

Correlation Between Resected Volume of Prostate and Improvement in International Prostate Symptom Score

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ABSTRACT

Introduction: Benign prostatic hyperplasia (BPH) is a common disease in ageing men and prostate resection is common surgical procedure for it. The symptoms of the enlarge prostate can be assessed by using International Prostate Symptoms Score (IPSS). Some studies show that the resected volume of prostate correlates with the prostate symptoms while some show no correlation between symptoms and volume resected.

Objective: To find the correlation between resected volume of prostate and IPSS after resection.

Study Design: Cross-Sectional Study.

Study Setting: Department of Urology, Institute of Kidney Diseases, Peshawar, Pakistan.

Study Duration: 01-10-2020 to 30-03-2022.

Material and Methods: Pre-operatively, weight and height were measured by digital weight machine and inches tap. Patients symptoms assessed with IPSS for mild, moderate and severe symptoms. Prostate tissue resected during surgery was put in a 60cc syringe and sent to pathologist for exact volume. Post-operatively, patients were followed after one month for symptoms. The difference between pre and post-operative IPSS was calculated.

Results: Mean age, prostate volume and change in IPSS were 57.89±14.18 years, 41.05±6.28 ml and 14.84±3.20. There were 34.1% patients each in 30-49 and 50-59 years age groups and 31.8% in 70-80 years group. Pre-operatively, 68.2% patients presented with severe symptoms, 22.7% with moderate symptoms and 9.1% with mild symptoms. Post-operatively, severe symptoms were reduced to 11.4% while moderate symptoms were seen in 52.3% patients. Mean prostate resected was 41.05 grams. Correlation of change in IPSS and prostate volume was 0.280.

Conclusion: There was positive correlation between change in prostate volume and IPSS but it was very weak. In other words, the strength of association between these two is very low i.e. $r = 0.280$ or 7.8% (0.280^2) and not statistically significant i.e. $P = 0.065$.

Keywords: Benign prostatic hyperplasia, enlarge prostate, BPH, IPSS, TURP.

INTRODUCTION

Benign prostatic hyperplasia is a multifactorial disorder resulting in progressive histopathological changes in the stromal and epithelial cells of the prostatic transitional zone. This results in bladder outlet obstruction, followed by increased muscle tone and secondary dysfunction of the detrusor, causing lower urinary tract symptoms (LUTS) ¹. It's a chronic disease which occurs over a wide range of the age; present in about 8% of men in the 4th decade, increases with age to 90% above 80 years of age ². The prostate size increases with age at the rate of about 1.6% as suggested by Olmstead county study in the longitudinal data ³.

The International Prostate Symptom Score (IPSS) is a validated tool for assessing lower urinary tract symptoms ⁴. It has become an important tool for clinician in the evaluation and follow up of BPH patients. But many patients with low education level are unable to answer IPSS questionnaire ⁵. A number of investigations may help in the assessment and treatment of BPH. They are not all necessary in all patients and the clinician must weigh the benefits against the increased cost. When advising an investigation it should have a question need to be answered and how it will change the management.

Treatment options include watchful waiting, pharmacotherapy and surgical intervention ⁶. Trans-urethral resection of the prostate is considered the gold standard modality of treatment for medium sized prostate. Several studies suggest that one of the parameter to predict outcome of TURP is amount of tissue resected; while others found resected tissue to be not significantly correlated with symptoms improvement ⁷. The aim of the study is to determine the correlation between resected volume of prostate and change in IPSS after TURP.

MATERIAL AND METHODS

Study Setting: Department of Urology, Institute of Kidney Diseases, Hayatabad Medical Complex, Peshawar, Pakistan.

Duration of Study: The duration of this study was 18 months starting from 01-10-2020 to 30-03-2022.

Sample Size: Total sample size was 44 patients undergoing TURP.

Taking the correlation coefficient (r) for change in prostate volume and IPSS score $r = 0.417$ with two tailed α value of 0.05 (5%) and power of study 80% ($\beta=0.20$) by using the formula

$$n = [(Z_{\alpha} + Z_{\beta})/C]^2 + 3.$$

Sampling Technique: Non-probability Consecutive sampling technique was used to conduct this study.

Sample Selection: Inclusion Criteria:

- 1 All those patients who were on list for TURP for enlarge prostate
- 2 Age 30 to 80 years.
- 3 Males only.
- 4 Willing for consent and follow-up.

