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Study to Establish a Relationship in Patients of Lower Urinary Tract Symptoms by Correlating International Prostate Symptom Score with Sonography (Prostate Volume)

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ABSTRACT
Benign prostate hyperplasia (BPH) is a common condition in aging men. To estimate the prostate size ultrasonography is the basic non-invasive investigation that can be done before deciding the plan of management. Present study was aimed to establish a relationship in patients of Lower Urinary Tract Symptoms by correlating International Prostate symptom score with sonography (Prostate volume). Present study was single-center, prospective, observational study, conducted in male patients with age more than 40 years, having Lower urinary tract symptomsm. A clinical questionnaire including detailed History, examination, IPSS score was made. The Maximum number of patients were from the sixth and seventh decade of life, almost 50%. 46.7% individuals had grade I prostatomegaly. 12.5% had grade III prostatomegaly and the remaining 40.8% had grade II prostatomegaly. 69 patients (57.5%) had a prostate size of less than 50 grams, followed by 39 patients (32.5%) who had prostate sizes ranging from 50-70 grams. The remaining 12 patients (10%) had a prostate size of >70 grams. In our study maximum, i.e. 60 % (72 patients) were having moderate symptoms. Followed by 37 patients (30.8%) were having severe symptoms while remaining 11 patients were having mild symptoms. There is a significant correlation between age and IPSS score. There is a moderate but statistically significant correlation between prostate sizes when compared to the IPSS score. There is a significantly higher correlation between post-void residue and IPSS score. There is no correlation between pre-void residue and IPSS score.

INTRODUCTION

Benign prostate hyperplasia (BPH) is a common condition in aging men[1]. According to Sommer *et al.,* BPH may be related to the rise in the prevalence and intensity of voiding symptoms in males in the fifth and sixth decades, including obstructive and irritative symptoms[2]. Obstructive BPH symptoms include weak urine stream force, hesitation, intermittent, terminal dribbling and incomplete bladder emptying, as well as irritative symptoms as such frequency, nocturia and urgency. Quality of life could be impacted by these symptoms[3,4,5].

The American Urological Association created the international prostate symptom score (IPSS) rating system[6]. This scoring system, which ranges from 0-35, takes into account seven questions about voiding and filling symptoms and accounts for mild, moderate and severe lower urinary symptoms. The IPSS has been frequently used in clinics to assess the intensity of lower urinary tract symptoms (LUTS) in BPH patients[7,8]. It is a practical and efficient method.

To estimate the prostate size ultrasonography is the basic non-invasive investigation that can be done before deciding the plan of management. Patients with lower urinary tract symptoms can be evaluated based on sonography findings like prostate size, pre and post-void residue. Present study was aimed to establish a relationship in patients of Lower Urinary Tract Symptoms by correlating International Prostate symptom score with sonography (Prostate volume).

MATERIALS AND METHODS

Present study was single-center, prospective, observational study, conducted in department of surgery, at B K L Walawalkar Rural Medical College and Hospital, Sawarde, Taluka- Chiplun, District-Ratnagiri, Maharashtra, India. Study period was from December 2020-July 2022. Study approval was obtained from institutional ethical committee.

Inclusion Criteria:

Male patients with age >40 years, having Lower urinary tract symptoms, willing to participate in present study

Exclusion Criteria:

- Previously operated cases of prostatic surgery.
- Diagnosed case of carcinoma prostate.

Study was explained to patients in local language and written consent was taken for participation and study. A clinical questionnaire including detailed History, examination, IPSS score was made. Participants were subjected to undergo ultrasound abdomen and pelvis., prostate size, pre-void, post-void residue was noted. Similarly, serum PSA level was done in each and every participant and the values were recorded accordingly. All the collected data were entered into a spreadsheet on Microsoft office excel sheet, data validation checks were performed at regular intervals and later were transferred the o Statistical package for social sciences version 21.0 (SPSS, Inc., Chicago, IL, USA) for window. The quantitative variables are described in terms of mean, median, range and standard deviation., while qualitative variables are described in the form of proportion. A significant p-value was taken as $p<0.05$.

RESULTS AND DISCUSSIONS

The Maximum number of patients were from the sixth and seventh decade of life, almost 50%. Patients in the Third and fourth decade contributed to around 18.3% which were the lowest. 31.7% of patients were above 70 years of age. DRE was performed on all patients in this study. Out of which 46.7% individuals had grade I prostatomegaly. 12.5% had grade III prostatomegaly and the remaining 40.8% had grade II prostatomegaly. In our study prostate size ranged from 26-92 grams. 69 patients (57.5%) had a prostate size of <50 grams, followed by 39 patients (32.5%) who had prostate sizes ranging from 50-70 grams. The remaining 12 patients (10%) had a prostate size of more than 70 grams.

IPSS score is divided into mild, moderate and severe. Mild 0-7, Moderate-8 to 19 and Severe- >20. In our study maximum, i.e. 60 % (72 patients) were having moderate symptoms. Followed by 37 patients (30.8%) were having severe symptoms while remaining 11 patients were having mild symptoms.

