

## Comparative Evaluation of Relationship Between Prostate Volume and Lower Urinary Tract Symptoms

Rakesh Ranjan<sup>1\*</sup>, Niranjan Bharti<sup>2\*</sup>

<sup>1</sup>Ex- senior resident, Department of General Surgery, U.C.M.S., New Delhi, India

<sup>2</sup>Tutor, Department of Physiology, N.M.C.H., Patna, Bihar, India

Received: 02-09-2020 / Revised: 29-11-2020 / Accepted: 02-1-2021

### Abstract

Lower Urinary tract symptom (LUTS) is a common presentation among elderly male patients in urology clinical practice. Evaluation and treatment of LUTS is a major consideration and IPSS score is routine investigations for assessment of such patients. International Prostate Symptom Score (IPSS) have contributed much to the objective and quantitative evaluations of LUTS in terms of the elucidation of its pathogenesis and changes accompanied with treatments. The objective of this study is to evaluate the relationship between IPSS and prostate volume in patients with LUTS. There is a significant relationship between IPSS and prostate volume measured through transabdominal ultrasonography. The Total IPSS increases with the prostate volume, as a significant positive relationship between IPSS total score and prostate volume was recorded ( $r=0.45$ ,  $t=3.8$ ,  $p<0.001$ ).

**Keywords:** lower urinary tract symptoms (LUTS), international prostate symptom score (IPSS), transabdominal ultrasonography and prostate volume.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

Lower urinary tract symptoms (LUTS) are one of the commonest presentation in surgical out patient department . Although benign prostrate hypertrophy (BPH) is one common cause of these symptoms, some men with LUTS have no prostate enlargement[1]. BPH has been known as a cause of urinary obstruction and the most common disease effecting the aging men. 50% of the men aged 51-60 years and 90% of men over aged 80 years have histological evidence of BPH[2]. Clinical diagnosis of BPH is made by the assessment of the International Prostate Symptom Score (IPSS), prostate size or volume and reduced urinary flow rate. The IPSS questionnaire is used worldwide to measure lower urinary tract symptoms (LUTS). Ultrasound of the prostate is the investigation that enables us to visualize the prostate gland directly and is one of the commonest diagnostic modalities performed in patients presenting with LUTS. It can be done using the trans-abdominal approach as well as trans-rectal approach. There is a controversy on the relationship between IPSS score and the prostate volume in the literature. The objective of the study was to evaluate the relationship between IPSS and sonologically measured prostate volume in the patients with LUTS.

### Material and Methods

This study was conducted at Department of Surgery, at U.C.M.S., New Delhi. 58 patients with lower urinary tract symptoms (LUTS) from OPD and IPD were included in the study from year January 2010 – July 2012. All the patients were well informed about the study. Informed written consent was taken from patients who were willing to participate in this study. All patients were assessed with clinical history, examination and interviewed using standard-ized questionnaires for IPSS. The IPSS is widely used in evaluating LUTS quantitatively and also in monitoring therapeutic effects in terms of improvement. The IPSS is based on the answers to seven questions (1. Straining 2. Weak stream 3. Intermittency 4. Incomplete emptying 5. Frequency 6. Urgency 7. Nocturia (times per night). Each question is assigned points from 0 (Not at all) to 5 (Almost always). Total score ranges from 0-35. A total score was categorized as mild (scores 7 or less), moderate (scores 8-19), and severe (scores 20-35). The prostate volume of each patient was then estimated by trans-abdominal ultrasound. Data obtained was recorded was subjected to statistical analysis using statistical package for the social sciences (SPSS), version 11.0, and Pearson's correlation coefficient was used to assess correlation between prostate volume and IPSS score.

### Results

The mean age of 58 BPH patients included in the study was found to be  $62.0 \pm 9.0$  years (range 45-90 years). (Fig 1)

\*Correspondence

**Dr. Niranjan Bharti**

Tutor, Department of Physiology, N.M.C.H., Patna, Bihar, India

E-mail: [niru81rims@gmail.com](mailto:niru81rims@gmail.com)

