



Research Article

ROLE OF TRANSRECTAL ULTRASOUND IN EVALUATING PROSTATE PATHOLOGIES IN OBSTRUCTIVE LUTS

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ABSTRACT

Aim: To evaluate the efficacy of Transrectal ultrasound in evaluating the diseases of the prostate in men presenting with lower urinary tract symptoms and its impact on management and treatment outcomes.

Methods: This is a prospective randomized control study conducted in the Department of Urology in Government Kilpauk Medical College Hospital and Government Royapettah Hospital, Chennai during the period March 2018 to March 2019. 67 patients with obstructive LUTS above the age of 30 years, were included in this study. Patients with symptoms of LUTS due to urinary tract infections, neurogenic bladder, trauma, chronic kidney diseases and patients with significant medical and psychological condition precluding interventions and who did not consent for the study were excluded from our study. Both Transabdominal and Transrectal ultrasound is performed in all these patients preoperatively and calculations of the prostate volume (both total and transition zone) was made. If any suspicious lesions or nodules were present, these patients would be subjected to MRI followed by TRUS guided biopsy of these lesions. All these would be compared with respective transabdominal calculations of the prostate volume and findings as well as the intraoperative and postoperative assessment along with histopathological reports.

Results: Patients' ages ranged between 40 and 80 years with a peak age incidence at sixth decade. Transition Zone (TZ) volume estimation on both transrectal and transabdominal ultrasound showed transrectal method was more accurate. However there is no statistically significant difference between TRUS and Transabdominal volumetric analysis. TRUS showed to have advantage in diagnosing other prostate pathologies and helpful in the decision making regarding management. In our study, 54 BPH, 7 prostate cancer and 6 inflammatory prostate pathologies were diagnosed.

Conclusion: The volumetric analysis of BPH showed more accurate and superior results with transrectal ultrasound when compared to transabdominal USG. Measurements of the transition zone of the prostate by transrectal ultrasound are more accurate than those for the whole prostate to predict enucleated or resected weight. The assessment of the transition zone volume may be sufficiently reliable to be used in the clinical management of benign prostatic hyperplasia and helpful to choose modality of the surgery. Also TRUS showed advantageous in evaluation and management plans in patients with other prostate pathologies.

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INTRODUCTION

Despite being formally included in the assessment of patients presenting with lower urinary tract symptoms (LUTS), transrectal ultrasonography (TRUS) is not routinely offered to these patients. This tactic however might not be optimum since data exist on the superiority of TRUS over transabdominal ultrasound in accurately predicting prostate volumes. We aimed to evaluate TRUS as a standard tool in the evaluation of

patients with benign prostate hyperplasia (BPH) and other benign and malignant prostate pathologies with a special focus on the potential impact it might have on the decision on management.

MATERIALS & METHODS

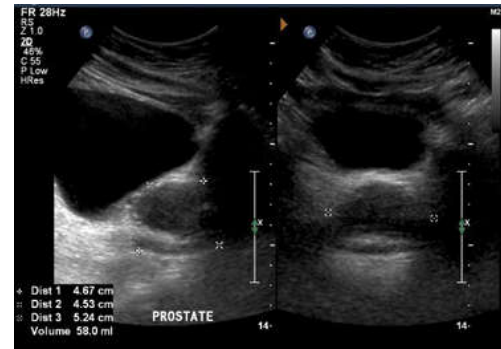
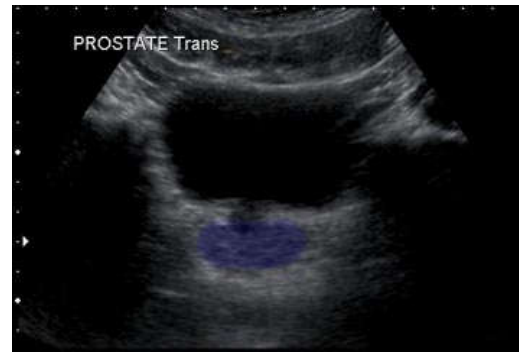
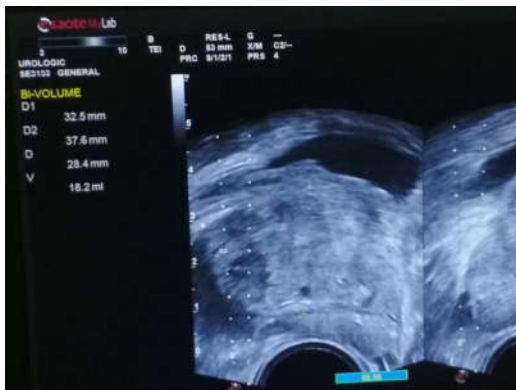
This is a prospective study conducted in the Department of Urology, Government Royapettah Hospital and Government Kilpauk Medical College Hospital from August 2018 to February 2019 for a period of 7 months. A total of 67 patients above the age of 30 years who presented with obstructive LUTS were included in this study. All these patients were

