

Association of Prostate Volume with International Prostatic Symptom Score

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⁶ Conception of study

¹ Experimentation/Study conduction

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Abstract

Introduction: Objective: To find out the association of Prostate volume with International Prostatic Symptom Score in Benign Prostatic Hyperplasia patients.

Study Design: A Cross- out sectional study was carried out. Qualitative variables measured by Chi square test and quantitative by ANOVA. Pearson correlation & multinominal regression were applied. P value considered significant at <0.05. It was conducted in a tertiary care hospital, Ziauddin University Hospital Karachi.

Materials and Methods: The data was collected from 103 Benign prostatic hyperplasia patients. Prostate Volume of BPH patient were recorded by transabdominal ultrasonography in Radiology department (performed by senior faculty). Severity of symptoms were assessed by IPSS questionnaire.

Results: Mean IPSS was found out to be ± 13.7 . Clinical presentation showed incomplete emptying, hesitancy & nocturia, the parameters in IPSS as most frequently occurring symptoms in benign prostatic hyperplasia patient in our subset of population. These symptoms were found to be statistically significant with prostatic volume.

Conclusion: IPSS strongly correlated with prostate volume. Irritative storage and voiding obstructive symptoms have shown association with increasing prostate volume.

Keywords: Benign Prostatic Hyperplasia, Prostate Volume, International Prostatic Symptom Score, Lower Urinary Tract Symptoms.

Introduction

Benign Prostatic Hyperplasia (BPH) has always been an emerging health issue of men between 50 to 80 years⁽¹⁾. BPH is characterized as having group of obstructive and irritative symptoms. These complex symptoms can be collectively seen in a more preferred terminology that is "lower urinary tract symptoms (LUTS)"⁽²⁾

WHO has adopted International Prostatic Symptom Score (IPSS) as the most validated score for quantifying lower Urinary tract symptoms⁽³⁾ since such symptoms are diagnostic for benign prostatic hyperplasia. IPSS is a questionnaire, a subjective parameter that is of help in assessing Benign Prostatic Hyperplasia (BPH)⁽⁴⁾. There are two parameters for detecting BPH, one is subjective and other is objective. The objective parameter is prostate volume⁽⁵⁾.

The IPSS uses these seven questions for assessing the severity of LUTS plus an eighth question which is a disease specific which is quality of life (QoL) questionnaire^{(6),(7)}. These eight questions are used to quantify benign prostate hyperplasia.

International Prostatic Symptom Score:

"IPSS is based on the answers to 7 questions (Frequency, Urgency, Nocturia, Incomplete emptying, Intermittency, Weak stream and Straining)⁽⁸⁾. The answers are given marking as 0 to 5. The total score ranges from 0 to 35 (asymptomatic to symptomatic)⁽⁹⁾. The Symptom index is categorized as mild (≤ 7), moderate (8-19) and severe (≥ 20). For symptomatic score classification, IPSS divides the symptoms into obstructive and irritative symptoms as assessed by questionnaire⁽¹⁰⁾. Among these irritative or storage symptoms are frequency, urgency, nocturia. Voiding symptoms are incomplete emptying, intermittency, weak stream and straining. Benign Prostatic Hyperplasia has been used to explain a group of obstructive and storage symptoms^(11, 12)".

This study was conducted to identify that among IPSS, which of the following symptoms whether obstructive/ voiding and irritative/storage were more closely linked with BPH patients. The objective of this study is to find out the association of IPSS with Prostate volume.

Materials and Methods

This study spanned a period of a year and conducted in Ziauddin University Hospital, Karachi. Samples were collected through Urology clinic & Radiology

dept. Approval of study was obtained by research and Ethical committees. Target patients aged 40 years and above. Informed consent & Performa including past medical history and also IPSS questionnaire was filled by the participants, known case of BPH & patient diagnosed after ultrasonography (PV >25ml) were part of study. Patients with acute or chronic urinary retention status, Acute or chronic prostatitis within previous 3 months, Known case of prostatic carcinoma and on medications using 5-alpha reductase inhibitors and anti-androgens were excluded from the study. Inclusion criteria includes IPSS > 8, PV > 25ml and patients aged 40 years and above.

Statistical Analysis:

A cross-sectional study with convenience sampling was carried out. Statistical analysis was done on SPSS version 22. Quantitative variable was measured using ANOVA, Pearson correlation and Multinomial Regression. Qualitative variable was measured using Chi-Square. P value less than 0.05 was considered significant at 95% confidence interval.

Results

1. Descriptive and Clinical Presentation:

Mean average score of IPSS was found out to be 13.7, with hesitancy & nocturia being most prominent symptom in BPH patients.

