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EDITORIAL

Imaging and technologies for prostate cancer. Where are we now—where do we go?

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We have been witnessing rapid advances in the diagnosis and treatment of prostate cancer. While some approaches have matured, others are still in their infancy. We have learned that Active Surveillance is safe in patients with low-risk prostate cancer while patients with high-risk prostate cancer are best served by a multimodality approach including surgery, radiotherapy, and medical management [1, 2]. In patients with moderate-risk prostate cancer, we are balancing our choice between cancer control and cancer cure. While surgery offers a potential cure for the disease, it also harbors a significant probability for morbidity and complications. Hence many men and their partners value not to impair quality of life as a possible trade-off for a definitive cure.

During the past decades, the age of men at prostate cancer detection has decreased by almost 10 years and men's life expectancy has increased by nearly 5 years. Parallel to the increased diagnosis of intermediate-risk prostate cancers, interest in minimally invasive targeted ablative treatment with its lower side-effect profile has grown. Consequently, focal therapy is a rapidly evolving field that covers several ablative techniques, energy sources, and treatment scenarios [3, 4].

The rationale behind targeted ablative therapy sounds reasonably simple, directing therapy towards the predefined cancerous part of the organ while sparing uninvolved tissue; however, the execution in prostate cancer is somewhat more complicated [5]. It is at present very difficult to predict the patients' individual clinical development of de novo cancer or cancer progression. The selection of the appropriate patient takes into account factors such as PSA, biopsy results with histopathological parameters of the cancer foci, patients' life expectancy and quality of life, and most important: the preferences of the patient [6, 7]. Effective predictive models will make a difference in the future in order to move beyond the disease factors and readily accomplish a tailored therapeutic indication for each patient [8]. After selecting the patient, it remains challenging to localize, visualize, and characterize the clinically significant tumor areas and to target the area accurately with the ablative modality most suitable. Today, as stated by the acronyms of the major MRI studies, "For most one (4M) promises (PROMIS) precision (PRECISION) if we do MRI first (MRI-FIRST)" unfortunately MRI remains limited [9]. Although mpMRI has provided an excellent platform for localization and image-guidance, it cannot accurately display the boundaries of all cancers and many cancers remain MRI-invisible [10]. Finally, after the focal treatment, it remains challenging to evaluate treatment efficacy by the interpretation of the serum PSA, imaging- and biopsy results during follow-up as well as, the actual quality of life occurring after the intervention [11, 12].

The establishment of focal therapy as a valid therapy for the treatment of localized prostate cancer still faces many challenges. While some ablative treatments have received approval from the FDA authorities for application in the prostate, at present many other ablative techniques are being studied in early-phase trials. That research has taken place mainly to determine the safety of the technique and

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procedure and to evaluate the efficacy and adverse and side effects. If the treatment is considered safe and feasible for targeted ablation of tumorous areas, research will proceed to the next phases. This will include prospective (randomized) controlled trials to determine efficacy, to compare the ablative techniques, and finally to test equivalence to current conventional treatments.

For focal therapy to evolve into an accepted segment of prostate cancer treatment more research is needed directed at tissue-specific device settings, well-designed clinical trials with standardized ablation protocols, evaluation of short-term ablation results, and long-term clinical benefit. But for focal therapy to be successfully positioned within the armamentarium to treat prostate cancer it is mandatory to better identify the best candidates for focal therapy. This is in line with the concept of personalized medicine.

While initially, we have been reluctant to use freely tests such as PSA, we now offer this more liberally to men seeking advice or for case finding. More recently we have several molecular platforms available to study the presence and aggressiveness of prostate cancer [13]. This has flourished conjointly with the generous use of advanced imaging including ultrasound, MRI, and molecular imaging [14–16]. This helps us to better differentiate the 'kittens' from the 'tigers' in prostate cancer. Whereas a human factor is still guiding our decisions, the information obtained from the many studies conducted in this field will provide big data that can be used to create an Artificial Intelligence platform for patient selection.

The special issue on Imaging and Focal Therapy presents 'where we are now' in this area and is co-authored by experts and opinion leaders in the forefront in this discipline. The time has come to accept 'where we do go' since Focal Therapy is here to stay and during the past years has reinforced its position. This allows us to safely offer the best and most appropriate treatment to our patients with moderate-risk prostate cancer. The time has come to embrace Focal Therapy with all its benefits and limitations similar to any other established treatment modality [17].

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