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Clinical relevance of prostatic enlargement on transabdominal ultrasound

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Abstract---Background: The prostate enlargement is an important public health problem in the geriatric male patients. The diagnostic procedures of BPH ranges from non-invasive to invasive procedures. This study was undertaken to study the correlation of findings of transabdominal ultrasound with the IPSS scores and QOL scores. Material and methods: A cross sectional study was conducted in the department of radiology on 100 patients attending urology OPD and IPD in a tertiary care hospital in Mangalore. The transabdominal ultrasonography was conducted by an expert sonologist and prostate volume was measured. The data was collected by using a pre-designed proforma and the results were tabulated. Results: Majority of the patients in this study were aged between 60 – 65 years. Increased frequency was most common lower urinary tract symptom observed in this study. There was a statistically significant difference in the grading of prostatic enlargement and IPSS scores. There was no significant difference of grading of prostate volume and Quality of Life scores. Conclusion: This study had shown that, transabdominal ultrasound assessed prostate volume correlates with the IPSS scores.

Keywords---benign prostatic hypertrophy, lower urinary tract symptoms, transabdominal ultrasound, quality of life, IPSS scores.

Introduction

More than 32 million men worldwide have symptoms related to BPH and BPH affects more than 50% of men over the age of 60 years and as many as 90% of men over the age of 70 years.¹ BPH is a benign disease of the prostate gland and consists of nodular hyperplasia of the fibrous, muscular, and glandular

tissue within the periurethral and transition zones. The exact pathophysiology of BPH is still unknown but it is probably associated with hormonal changes that occur as men age. BPH appears in abdominal USG as an echogenic and non-mobile mass. TRUS is usually 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.¹

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. The prolate ellipsoid formula, multiplying the largest antero-posterior (height), transverse (width) and cephalocaudal (length) prostate diameters by 0.524 ($H \times W \times L \times \pi/6$) is probably the most commonly used method, since it is rapid, reproducible, and has been shown to have high correlation with the actual prostate volume. Most of the patients with BPH come to OPD with having mild-to-severe Lower Urinary Tract Symptoms (LUTS). Few of the cases of BP Hare diagnosed on routine transabdominal ultrasound with no significant LUTS. Many parameters have been used to assess the severity of BPE and to guide treatment of this common condition. These range from subjective symptomatic scoring systems such as the International Prostatic Symptoms Score (IPSS) Quality of Life Score to objective measurements of prostatic volume, shape and configuration. Most of the objective prostatic measurements thought to be related to the severity of bladder outflow obstruction secondary to BPE can be measured transabdominally using ultrasound.² Shareef et al. studied 155 patients out of which 66 patients were diagnosed with benign hyperplasia of prostate differentiating from rest of the patients as having a malignant aetiology on transabdominal ultrasonography establishing it as an economical and a non-invasive investigation to differentiate the nature of pathologies with a good accuracy.³

The International Prostate Symptoms Score was obtained by clinical questionnaire and personnel interview with the patient on the following symptoms which they experienced over the past one month. This study was mainly undertaken to correlate the Lower Urinary Tract (LUTS) with demonstrable evidence of prostatomegaly on transabdominal ultrasound.

Material and Methods

A cross sectional study was undertaken in the Department of Radiodiagnosis, KMC Hospital, Manipal Academy of Higher Education, Attavar, Mangalore from July 2020 to December 2020. This study was conducted after obtaining the permission from the Institution Ethics Committee. All patients referred for transabdominal ultrasonographic imaging including inpatients, outpatients and referral patients. Male patients showing ultrasonographic evidence of prostatomegaly were included in to the study. The patients who had underwent complete prostatetctomy were excluded from the study.

The sample size was calculated by using 50% of the prevalence, 10% as marginal error and at 0.05 level of significance and derived to be 97 which was

approximately equal to 100. This study used a non-probability convenience sampling method. Two ultrasound machines (Philips) with 3.5 MHz transducers were used for the transabdominal ultrasonic examination, throughout the study. The volume measurements were taken using the B mode by treating the prostate as an ellipsoid. Post diagnosis of BPH, the management history is collected and tabulated. Statistical Package for social services (vs 20) was used for the analysis. A p value of less than 0.05 was considered as statistically significant.