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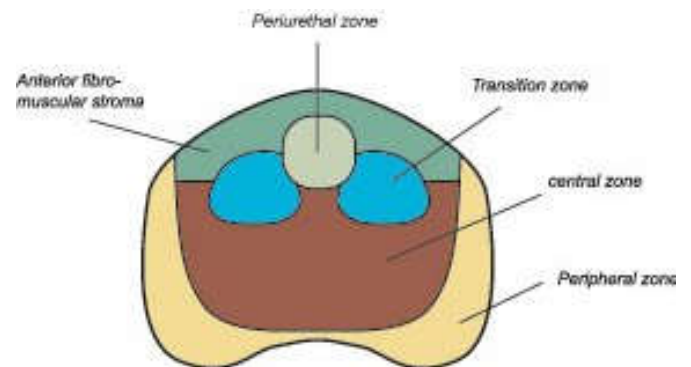
subjected to thorough clinical evaluation and both Transabdominal and transrectal ultrasonographic evaluation of the prostate for volume and any other suspicious lesions in the prostate, if clinically indicated. Patients with symptoms of LUTS due to bladder outlet obstruction other than benign prostatic enlargement, urinary tract infections, neurogenic bladder, trauma, chronic kidney diseases and patients with

significant medical and psychological condition precluding interventions and who did not consent for the study were excluded from our study. Transabdominal scan and TRUS was performed in all these patients preoperatively. Transrectal ultrasonography (TRUS) was done by micro convex transrectal probe of 6.5 MHz. Patient is advised to lie in left lateral decubitus position with knees flexed and applied closely to chest.



Transabdominal scan

Transrectal usg

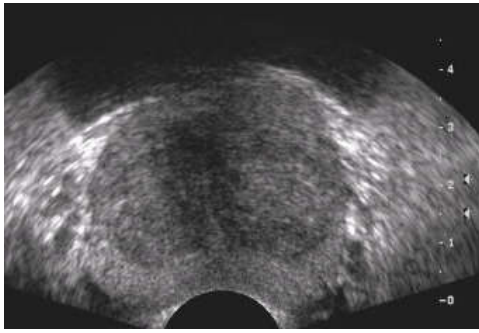


The Prostate Gland was Evaluated for

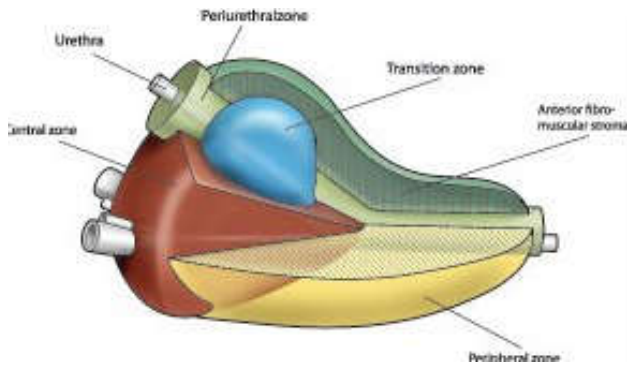
- Assessment of the presence of any focal lesion and their echo pattern
- Capsular integrity
- Prostate volume (both total and transition zone)

Enlarged prostate gland with or without median lobe enlargement with symmetric echogenicity with heterogenous echotexture of inner glandular zone is suggestive of benign prostatic hyperplasia (BPH). For calculating the prostate volume, ellipsoid formula, multiplying the largest anteroposterior (height), transverse (width) and cephalocaudal (length) prostate diameters by 0.524 ($H \times W \times L \times \pi/6$) was used.

All the data were compared with respective transabdominal ultrasonogram as well as the intraoperative assessment.



Transverse View



Sagittal View

RESULTS

In our study a total of 67 patients with prostate pathologies were included. Age distribution in our study was between 51 years and 80 years with highest percentage of distribution in 61-65 year age group with 36% distribution.

Age	No. of patients	% distribution
51-55	10	15
56-60	14	21
61-65	24	36
66-70	12	18
71-75	4	6
76-80	3	4

Out of these 54 patients had Benign prostatic hyperplasia, 7 had prostate cancer and 6 had inflammatory pathologies. Benign hypertrophy of the prostate predominated the cause of obstructive LUTS in our study population. All patients diagnosed to have BPH underwent TURP.

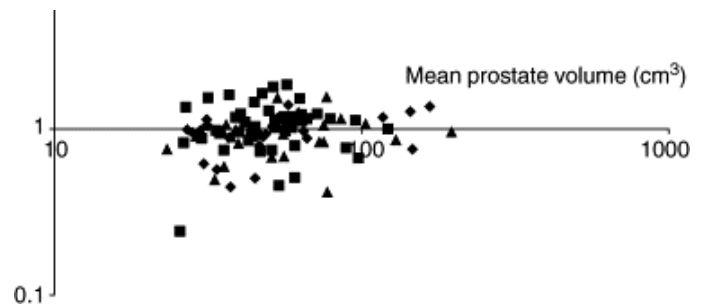
Of the patients suspected to have Benign hypertrophy on clinical examination, 3 had suspicious lesions, which were subjected to biopsy and were diagnosed to have prostate cancer. Remaining 4 patients diagnosed with prostate cancer in our study, had hard nodular prostate on clinical examination and MRI and TRUS guided biopsy were done in these patients. In our study 6 patients were diagnosed with inflammatory pathologies, which included 4 patients with prostatitis, 1 with prostatic abscess and 1 with granulomatous prostatitis. One patient with granulomatous prostatitis was suspected to have carcinoma, but on biopsy proved to be TB granulomatous prostatitis and was started on Category I ATT. One patient with prostatic abscess underwent TRUS guided aspiration followed by IV antibiotics. Remaining patients were managed conservatively with IV antibiotics.