In our study group, 43 subjects (35.8) gave score of 2, followed by 29 subjects (24.2) gave score of 3. There were no Subjects who were unhappy with a score 5 in our study. 13 (10.8%) subjects were mostly dissatisfied with the symptoms.

For age <51 years, the mean IPSS score was 14.9. The mean IPSS score was highest (18.29) in subjects above 70 years of age. For age group 51-70 years the mean IPSS score was 15.15. When age was correlated with IPSS score statistically significant result was obtained in our study.

Those with mild symptoms had average age of 54 years with serum PSA of 2.58 ng/ml, prostate volume on ultrasonography was 38 grams, pre-void residue 310 cc, and post-void residue 73 cc. Those with moderate symptoms had average age 62 years with serum PSA 2.81 ng/ml, prostate volume on ultrasonography 45 grams, pre-void residue 301 cc and post-void residue 125.3 cc. Those with severe symptoms had average age of 70 years with serum PSA 3.40 ng/ml, prostate volume 42 grams on ultrasonography, pre-void residue 305 cc and post-void residue 169.0 cc.

Also in our study, it was found that there was no significant change in pre-void residue as the IPSS score increased. But there was a significant difference when

Table 1: IPSS Score : International-Prostate Symptom Score (I-PSS)9

	0 -Not at all, 1-Less than 1 time, 2-Less than half the time, 3= About half the time, 4- More than half the time, 5- Almost always
1. Over the past 4 weeks, how often have you had a sensation of not emptying your bladder after you Finished urinating?	
2. Over the past 4 weeks, how often have you had to urinate again less than two hours after you finished urinating?	
3. Over the past 4 weeks, how often have you found you stopped and started again several times when you urinated?	
4. Over the past 4 weeks, how often have you found it difficult to postpone urination?	
5 Over the past 4 weeks, how often has your urinary stream been weaker than usual?	
6 Over the past 4 weeks, how often have you had to push or strain to begin urination?	
	0-None, 1-1 time, 2-2 times, 3-3 times, 4-4 times, 5-5 or more times
7. Over the past 4 weeks, how many times, in general, did you get up to urinate from the time you went to bed at night until the time you got up in the morning?	
Quality of Life Due to Urinary Symptoms	0 -Delighted, 1-Pleased, 2-Mostly satisfied, 3 - Mixed-neither satisfied nor dissatisfied, 4-Mostly dissatisfied, 5-Unhappy, 6-Terrible
1. If you were to spend the rest of your life with your Urinary condition just the way it is now, how would you feel about that?	
IPSS Score	**Correlation**
0-7	Mildly symptomatic
8-19	Moderately symptomatic
20-35	Severely symptomatic

Table 2: General Characteristics

	No. of patients	Percentage
Age groups (in years)		
<51 years	22	18.3
51-70 years	60	50.0
>70 years	38	31.7
Prostatomegaly on DRE		
1	56	46.7
2	49	40.8
3	15	12.5

Table 3: Distribution of Prostate Size on the Basis of Ultrasonography

Prostate Size(gms)	Frequency	Percentage
<50	69	
50-70	39	
>70	12	

Table 4: Distribution on the Basis of IPSS Score

IPSS score groups	n	Percentage
Mild (0-7)	11	9.2
Moderate (8-19)	72	60
Severe (> 20)	37	30.8

Table 5: Distribution on Basis of Quality of Life

Quality of life	n	Percentage
0-delighted	11	9.2
1-Pleased	24	20
2-Mostly satisfied	43	35.8
3-Mixed about equally satisfied and dissatisfied	29	24.2
4-Mostly dissatisfied	13	10.8
5-Unhappy	0	0

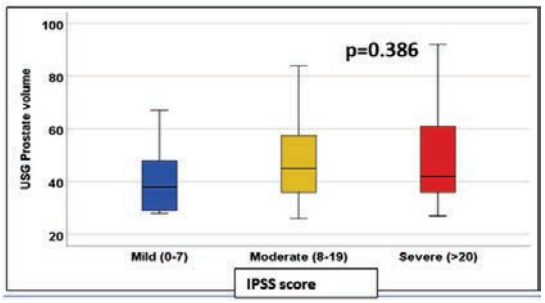
Table 6: Correlation of IPSS Score with Age

Age group	Mean (SD)
<51 years	14.9 (6.2)
51-70 years	15.1 (6.4)
>70 years	18.2 (5.7)

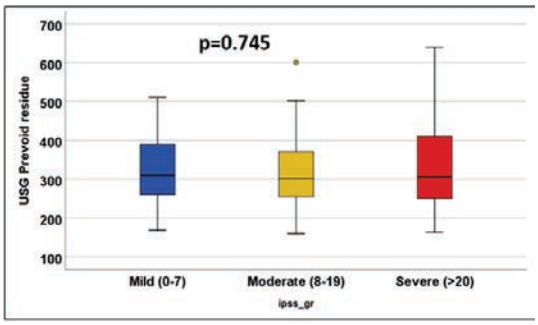
Table 7: Correlation of Medians with IPSS Score