Table 1: Descriptive Statistics of IPSS

	Mean score	Frequency of Clinical presentation (n)	Percent of Clinical presentation %
IPSS	13.7±5		
Incomplete emptying	1.8±1.5	97	94.2
Frequency	1.6±1.4	69	67
Intermittency	1.7±1.5	74	71.8
Urgency	2.1±1.5	61	59.2
Weak Stream	1.2±1.2	97	94
Straining/ hesitancy	2.4±1.2	98	95.2
Nocturia	2.6±1.3	98	95

Hesitancy was the most common complaint in BPH subjects as shown in table.

Out of 103 patients, 94% experienced sense of incomplete emptying, 71% experienced intermittency, 94% had weak stream, 95% had hesitancy and nocturia.

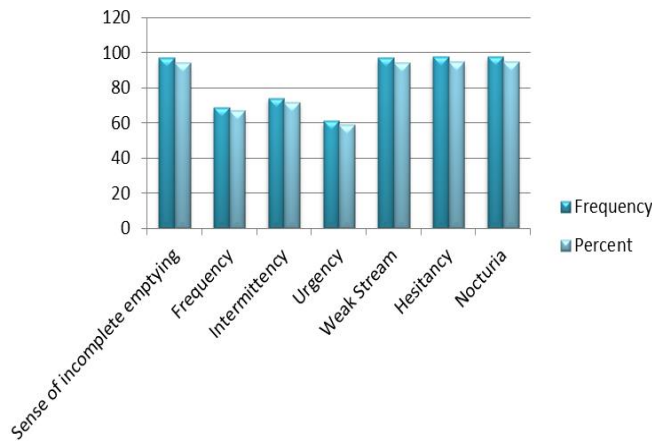


Figure 1: Distribution of BPH patients according to Clinical Presentation

This bar diagram depicted the frequency and percentage of clinical symptoms in BPH patient.

2. Correlation of IPSS with Prostate Volume

In our study there was significant correlation found between prostate volume and following symptoms of IPSS. Incomplete emptying ($r= .470, p= .036$), Hesitancy($r=.404,p=.043$), Nocturia($r=.277,p =.041$) but insignificant correlation was observed among prostate volume and rest of parameters of IPSS like Weak stream($r=.583,p=.109$), Intermittency ($r=.133,p=.220$), Increased frequency of micturition ($r=.357, p=.503$), Urgency($r=.22, p=.449$).

Table 2: Symptoms of IPSS and their significance levels

S.no	IPSS	R value	P-value
1.	Incomplete emptying	.470	0.036*
2.	Frequency	.357	0.503
3.	Intermittency	.133	0.220
4.	Urgency	0.22	0.449
5.	Weak Stream	.583	0.109
6.	Hesitancy	.404	0.043*
7.	Nocturia	.277	0.041*

Pearson correlation coefficient and significance levels. Above findings in our study indicated that increased prostate volume was associated with incomplete emptying, hesitancy and nocturia.

2a) Association of Incomplete Emptying with Prostate Volume:

There was a significant correlation found between prostate volume and incomplete emptying represented as a symptom of BPH patient.

Table 3: Incomplete emptying with prostate volume

Incomplete Emptying	N	Prostate volume Mean \pm SD	p-value
1.No symptom (0/5)	24	33.9 \pm 8	0.036*
2.Atleast 1 time (1/5)	26	38.4 \pm 10	
3.Less than half time(2/5)	22	44.2 \pm 15	
4.Half of the time(3/5)	16	53.2 \pm 19	
5.More than half(4/5)	3	43.2 \pm 16.7	
6.Always(5/5)	12	51.3 \pm 17.9	

p -value <0.05 * considered significant.

2b) Association of Straining With Prostate Volume:

There was a significant correlation of the straining with the prostate volume.

Table 4: Straining with prostate volume.

Straining	N	PV Mean	p-value
1.No symptom (0/5)	32	38 \pm 8	0.043*
2.Atleast 1 time (1/5)	34	38 \pm 14	
3.Less than half time(2/5)	21	46 \pm 15	
4.Half of the time(3/5)	9	54 \pm 22	
5.More than half(4/5)	4	57.9 \pm 6	
6.Always(5/5)	3	57 \pm 24	

$p < 0.05$ *considered significant.

2c) Association of Nocturia with Prostate Volume:

There was a significant correlation found between nocturia and prostate volume.

