ABSTRACT

Lower urinary tract symptoms (LUTS) are mostly due to benign prostate hyperplasia (BPH) in the elderly men. The severity of LUTS associated with BPH is measured with the international prostate symptom score (IPSS). Objective indicators of the disease severity in BPH are prostate volume, post void residual urine volume (PVRU), uroflowmetry values etc. However the correlation between the severity of subjective symptoms and objective parameters remains unclear. We designed this study to see if there actually is a correlation between the subjective symptoms and the objective parameters in evaluation of LUTS. Elderly male patients presenting with LUTS in the Urology OPD over a period of 10 months are enrolled in this study. These patients are asked to fill the IPSS with assistance if necessary from medical person. Prostate volume and PVRU are measured with trans-abdominal ultrasonography. Uroflowmetry evaluations are done to record maximum flow rate (Qmax) and average flow rate (Qave). Correlation of IPSS with age, prostate volume, PVRU and uroflowmetry parameters is evaluated using correlation regression analysis. Our results revealed significant positive correlation of IPSS with prostate volume and PVRU. Similarly there is significant negative correlation of IPSS with Qmax and Qave. Hence this study concluded that there is significant correlation between symptom severity and objective parameters in elderly patients with LUTS.

KEYWORDS

Correlation, LUTS, objective parameters

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INTRODUCTION

Lower urinary tract symptoms (LUTS) include storage and/or voiding disturbances and are mostly due to benign prostate hyperplasia (BPH) in elderly men. Management of BPH needs both subjective assessment of symptoms and objective documentation of measurable parameters. The severity of LUTS associated with BPH can be measured using a validated questionnaires such as the international prostate symptom score (IPSS). The IPSS is recommended as the symptom scoring instrument to be used for the baseline assessment of symptom severity in men presenting with LUTS.\(^1,2\) However the IPSS can not be used to establish the diagnosis of BPH. A variety of lower urinary tract disorders like infection, neoplasm, neurogenic bladder disease may have a high IPSS.

Objective indicators of the disease severity in BPH are prostate volume, post void residual urine volume (PVRU) and uroflowmetry values including maximum flow rate (Qmax) and average flow rate (Qave). However, the correlation between the severity of subjective symptoms and value of objective parameters remains unclear. Hence we planned this study to analyze the correlation between IPSS and objective parameters in elderly men with LUTS.

MATERIALS AND METHODS

This is a prospective observational study done at Nepal Medical College Teaching Hospital, a tertiary care center in Kathmandu, Nepal. Ethical approval from Institutional Review Committee (approval number 001-074/075) was taken prior to starting the study. Minimum sample size for this study is calculated to be 95, taking the reference from previous study by Basri et al\(^3\) with correlation coefficient of -0.446 between IPSS and maximum flow rate using the sample size formula:

\[ n = \frac{Z^2(1-r^2)}{d^2} + 2 \]

Patients were divided into three groups according to IPSS score: group I with IPSS 0-7, group II with IPSS 8-19 and group III with IPSS 20-35. Age, prostate volume, PVRU, Qmax and Qave were compared according to IPSS groups. The correlation between IPSS groups and these objective parameters was evaluated. Statistical analysis was done using SPSS version 16 and p value <0.05 is considered as statistically significant.

RESULTS

Mean age of the patients was 64.09±10.92 years. Mean total IPSS was 16.01±8.25. According to IPSS scoring, among 95 patients, 22 had mild symptoms, 42 had moderate symptoms and 31 had severe symptoms. The mean prostate volume, PVRU, Qmax and Qave in patients with mild, moderate and severe symptoms were shown in Table 1.

| Table 1: Distribution of age and objective parameters according to IPSS groups |
|-----------------------------------------------|-----------------|-----------------|
| Group I (n=22)*                             | Group II (n=42)* | Group III (n=31)* |
| Age                                         | 61.5±11.2       | 62.7±9.7        | 67.7±11.6       |
| Prostate volume (ml)                        | 38.0±7.9        | 46.3±10.1       | 55.0±16.6       |
| PVRU (ml)                                   | 19.9±16.0       | 51.1±64.2       | 101.1±104.8     |
| Qmax (ml/sec)                               | 20.8±4.8        | 17.1±4.3        | 10.0±2.9        |
| Qave (ml/sec)                               | 10.2±3.2        | 8.1±2.3         | 5.1±1.9         |
| QoL                                         | 2.0±0.6         | 2.7±0.7         | 3.6±0.7         |