Prostate pathology	No. of patients
BPH	54
Prostate cancer	7
Inflammatory Lesions	6

Inflammatory Lesions	No. of patients
Prostatitis	4
Prostatic Abscess	1
TB granulomatous prostatitis	1

All patients were subjected to Transabdominal scan to compare with transrectal ultrasound.

Deviation from TRUS	<10%	10-20%	>20%
No. of Transabdominal readings	48	12	7



Prostate volumes measured transrectally and transabdominally in each volunteer was plotted against the mean of those two volumes

Paired analysis of transrectal ultrasound measurements and transabdominal scans revealed that transrectal ultrasound length was accurate and good correlation with intraoperative assessment. No statistically significant differences were found between the transabdominal and transrectal ultrasonographic prostate volume readings in the same patients. TRUS volumetric assessment has been shown to be more accurate than Transabdominal scans. However, interoperator variability is shown to be there and this may be the reason accounted for the high variation of readings in some patients, whereas others correlated to the transabdominal scans.

Also in our study, TRUS was helpful in picking up prostate cancer in 3 patients suspected to have BPH and the management was altogether changed. This shows the efficiency of TRUS in picking up early lesions in carcinoma prostate and the need to consider doing TRUS evaluation for all patients with BPH before proceeding to TURP. Also

TRUS was useful in accurately differentiating inflammatory lesions which helped in the right management in these patients.

DISCUSSION

Many urologists routinely use transrectal ultrasonography (TRUS) to diagnose BPH. TRUS is useful in that it can evaluate the size, shape, presence of adenoma, and anatomy of the prostate relatively accurately and noninvasively. TRUS has been the most widely used imaging modality for estimating prostate size because it has been shown to be inexpensive, rapid, reproducible, and well correlated with actual prostate volume.

Prostate enlargement is a common finding among elderly men with BPH and is considered an important risk factor leading to urinary retention. There are many criteria of prostate size for diagnosing BPH. Garraway *et al.* determined BPH when prostate size was over 20 mL, and Bosch *et al.* determined BPH when prostate size was over 30 mL. Generally, there are many other criteria for diagnosing BPH, such as maximum flow rate, International Prostate Symptom Score (IPSS), and prostate size measured by digital rectal examination, but these days, prostate size is thought to be important for treating BPH patients.

BPH appears in TRUS as an echogenic and non-mobile mass. TRUS is mainly used to assess prostate volume, which is crucial for therapeutic strategies. Prostate volume can be estimated by serial planimetry, orthogonal plane, rotational body (single plane, ellipsoid) and three-dimensional methods. Step-section planimetry is assumed to be the most accurate method of determining prostate volume, but it is time consuming and requires cumbersome special equipment. One-dimensional measurements are preferable in the clinic.

Most commonly used - ellipsoid formula, multiplying the largest anteroposterior (height), transverse (width) and cephalocaudal (length) prostate diameters by 0.524 ($H \times W \times L \times \pi/6$). Spheroid formula $W \times W \times H \times \pi/6$ seems equally accurate, and has the advantage of requiring measurements in the transversal plane only. In our study we used ellipsoid formula and has shown to have good correlation.

Carcinoma prostate in TRUS is useful in identifying the suspicious lesions, targeting biopsy and for local staging. Prostatic cancer appears hypoechoic in about 39% of patients. Hypoechoic area may also be due to granulomatous prostatitis, prostatic infarction and lymphoma. Hypoechoic is malignant in 17 to 57%, but is not pathognomonic and needs biopsy for confirmation. Focal contour abnormalities and asymmetry suggests malignancy. TRUS is also useful to rule out extracapsular extension. Although newer modalities for diagnosis and staging is widely used nowadays like MR spectroscopy, TRUS remains still useful in initial evaluation and tissue biopsy for confirmation.

CONCLUSION

The volumetric analysis of BPH showed more accurate results with TRUS. Assessment of the transition zone volume by TRUS will be helpful in choosing the modality of treatment. It has a potential impact on the decision on management and remains a standard tool in the evaluation of patients with benign prostatic hyperplasia (BPH). Also in addition, it has the advantage in diagnosis and simultaneous tissue biopsy in suspected malignancy and other prostate pathologies. Hence TRUS examination of prostate in elderly men with obstructive LUTS remains indispensable tool in the evaluation of prostate pathologies.

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