Table 5: Nocturia with Prostate Volume

Nocturia	N	PV Mean	p-value
1.No symptom (0/5)	3	42 \pm 10	0.041*
2.Atleast 1 time (1/5)	15	38 \pm 12	
3.Less than half time(2/5)	33	37 \pm 11	
4.Half of the time(3/5)	27	45 \pm 15	
5.More than half(4/5)	11	54 \pm 24	
6.Always(5/5)	13	44 \pm 13	

$p < 0.05$ * considered significant.

Correlation of Weak Stream ($R=.583, P=.109$) with Prostate Volume.

Discussion

In this study of average mean IPSS was found out to be 13.7 (Table 2) which is in concordance with the study conducted in 2017,in which mean IPSS was 13.5⁽¹³⁾.

Another, Saudi study found out that total mean IPSS in a 70 year old Saudis was 8⁽¹⁴⁾. Brazilian study stated that obstructive symptoms of IPSS scored 8 and

irritative symptoms scored 9. In this study obstructive symptoms had IPSS of 6 whereas irritative symptoms IPSS was 8⁽¹³⁾. Study conducted by Hebert Lepor stated that IPSS in Caucasian men was found to be 25.5 and that of Asian was 33 whereas obstructive symptom score was 2.7 and irritative symptom score was 4.2^(15, 16). HJ Park in his study found out that mean IPSS in BPH patients was 15⁽¹⁷⁾.

Out of one hundred and three subjects, a large number of patients had complaint of incomplete emptying which depicts post micturition symptoms. Patients who experienced intermittency, weak stream and straining were 71.8%, 94% and 95% respectively (voiding symptoms). Those experiencing frequency, urgency and nocturia were 67%, 59%, 95% respectively (storage symptoms) (Table 1). Some studies suggest that patients were bothered more about voiding symptoms than storage symptoms but further researches are needed to confirm this⁽¹⁸⁾. Study conducted by Oranusi explained in his study that among IPSS-LUTS nocturia (100%), frequency (98%) straining (92%) and weak stream (84%) were most frequently occurring symptoms in BPH patients whereas urgency (41%), incomplete voiding (39%) and intermittency (35%) were least occurring symptoms respectively⁽¹³⁾.

The common clinical presentation in our study was incomplete emptying, hesitancy and nocturia. These findings were similar to those of Taiwanese study⁽¹⁹⁾ in which incomplete emptying, hesitancy, urgency, weak stream and nocturia strongly correlated with prostate volume. Another study⁽²⁰⁾ observed that nocturia as the only most occurring, repeatable symptom in BPH. This is in concordance with our findings that nocturia significantly correlated with PV and the most commonly occurring symptom in our patients as well. One of the Korean study observed that most frequently occurring symptom in their BPH population was nocturia and weak stream whereas urgency was the least occurring symptom, these results were similar to our findings⁽¹⁹⁾. Similarly, Unsal in his study found out that symptoms of nocturia and incomplete emptying rises as person gets older⁽²¹⁾. Among bothersome LUTS, nocturia is an obstructive symptom that greatly affects patient's quality of life resulting in disturbed sleep.

This study correlated strongly with straining or hesitancy with highly significant p value. Research conducted by Aslan was in concordance with our study which stated that straining associated with LUTS, Prostate Volume and Erectile Dysfunction as well⁽²²⁾. Another study also found out that straining as

one of prominent symptom in IPSS in Nigerian community⁽²³⁾. These symptoms are present in the course of disease, nevertheless contributing to Benign Prostatic Hyperplasia, an age associated disease.

In this study Incomplete emptying also correlated positively with prostate volume. Study conducted in 2018 concluded that BPH patients had high score for incomplete emptying which subsequently improved after medications⁽²⁴⁾. Another study established by Irwin validated the importance of irritative symptoms over obstructive symptoms as Irritative symptoms have large impact on quality of life and irritative symptoms points more towards bladder outlet obstruction symptoms whereas obstructive symptoms relate more towards bladder pathologies⁽²⁵⁾.

BPH is an age related disease, 70% of the patients by age of 65 years have enlarged prostate gland measuring Prostate volume more than 40 ml⁽²⁶⁾. According to Baltimore Longitudinal Study, patients had some degree of LUTS and Clinical BPH by the age of 60 years⁽²⁷⁾. Our study is in concordance with above study that shows that LUTS as assessed by IPSS strongly correlates with prostate volume.

Conclusion

This study has shown significant association between IPSS and Prostate volume. Among IPSS parameters obstructive and storage symptoms both strongly correlated with increased prostate volume. Incomplete emptying, straining and nocturia were most repeatable symptoms as assessed among benign prostatic hyperplasia patients in our subset of tertiary care hospital.

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