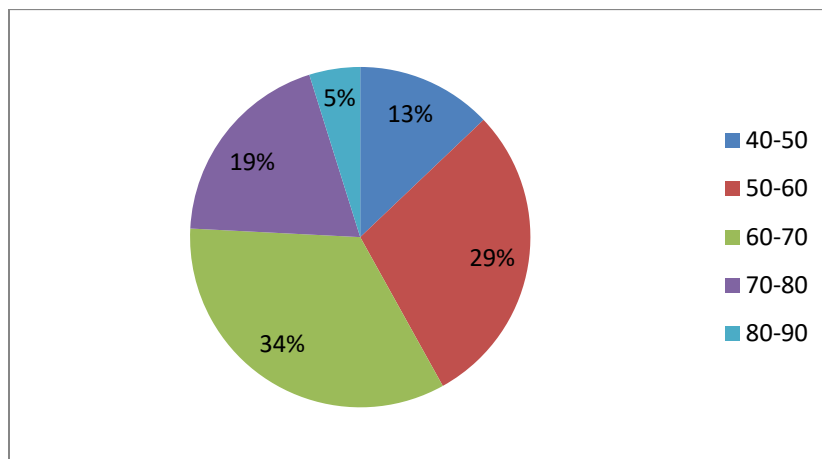


Fig 1: Distribution of BPH patients according to age group. (mean age = 62.0)

In this study out of 58 BPH patients 17 had mild, 29 had moderate and 12 patients had severe symptoms (IPSS score) and Mean prostatic volume in BPH patients was found to be 42.9 ±18.4 cm<sup>3</sup> with a range of 20-92 cc.

Table 1: Frequency of IPSS severity in relation to prostrate volume

Prostrate volume (in cc)	Mild(score 0-7)	Moderate(score 8-19)	Severe(score 20-35)
20-30	8	8	1
30-40	5	9	2
40-50	2	2	3
50-60	1	5	1
60-70	1	3	1
70-80	0	1	1
80-90	0	1	3

There was a positive correlation between prostate volume and total IPSS score in our study, which was statistically significant. (r =0.45, t =3.8, p<0.001). Pearson correlation was applied to determine the relationship between prostate volume and total IPSS score.

**Discussion**

The mean age of 58 BPH patients included in the study was found to be 62.0 ± 9.0 years (range 45-90 years). Data suggest that the incidence of symptomatic BPH is 23% in men aged 50 years and 78% in men aged 60-70 years[3]. Akin et al., on 48 BPH patients, reported mean age of 60.17 ± 1.18 years[4]. Pethiyagoda et al., in their study on 185 patients showed mean age of 65.2 ± 11.46 years[5]. Thus, our findings appear to be in conformity with the findings of other researchers. In our study, most of the patients (36.2%) were in the age group of 60-70 years. Manjunath et al.;conducted a study on 60 BPH patients to determine the relationship among the parameters of uroflowmetry and severity of symptoms. The mean age of patients was 67.8 years. Most of the patients (46%) in their study were in the age group of 61-70 years[6]. Agarwal et al.,did a study, the mean age of patients was found to be 67.5 ± 8.5 years and most of the patients (44.0%) were in age group of 61-70 years.<sup>7</sup>Jiang et al., on 298 patients with LUTS reported mean age of 72.7 ± 9.0 years (range, 44-92)[8]. Eghbali et al., did study on 44 patients of BPH, the mean age was 61.7 ± 9.2 years[9]. In our study out of 58

BPH patients 17 (29.3%) had mild, 29 (50%) had moderate and 12 patients (20.7%) had severe symptoms (IPSS score). A similar study conducted by Itoh et al., in which the frequencies of mild, moderate and severe symptoms according to total IPSS were 23.8%, 50.0% and 26.2%, respectively[10]. In the study conducted by Pethiyagoda et al., on 185 patients, 4.4% had mild, 50.5% had moderate and 45.1% had severe LUTS according to IPSS total score, respectively[5]. However, Mostafa et al., showed 58.3% of BPH patients had mild, 27.3% had moderate and 4.4% had severe symptoms on the basis of IPSS and the prevalence of moderate to severe was 31.7%[11]. Mean prostatic volume in BPH patients was found to be 42.9 ±18.4 cm<sup>3</sup> with a range of 20-92 cc, which was comparable to other studies done by Agarwal et al., where the mean volume of prostate was found to be 42.5 ± 12.7 cm<sup>3</sup> on 100 patients of BPH<sup>7</sup> and by Vesely et al., who reported mean prostate volume of 40.1± 23.9 cm<sup>3</sup> conducted on 354 men in a study. <sup>12</sup>Akin et al., reported a mean prostate volume of 35.77 ± 3.86 cc in 48 patients of BPH[4]. In the study conducted by Dicuio et al., mean prostate volume was 41.4 cc [13]There was a positive correlation between prostate volume and total IPSS score in our study, which as statistically significant. (r =0.45, t =3.8, p<0.001). Pearson correlation was applied to determine the relationship between prostate volume and total IPSS score. These findings were further supported by other study which was done on 185

patients by *Pethiyagoda et al.*, in which there was a strong positive correlation between two parameters (Correlation Coefficient =0.223,  $p < 0.003$ ) [5]. Similarly, *Tsakamoto et al.*, showed that correlation between change in IPSS and change in PV was 0.47 ( $P = 0.05$ ) based on 25 patients. They concluded that change in IPSS was associated with change in prostate volume [14].

