectroscopic analysis and dynamic contrast-enhanced imaging (DCEMR), could represent a powerful tool for the management of most aspects of prostate cancer, including initial diagnosis, cancer localization, road map for surgery and radiotherapy, and early detection of local recurrence. Ultrasound-guided biopsy is considered the preferred method for prostate cancer detection; however, most of the studies have reported that sextant biopsies missed up to 30% of cancers, and biopsy results showed a positive predictive value of 83% and a negative predictive value of 36% when compared to radical prostatectomy for tumor localization [3].

Although MR and MR spectroscopy imaging (MRSI) are not used at this time as a first approach to diagnose prostate cancer, they can be useful for directing targeted biopsies, especially for cases with prostate-specific antigen (PSA) levels that are indicative of cancer and negative previous biopsy. In the present article, Pondman et al [4] summarized current technical and clinical application of MR-guided biopsies of the prostate. In some experiences [5,6], MR-guided biopsy techniques are becoming more and more available, but there is no current consensus on the optimal technique. Moreover, relevant problems remain: in particular, movement of the prostate during the biopsy procedure is one of the biggest challenges in taking biopsies of the gland. Robotic assistance for MR-guided intervention with the prostate may improve results, but the problem of cost could be more relevant.

For a long time, a valid diagnostic imaging procedure has not been available for prostate cancer. MRSI may reduce the rate of false-negative biopsies and decrease the need for more extensive biopsies or repeat biopsy procedures. MR-guided prostate biopsy will also have an increasing role in this field. Extensive clinical studies are essential for analyzing the real value and advantages of MR guidance for biopsy.

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