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Magnetic resonance imaging of benign prostatic hyperplasia patients: A retrospective study

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Abstract--The present study was conducted for assessing Magnetic resonance imaging findings of benign prostatic hyperplasia (BPH) patients. The present study was conducted for assessing Magnetic resonance imaging findings of benign prostatic hyperplasia patients. Data of a total of 25 patients with BPH were enrolled. Complete demographic details of all the patients were evaluated. Wasserman NF et al classified BPH types on MRI as follows: type 0, an equal to or less than 25 cm³ prostate showing little or no zonal enlargement; type 1, bilateral TZ enlargement; type 2, retrourethral enlargement; type 3, bilateral TZ and retrourethral enlargement; type 4, solitary or multiple pedunculated enlargement; type 5, pedunculated with bilateral TZ and/or retrourethral enlargement; type 6, subtrigonal or ectopic enlargement; and type 7, other combinations of enlargements. All the details were recorded in Microsoft excel sheet and were assessed using SPSS software. Out of 25 patients, 28 percent and 24 percent of the patients were type 2 and type 4 according to classification as per MRI finding. 20 percent and 16 percent of the patients were type 3 and type 6, whereas 12 percent were type 5 according to classification as per MRI finding. From the above results, the authors concluded that MRI, with its superior soft tissue contrast resolution, is significantly in differentiating BPH from prostate cancer.

Keywords--magnetic resonance imaging, benign prostate hyperplasia, hyperplasia patients.

Introduction

Benign prostatic hyperplasia (BPH) is a histologic diagnosis showing glandular and stromal hyperplasia in the prostate. Its symptoms usually occur after the age of 40, and its prevalence reaches 50%–60% by the age of 60. About 50% of men who have a histologic diagnosis of BPH have lower urinary tract symptoms including storage and voiding symptoms. Imaging plays an important role in evaluation of enlargement locations and nodules, estimation of prostatic volumes, and management of BPH patients. Ultrasonography (US) and magnetic resonance imaging (MRI) are used in evaluation of the prostate.¹⁻³

Imaging has a significant role in the evaluation of BPH patients. Transrectal ultrasound (TRUS) is the most common imaging tool which can depict the prostate and TZ volume, the presence of enlarged middle lobe and areas suspicious of prostate cancer (PCa). However, the accuracy of TRUS is user dependent, it could under- or overestimate prostate volumes larger than 50 cm³ or smaller than 30 cm³, respectively, while the mixed echo pattern of BPH may mask central and anterior located tumors.⁵ These limitations have led to the increased use of multiparametric Magnetic Resonance Imaging (MRI) especially for PCa recently showing a diagnostic sensitivity of 95% for significant tumors.⁶ In BPH, prostate segmentation with MRI is also an accurate technique for determining prostate and TZ volume, while it has been additionally used for choosing the optimal medical therapy, based on the stromal/glandular ratio and for the assessment of interventional procedures, including ablation and prostatic artery embolization.⁴⁻⁶ Hence; the present study was conducted for assessing Magnetic resonance imaging findings of benign prostatic hyperplasia patients.

Materials and Methods

The present study was conducted for assessing Magnetic resonance imaging findings of benign prostatic hyperplasia patients. Data of a total of 25 patients with BPH were enrolled. Complete demographic details of all the patients were evaluated. Wasserman NF et al classified BPH types on MRI as follows: type 0, an equal to or less than 25 cm³ prostate showing little or no zonal enlargement; type 1, bilateral TZ enlargement; type 2, retrourethral enlargement; type 3, bilateral TZ and retrourethral enlargement; type 4, solitary or multiple pedunculated enlargement; type 5, pedunculated with bilateral TZ and/or retrourethral enlargement; type 6, subtrigonal or ectopic enlargement; and type 7, other combinations of enlargements.² All the details were recorded in Microsoft excel sheet and were assessed using SPSS software.

Results

Mean age of the patients was 51.5 years. Out of 25 patients, 28 percent and 24 percent of the patients were type 2 and type 4 according to classification as per MRI finding. 20 percent and 16 percent of the patients were type 3 and type 6 and only 12 percent were type 5 according to classification as per MRI finding.

Table 1
Demographic data

Variable	Number (%)
Age group (years)	51.5

Table 2
MRI findings

Variable	Number of patients	Percentage
Type 2	7	28
Type 3	5	20
Type 4	6	24
Type 5	3	12
Type 6	4	16

Discussion

Transurethral resection of the prostate is the most commonly performed procedure for the management of patients with lower urinary tract symptoms attributed to benign prostatic hyperplasia (BPH). However, in recent years, various minimally invasive surgical therapies have been introduced to treat BPH. These include laser-based procedures such as holmium laser enucleation of the prostate and photoselective vaporization of the prostate as well as thermal ablation procedures such as water vapor thermal therapy (Rezūm), all of which result in volume reduction of periurethral prostatic tissue.⁶⁻⁸ In comparison, a permanent metallic device (UroLift) can be implanted to pull open the prostatic urethra without an associated decrease in prostate size, and selective catheter-directed prostate artery embolization results in a global decrease in prostate size. Although MRI is not currently used in the routine preprocedural evaluation of BPH, emerging data support a role for MRI in predicting postprocedure outcomes.⁸⁻¹⁰ Hence; the present study was conducted for assessing Magnetic resonance imaging findings of benign prostatic hyperplasia patients.

Mean age of the patients was 51.5 years. Out of 25 patients, 28 percent and 24 percent of the patients were type 2 and type 4 according to classification as per MRI finding. In a similar study conducted by Wasserman NF et al, authors presented an MRI classification of benign prostatic hyperplasia (BPH) for use as a phenotype biomarker in the study of proposed therapeutic interventions. T2 weighted magnetic resonance images were obtained at 3 Tesla in patients with suspicion of adenocarcinoma. Previous BPH classifications were reviewed, and implications for inclusion of lobar classification in therapeutic research for BPH were discussed. Six patterns of BPH distribution were identified. Illustrations are shown for each classification type.²

20 percent and 16 percent of the patients were type 3 and type 6 according to classification as per MRI finding. Grivas N et al investigated the association between benign prostatic hyperplasia (BPH) patterns, classified by magnetic resonance imaging (MRI), with lower urinary tract symptoms (LUTS) or continence, preoperatively and after robot-assisted laparoscopic radical

prostatectomy (RARP). Their retrospective study included 49 prostate cancer patients, with prostate size >47 cm³, who underwent an endorectal MRI followed by RARP. Five BPH patterns were identified according to Wasserman, and additional prostate measurements were recorded. BPH pattern 3 (44.9%) was identified most common, followed by pattern 5 (26.6%), 1 (24.5%), and 2 and 4 (both 2%). BPH patterns were significant predictors of preoperative LUTS, with pedunculated with bilateral transition zone (TZ) and retrourethral enlargement (pattern 5) causing more severe symptoms compared with bilateral TZ and retrourethral enlargement (pattern 3) and bilateral TZ enlargement (pattern 1), whereas pattern 3 was additionally associated with more voiding symptoms compared with pattern 1. None of the BPH patterns was predictive of postoperative LUTS and continence. Independent predictors of continence at 12 months were lower preoperative PR25-LUTS score and longer membranous urethral length. MRI is useful for classifying patients in BPH patterns which are strongly associated with preoperative LUTS.¹⁰

Conclusion

From the above results, the authors concluded that MRI, with its superior soft tissue contrast resolution, is significantly in differentiating BPH from prostate cancer.

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