Results

Table 1. Distribution of the study subjects according to age group

Age group	Frequency	Percent
50 to 59 years	15	15.0
60 – 69 years	51	51.0
70 – 79 years	27	27.0
Above 80 years	7	7.0
Total	100	100.0

This study had shown that, about 51% of the cases were aged between 60 – 69 years in this study followed by 70 – 79 years (27.0%).

Table 2. Distribution of the study group according to Lower urinary tract symptoms

Lower urinary tract symptoms	Frequency	Percent
Frequency	92	92.0
Urgency	62	62.0
Incomplete emptying	58	58.0
Nocturia	59	59.0
Poor streaming	49	49.0
Straining	49	49.0

Increased frequency was the main Lower Urinary tract symptom in this study in 92% of the cases. Other symptoms noted were Urgency (62.0%), Incomplete emptying (58.0%), Nocturia (59%), Poor streaming (49.0%) and straining (49.0%).

Table 3. Distribution of the study group according to USG findings and IPSS scores

Grading	Mild N (%)	Moderate N (%)	Severe N (%)
Normal	19 (38.0)	1 (2.2)	0
Grade I	31 (62.0)	23 (50.0)	0
Grade II	0	14 (30.4)	4 (100)
Grade III	0	8 (17.4)	0
Total	50 (100)	46 (100)	4 (100)

χ^2 value=56.383

df=6

p value=0.000, Sig

About 62.0% of the mild cases had grade I prostatomegaly, about 50% with moderate IPSS scores had Grade I had grade I prostatomegaly and all cases with severe IPSS scores had grade II prostatomegaly on abdominal ultrasonography. This difference was statistically significant.

Table 4. Distribution of the study group according to USG findings and QOL scores

Grading	Quality of life	
	Mean	SD
Normal	3.45	0.9
Grade I	2.96	1.0
Grade II	3.39	1.0
Grade III	3.12	1.4

F value=1.574

p value=0.217, NS

The mean QOL scores for normal prostatomegaly was 3.45, Grade I prostatomegaly was 2.96, Grade II prostatomegaly was 3.39 and grade III prostatomegaly was 3.12. However, this difference was not statistically significant.

Disussion

TRUS is commonly used to assess the prostate volume which is useful for the therapeutic strategies. But this approach is invasive. Accurate assessment of the volume of the prostate volume is important guide in the management of prostate enlargement in men. Assessment of prostate by transabdominal ultrasound is quite convenient to the sonologist and patients.⁴ Hence, this study was mainly undertaken to study the role of transabdominal ultrasound in diagnosis of prostatic enlargement.

This study involved 100 patients presenting with lower urinary tract symptoms. Majority of them were aged between 60 – 69 years. A study by Shreef et al had noted that the mean age of the benign cases was 68.5 years and malignant cases was 69.2 years.³ A study by Awaisu et al had noted that, the mean age of the patients was 64.22 years.⁵ Increased frequency was the main lower urinary tract symptom in this study followed by urgency, incomplete emptying, nocturia, poor streaming and straining.

Most of the cases with mild and moderate IPSS scores had grade I prostatomegaly as diagnosed by transabdominal ultrasound. All the cases with severe IPSS scores had grade II prostatomegaly which was statistically significant. A study by Udeh et al had shown that, the mean value of prostate was 72.79 cm.⁶ There was no correlation between the prostate volume and IPSS scores unlike this study in Africans.⁵ In a study by Azhar et al, there was a statistically significant difference between the grading of prostate by trans abdominal ultrasound and IPSS scores similar to the results of this study.⁷ A study by Awaisu et al had shown a positive and significant correlation of between the prostate volume and IPSS scores.⁵ These findings suggested that, the transabdominal ultrasound being a non-invasive procedure have a significant correlation of prostatic volume with the IPSS scores. Hence, the transabdominal ultrasound can be widely used than the

invasive diagnostic procedures like trans rectal ultrasound. But it mainly depends on the expertise of the sonologist.

The mean QOL scores were not statistically significant between the different grades of prostatic enlargement as per transabdominal ultrasound. A study by Awaisu et al had shown that, majority of the patients were unhappy about their symptoms.⁵ The quality of life usually deteriorates with deterioration of the prostatic enlargement due to clinical symptoms hampering the day today clinical symptoms.

Conclusion

This study had shown that, the transabdominal ultrasound can easily pick up the prostate enlargement in patients with lower urinary tract symptoms. These symptoms can be easily correlated with the IPSS scores.

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