Parameter		Mild (0-7) n=11	Moderate (8-19) n=72	Severe (>20) n=37	P-value
Age (years)		54 (48-61)	62 (52-71)	70 (59 – 77)	0.013*
USG	prostate volume	38.0 (29.0-50.0)	45.0 (36.0 – 58.2)	42.0 (36.0-62.5)	0.386
USG	pre-void residue	310.0 (230.0-402.0)	301(252.7-371.0)	305 (250.0-413.0)	0.745
USG post-void residue		73.0 (52.0-106.0)	125.3 (83.2-169.7)	169.0 (154.5-240.0)	0.000*

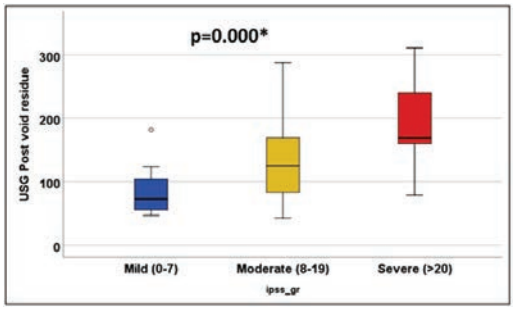
compared with post-void residue. The p-value was statistically significant when compared with age



Graph 1: Correlation Between IPSS Score and Prostate Volume



Graph 2: Correlation of IPSS Score with Pre-Void and Post-Void Residue



Graph 3: Correlation of IPSS Score with Post-Void Residue

(0.013), sr PSA (0.204), USG prostate size (0.386) and post-void residue (0.000). It was not significant when compared with pre-void residue (0.745)

As age advances prostatic diseases are common in men causing significant morbidity. Since these symptoms can occur in a variety of urologic disorders, it is crucial to accurately identify lower urinary tract symptoms (LUTS). As a result, several symptom indices have been demonstrated to be trustworthy and valid for the assessment of LUTS. The International Prostate Symptom Score, often known as the American Urological Association (AUA) Symptom Score, is the best LUTS symptom scale

In the population-based study conducted in Olmsted County, males with baseline prostate volumes of 30 mL or less experienced median prostate growth of 1.7% per year, while men with prostate volumes more than 30 mL experienced median prostate growth of 2.2% per year. Population-based research has proven progressive prostate growth. The average annual prostate growth rate has been calculated to be 1.9%. Men's symptoms deteriorate with age and blockage and prostate volume rise[9].

The age group in this study was 41-92 years with the mean age of 63.4 years. The sixth and seventh decades constituted a maximum number of patients, it accounted 50%. Followed by 31.7 % above the age of 70 years. Comparable to this study is a sizable study by Andersson[10] that included 39,928 patients between the ages of 45 and 79, with a mean age of 63.7 years. Our study's age distribution was similar to that of an Indian study by Ganpule[11] that examined the natural history of lower urinary tract symptoms in 2406 individuals who were older than 40 years old. Increased frequency of micturition was the commonest clinical presentation (35.1%), followed by Nocturia (28%). Only 2 patients presented with acute urinary retention.

Increased frequency of micturition is the most frequent mode of presentation in patients under the age of 70, whereas nocturia is the most frequent mode in patients beyond the age of 70, according to Andersson[10] study with a larger number of patients. In individuals with a history of lower urinary tract symptoms, nocturia is the most prevalent clinical symptom, according to an Indian study by Ganpule[11] 60% of patients had moderate symptoms i.e. 72 patients. Severe symptoms in 30.8% (37 patients), while 9.2% had mild symptoms. According to a study by Tay[12] on 799 patients, 67.6% had an IPSS of greater than 8. 90.9% of the patients in our study, however, had an IPSS of higher than 8. The tendency of delaying medical care and late presentations may be the reason why there were more patients in our study with severe symptom scores. In a study by Overland[13] it was shown that 23.6% of patients had moderate symptoms whereas 5% of patients had severe symptoms. Compared to this study, the IPSS severity is significantly higher in our study.

In our study on DRE, 46.7% of patients had grade I prostatomegaly, 40.8% had grade II and the remaining 12.5% had grade III prostatomegaly. On ultrasonography, the prostate size ranged from 26-92 grams. 57.5% of patients were having a prostate size of <50 grams, 32.5% were having a prostate size between 50-70 grams while the remaining 10% were having size of >70 grams.

The relation between prostate volume and the IPSS score was significant in our study (p value 0.386). With the increase in prostate size, the severity of symptoms also increased. Urgency, incomplete emptying and increased frequency were the most common symptoms associated with prostate enlargement. There is significant correlation between serum PSA and IPSS score (p value 0.204). There is significant correlation between prostate size and IPSS score (p value 0.386). There is no correlation between pre-void residue and IPSS score (p value 0.745). There is significantly higher correlation between post-void residue and IPSS score (p value 0.000). Similar findings were noted by Overland[13] and Scirra[14,15].

CONCLUSION

There is a significant correlation between age and IPSS score. There is a moderate but statistically significant correlation between prostate sizes when compared to the IPSS score. There is a significantly higher correlation between post-void residue and IPSS score. There is no correlation between pre-void residue and IPSS score.

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