PVRU: Post void residual urine, Qmax: Maximum flow rate, Qave: Average flow rate, QoL: Quality of life

*mean ± SD
The correlations of IPSS with these individual objective parameters along with Pearson’s correlation coefficient are shown in Table 2. The correlation between IPSS and age is statistically not significant (p>0.05) with correlation coefficient of 0.203. Prostate volume and PVRU have significant positive correlation with IPSS, with correlation coefficient of 0.414 and 0.448 respectively. Similarly Qmax and Qave have significant negative correlation with IPSS, with correlation coefficient of -0.696 and -0.648 respectively. Among the evaluated parameters, Qmax has the strongest correlation with IPSS. Fig. 1 shows distribution of prostate volume among the IPSS categories and Fig. 2 shows distribution of Qmax in IPSS categories.

### Table 2: Correlation between IPSS and objective parameters

<table>
<thead>
<tr>
<th></th>
<th>Correlation coefficient, r</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPSS-Age</td>
<td>0.203</td>
<td>0.083</td>
</tr>
<tr>
<td>IPSS-prostate volume</td>
<td>0.414</td>
<td>0.01</td>
</tr>
<tr>
<td>IPSS-PVRU</td>
<td>0.448</td>
<td>0.01</td>
</tr>
<tr>
<td>IPSS-Qmax</td>
<td>-0.696</td>
<td>0.001</td>
</tr>
<tr>
<td>IPSS-Qave</td>
<td>-0.648</td>
<td>0.001</td>
</tr>
<tr>
<td>IPSS-QoL</td>
<td>0.701</td>
<td>0.000</td>
</tr>
</tbody>
</table>

IPSS: International prostate symptom score, PVRU: Post void residual urine, Qmax: Maximum flow rate, Qave: Average flow rate, QoL: Quality of life

### DISCUSSION

Lower urinary tract symptoms in elderly men due to BPH is evaluated using symptom scoring tools, the most common being IPSS which include weak stream, hesitancy, intermittency, incomplete voiding, urgency, frequency and nocturia. Higher the IPSS score, severe is the symptoms of the patient.

Several studies have shown that there are correlations between urinary symptoms and age, prostate volume, maximum flow rate, or residual urinary volume. However other studies have failed to show that these objective parameters can predict the severity of symptoms in BPH patients.

The present study is designed to determine the relationship of IPSS with objective parameters used in the evaluation of BPH. Age of the patient did not have statistically significant correlation in this study with correlation coefficient r=0.203. This is in contrast to studies by Barsi et al and Itoh et al where they have shown a significant correlation of IPSS with age of the patients.

Mean prostate size in our study is 47.2±13.6gm. This is much higher than the mean prostate size of 40.1cm³ measured by Vasely et al and 41cm³ measured by Dicuio et al. The larger size of the gland in our study may be due to late presentation of the patients in our setup. Patients tend to ignore minor symptoms and present to health service only when symptoms become severe.

We found significant correlation between IPSS and prostate volume as well as between IPSS and PVRU with coefficient of correlation r=0.414 and r=0.448, respectively. In a study of 100 patients from eastern part of Nepal, IPSS was found to have
a moderate positive correlation with prostate size, with correlation coefficient of 0.533. Similarly, statistically significant correlation has been found between symptom severity and PVRU in different studies. However, Barry et al. reported no correlation between symptom severity and prostate size or PVRU and El Din et al. found only a weak correlation among these parameters.

Although the gold standard for the diagnosis of bladder outlet obstruction is urodynamic studies, uroflowmetry is a simple, accurate and noninvasive method of assessing the dynamics of micturition. Maximum flow rate is the most important parameter in uroflowmetry study which is representative for severity of the degree of prostatic obstruction in BPH. Studies have shown statistically significant correlation of IPSS with Qmax and Qave.

In conclusion, data obtained in the present study suggest that there is significant correlation between the subjective symptom severity and values of objective parameters in the evaluation of elderly male patients with LUTS due to BPH. Among the evaluated objective parameters, strongest correlation of IPSS was found with the Qmax, with correlation coefficient $r=-0.696$.

**REFERENCES**


