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LETTER TO EDITOR

Should magnetic resonance imaging be considered in every patient before a bladder outflow obstruction procedure?

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To the Editor

Benign Prostatic Hyperplasia (BPH) is a highly prevalent histological condition in aging men that can commonly cause *lower urinary tract symptoms* (LUTS) due to benign prostatic obstruction (BPO). BPH typically begins developing after the age of 40 and affects approximately 50-60% of men by age 60 (1).
With the recent emergence of *Minimally Invasive Treatments* (MITs) in BPO treatment – including UroLift, EchoLASER, Rezūm, prostate artery embolization, and iTIND – detailed assessment of prostatic anatomy has become of paramount importance. Such procedures can often be limited by factors such as prostate volume, the presence of a high bladder neck or of a median lobe (2).
Whilst *transrectal ultrasound* (TRUS), often combined with flexible cystoscopy, remains commonly employed in BPO evaluation, *multiparametric Magnetic Resonance Imaging* (mpMRI) is less invasive and can offer superior information which we believe can be beneficial to the patient.

RATIONALE FOR PREOPERATIVE MPMRI IN BPO EVALUATION

In our clinical experience, many men presenting with LUTS or urinary retention express concerns that they may have underlying prostate cancer. It is therefore important to exclude a prostate cancer diagnosis before considering a BPO procedure. This is particularly critical in the context of MITs and vaporisation procedures, which do not yield tissue for histopathological analysis. Acquiring an MRI of the prostate and assessing for prostate cancer can alter the management as cancer management would take precedence over *bladder outflow obstruction* (BOO) procedures.
Even in procedures that do retrieve tissue, such as *transurethral resection of the prostate* (TURP) or enucleation techniques, a preoperative diagnosis of clinically significant prostate cancer can change the treatment plan. For example, if a patient with BPO and concomitant prostate cancer opts for a radical prostatectomy, it will address both his cancer and obstruction – thus eliminating the need for a separate BOO procedure.
Moreover, the incidental discovery of prostate cancer on BPO histology often usually prompts a *multidisciplinary team discussion* (MDT) and recommendation of a delayed mpMRI typically 3 to 6 months after the procedure allowing for postoperative changes to resolve in order to more easily be able to identify suspicious lesions present in the residual transitional zone or unsampled peripheral zone. This delay may be significantly stressful for some patients and, at least theoretically, could even compromise the chance of a cancer cure in those with significant prostate cancer that is underestimated by the tissue retrieved from the BPO procedure. Any such delay would have been avoided if an MRI had been performed preceding the BPO procedure.
MRI is highly accurate in terms of diagnosing locally advanced prostate cancer and can also identify suspicious lesions for subsequent targeted biopsy. It is superior to the combination of *prostate specific antigen* (PSA) and *digital rectal examination* (DRE) which is the only other way of screening for significant prostate cancer in the absence of MRI (3).
There are cases where prostate cancer can present without a raised PSA. In 2004 Thompson et al analysed data of nearly 10,000 men. About 3,000 of these men never had a PSA level of more than 4 ng/mL. Interestingly, 15% of these men

had prostate cancer, with 15% of those cancers being high grade tumours (4). Current guidelines consider PSA of less than 6.5 ng/mL to be in reference range for men 70 years and above, which is the usual age group of patients requiring BPH surgery. We can speculate on the results of the Goteborg trial, assessing the prostate cancer risk in men with PSA below 3 ng/mL (5), that increase in the overall cumulative incidence may be due to performing PSA screening rather than MRI imaging, and a certain percentage of those patients might have already had undiscovered prostate cancers with a PSA of less than 3 ng/mL, which might have been detected had an mpMRI been performed.
Additionally, post operative PSA levels may not accurately reflect the underlying cancer risk. It is well known that each gram of prostate tissue resected decreases PSA by 0.15 ± 0.11 ng/mL, while 1% prostate volume resection leads to a reduction of 2.4 ± 0.4% of serum PSA from its baseline (6). Thus in patients with normal or borderline PSA, stable grade prostate cancer can be missed if pre-treatment mpMRI has not been performed, and we solely rely on post treatment PSA results which will be subsequently reduced by the reduction of adenomatous tissue.
The UroLift procedure introduces permanent metallic implants, which create significant artifacts on mpMRI. These artifacts, especially in 3.0 Tesla systems using gradient echo sequences, can obscure up to 15 mm around each implant (6). Moreover, ablations do create areas of necrosis that may distort the normal zonal anatomy between the peripheral and transition zones, and prostate artery embolisation can create infarcts in the transition zone.
Therefore, acquiring a baseline mpMRI prior to these interventions can be helpful for future comparison, if another MRI is indicated (7).
Beyond its role in cancer detection, MRI offers superior anatomical evaluation of the prostate when compared to alternatives such as US and flexible cystoscopy (8). MRI allows for accurate assessment of prostatic anatomy with clear distinction of the prostatic zones, median lobe configuration, volume of the prostate, intravesical component, presence of a high bladder neck, bladder diverticula, and calculi (9).
Pesapane et al compared conventional mpMRI and the quicker and cheaper unenhanced bpMRI and demonstrated similar diagnostic performance between the two modalities, and no high grade prostate cancers were missed by bpMRI (10). Therefore, it can be useful for assessing prostate anatomy prior to BPH procedures.
These anatomical features are key to selecting the most suitable surgical option for each individual patient, supporting a tailored and evidence-based approach to BPO management.

Conclusions

Current prostate imaging and reporting guidelines, including PI-RADS, recommend measuring the prostate volume on T2-weighted MRI using either the ellipsoid formulation or planimetric segmentation and include it in the clinical reports. With the growing clinical use of mpMRI, unprecedented anatomical detail is now accessible for preoperative planning (11).
Naturally, an MRI classification of BPH has also been published detailing the same six patterns of lobar BPH distribution previously described on ultrasound and their appearance on MRI (11). MRI lobar classification of BPH has been associated with severity of LUTS (8). This will definitely aid in adopting the most suitable approach and choosing the most successful treatment option in every patient with BPH.
In light of MRI's capabilities in detecting prostate cancer and precisely characterising BPH anatomy, we believe MRI should more routinely integrated into the preoperative workup of patients being considered for BPO procedures.

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