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The limitations of multiparametric magnetic resonance imaging also must be borne in mind

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The increasingly widespread use of multiparametric magnetic resonance imaging (mpMRI) in recent years has clearly changed the diagnostic and, as a consequence, the therapeutic capabilities in prostate cancer. In the current literature review, Bjurlin et al. determined the exact role of contemporary research in various scenarios related to the clinical diagnosis of prostate cancer: no previous biopsy, prior negative or positive biopsy [1]. The use of diffusion-weight imaging (DWI) with dynamic contrast-enhanced imaging (DCE) has significantly improved sensitivity up to 90% and specificity to over 70%, with a negative predictive value of over 95% with respect to tumors with a Gleason score above 3+3 [2, 3]. On account of moderate specificity, however, urological scientific societies indicate that the only way to make a diagnosis in the case of cancer remains a biopsy of the prostate [4, 5]. That being said, despite the undoubted improvements that have occurred in recent years in the field of MRI, this technology presents several limitations.

So firstly, which factors have a significant impact on obtaining appropriate quality images and data and, secondly, which factors have a significant impact on their correct interpretation?

In order to obtain images with the parameters recommended in the PI-RADS 2.0 guidelines, mpMRI testing should be performed on a system with a field strength of at least 1.5 T [6]. If the field strength is any lower, or if the gradient system is weak, then this could prove to be a technical obstacle to achieving the above requirements. Despite the changes taking place in the standardized reporting system, it is still moderately reproducible. The development of clear recommendations as to which lesion score requires a biopsy and at which can safely be observed, is still required.

In the case of sequences that make up the mpMRI study, it must be highlighted that the most important, which go beyond the assessment of morphology, i.e. DWI images, apparent diffusion coefficient mapping (ADC) and DCE, are extremely sensitive to motion artifacts. Therefore, the mere susceptibility to prostate spasms and the muscle movements of the surrounding muscle apparatus may have an impact on the images obtained. Another factor that may also have an adverse impact on the quality of the study is intestinal motility. The use of measures limiting intestinal motility is recommended in mpMRI studies to assist in overcoming this limitation.

Intrinsic patient characteristics also pose additional limitations to MRI of the prostate. The signal strength of an organ, which determines the quality of the image obtained, is directly dependent on its distance from the receiver coil of the MR apparatus. Therefore, in patients with severe obesity, the sheer thickness of the adipose tissue, resulting in an increased distance between the receiver coil and prostate, may cause deterioration in the quality of the study to such an extent that it often becomes of no diagnostic use. Important factors limiting the performance of the mpMRI test, including metallic foreign bodies, and particularly hip endo-prosthesis (the frequency of which increases with age) should be mentioned. Field distortion caused by a metal endo-prosthesis may even prevent a reliable assessment of the mpMRI study.

In order for the mpMRI study to meet expectations, it should be described by an experienced radiologist [7]. Therefore, it is important for such studies to have been performed in referral centers where multiple descriptions improve quality. Moreover, for a proper interpretation of the morphological data to be obtained during mpMRI tests, a complete profile of the patient is required. Comprehensive presentation of clinical data by the urologist clearly facilitates interpretation of morphological images. Therefore,

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there is a need for close co-operation between the radiologist and the clinical urologist which, thanks to feedback and the exchange of information, leads to the building of mutual experience among both groups of specialists, in that, the radiologist knows what information is required by the urologist, and the urologist in turn is able to interpret the radiologist's description.

The current results of the research discussed in the article, highlighting the impact of mpMRI on the increase of clinically relevant cancer detection, are optimistic, especially when an undisputedly high – above 95% – negative predictive value of mpMRI research, in relation to a Gleason score above 3+3, has been observed.

The authors expect that in the near future, there will be a further increase in mpMRI sensitivity and specificity, the previously described limitations will be overcome, and that further precise standardisation of this technique will be implemented. Already today technological progress has replaced endo-rectal coils – until recently the "gold standard" – with surface coils. These surface coils are not inferior in terms of quality of imaging but are much easier to work with and the testing itself is more readily acceptable to the patient without this endo-rectal coil [8].

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