### Conclusion

There is a significant positive relationship between IPSS total score and prostate volume. It is evident from this study that there will be significant rise in IPSS score as prostate volume increases. However, the treatment of BPH should be based on IPSS and urinary flow rather than prostate volume only.

### References

1. Thorpe A, Neal D. Benign prostatic hyperplasia. *Lancet*. 2003; 361:1359-67.
2. Boon, Nicholas A, Colledge Nicki R, Walker Brian R, Hunter John AA. Davidson's Principles and Practice of Medicine 20th Edition, International Edition, Churchill Livingstone, 2006, 510-511.
3. Gai M, Corona G, Salvi M, Vignozzi L, McVary KT, Kaplan SA, et al. A systematic review and meta-analysis on the use of phosphodiesterase 5 inhibitors alone or in combination with  $\alpha$ -blockers for lower urinary tract symptoms due to benign prostatic hyperplasia. *Eur Urol*. 2012; 61:994-1003.
4. Yigit Akin, Hakan Gulmez, Murat Ucar, Selcuk Yucel. The effect of first dose of tamsulosin on flow rate and its predictive ability on the improvement of LUTS in men with BPH in the mid-term. *Int Urol Nephrol*. 2013; 45:45-51.
5. AUB Pethiyagoda, Pethiyagoda K. Correlation between prostate volume and Lower Urinary Tract Symptoms (LUTS) as measured by International Prostate Symptom Score (IPSS). *International Journal of Scientific and Research Publications*, 2016, 6(4):1
6. Chikkaraddi Manjunath L. Manjunath Shetty. Uroflowmetry Evaluation of Lower Urinary Tract Symptoms in Patients with Benign Prostatic Hyperplasia an institutional study. *International Journal of Recent Trends in Science And Technology*. 2014; 12(3):454-457.
7. Agrawal CS, Chalise PR, Bhandari BB. Correlation of prostate volume with international prostate symptom score and quality of life in men with benign prostatic hyperplasia. *Nepal Med Coll J*. 2008; 10(2):104-7.
8. Yuan-Hong Jiang, Victor Chia-Hsiang Lin, Chun-Hou Liao, Hann-Chorng Kuo. International Prostatic Symptom Score — Voiding/ Storage Subscore Ratio in Association with Total Prostatic Volume and Maximum Flow Rate is Diagnostic of Bladder Outlet-Related Lower Urinary Tract Dysfunction in Men with Lower Urinary Tract Symptoms. 2013 8(3):e59176.
9. Kamyar Eghbali, Mohammad Reza Shayegan, Sina Kianoush. Investigating the effect of tamsulosin on the measurement of bladder wall thickness and International Prostate Symptom Score in benign prostatic hyperplasia. *Canadian Urological Association*. 2013; 7:5-6.
10. Hideaki Itoh, Munekado Kojima, Koji Okihara, Osamu Ukimura, So Ushijima, Akihiro Kawachi, et al. Significant relationship of time-dependent uroflowmetric parameters to lower urinary tract symptoms as measured by the International Prostate Symptom Score. *International Journal of Urology*. 2006; 13:1058-1065.
11. Mostafa A Arafa, Karim Farhat, Saad Aqdas, Mohamed Al-Atawi, Danny M Rabah. Assessment of lower urinary tract symptoms in Saudi men using the International Prostate Symptom Score. *Urol Ann*. 2015; 7(2):221-226
12. Vesely S, Knutson T, Damber JED, Dicuio M, Dahlstrand C. Relationship between age, prostate volume, prostate-specific antigen, symptom score and uroflowmetry in men with lower urinary tract symptoms. *Scand J Urol Nephrol*. 2003; 37(4):3228.
13. Dicuio M, Pomara G, Vesely S, et al. The use of prostatic intravesical protrusion correlated with uroflowmetry: a new method to measure obstruction in patients with LUTS due to BOO without using P/F studies. *Arch Ital Urol Androl*. 2005; 77:50-3.
14. Tsakamoto T, Masumori N, Rahman M, Crane MM. Change in International Prostate Symptom Score, prostate-specific antigen and prostate volume in patients with benign prostatic hyperplasia followed longitudinally. *International journal of urology: Official journal of the Japanese Urological Association* 2007; 14(4):321-4.

**Conflict of Interest: Nil**

**Source of support: Nil**