Exclusion Criteria:

- 1 All patient who have known prostate carcinoma as proven by histopathology.
- 2 All those with other causes of urinary tract obstruction like post urethral strictures, bladder carcinoma etc.
- 3 All those who have previous history of any type of prostate surgery.

Study Design: Cross-Sectional study.

Data Collection Procedure: After approval from research ethical committee of Hayatabad Medical complex, Peshawar the study was started. Patients admitted in Urology Department of Institute of Kidney Disease, Hayatabad Medical Complex, Peshawar; for TURP were included as per inclusion and exclusion criteria. Informed consent was taken and all the pros and cons of the study were explained to the all participants. Confidentiality of the study was maintained. Weight were measure by digital weight machine pre-operative when patient was wearing light clothes with no added clothes like sweaters and was bare feet, and height was measured by inches tap from top of the head to heel of the patient.

Patient's symptoms were evaluated according to IPSS and were rated accordingly. The prostate tissue resected during surgery was put in a 60cc syringe to roughly estimate the volume and then pathologist was asked to tell the exact volume of resected prostatic tissue. After the surgery, patients were followed up after one month. Histopathology reports were followed. Again, after one month the IPSS score was calculated. This difference between pre and post-operative IPSS was noted.

Data Analysis: Data analysis was done with the help of computer software named SPSS Version 22. Mean and standard deviation was calculated for continuous variables like age, weight, height, BMI, duration of IPSS symptoms, pre-operative IPSS, prostate volume resected, post-operative IPSS and the change in IPSS. Frequency and percentage was used to calculate the categorical variables like mild, moderate and severe symptoms pre-operatively and post-operatively. Pearson's correlation test was applied to determine correlation between the change in the IPSS and prostate volume. Paired sample t test was used for the degree of difference between means of pre-operative IPSS and post-operative IPSS. A P value of ≤ 0.05 was considered significant.

RESULTS

Mean age of patients was 57.89 ± 14.18 years (minimum 32, maximum 80), mean weight was 66.98 ± 5.90 kg, height was 1.65 ± 0.07 meters, BMI was 24.78 ± 3.02 kg/m², duration of IPSS symptoms was 3.36 ± 1.69 months, pre-operative IPSS was 22.27 ± 7.31 , prostate volume resected was 41.05 ± 6.28 ml, post-operative IPSS was 9.39 ± 5.48 and change in IPSS was 14.84 ± 3.20 .

Total population was distributed in three age groups, in which, there were equal patients in 30-49 years age group and 50-59 years age group i.e 34.1% each, while in 70-80 years age group there were 31.8% patients of the total.

Pre-Operative IPSS was stratified with age. In age group 30-49 years, 4.5% patients were having 0-7 (mild) score, 6.8% patients were having 8-19 (moderate) score while most patients i.e. 22.7% patients were having 20-35 (severe) score. In age group 50-69 years, 2.3% patients were having 0-7 (mild) score, 11.4% patients were having 8-19 (moderate) score while most patients i.e. 20.5% patients were having 20-35 (severe) score. Similarly, In age group 70-80 years, 2.3% patients were having 0-7 (mild) score, 4.5% patients were having 8-19 (moderate) score while most patients i.e. 25% patients were having 20-35 (severe) score.

Post-Operative IPSS was stratified with age, wherein progress was seen in all age groups with respect to severe to moderate to mild symptoms. In age group 30-49 years, most patients i.e. 18.2% patients were having 0-7 (mild) score, 9.1% patients were having 8-19 (moderate) score while only 6.8% patients were having 20-35 (severe) score. In age group 50-69 years, 15.9% patients were having 0-7 (mild) score, 18.2% patients were having 8-19 (moderate) score while no patients was observed with 20-35 (severe) score. Similarly, In age group 70-80 years, 2.3% patients were having 0-7 (mild) score, 25% patients were having 8-19 (moderate) score while only 4.5% patients were having 20-35 (severe) score

Prostate Volume Resected was stratified with age. In age group 30-49 years, 30-39 ml prostate volume was resected in 15.9% patients, 40-49 ml prostate volume was resected in other 15.9% patients, while 50-59 ml prostate volume was resected in only 2.3% patients. In age group 50-59 years, 30-39 ml prostate volume was resected in 20.5% patients, 40-49 ml prostate volume was resected in 9.1% patients, while 50-59 ml prostate volume was resected in 4.5% patients. In age group 70-80 years, 30-39 ml prostate volume was resected in 11.4% patients, 40-49 ml prostate volume was resected in 15.9% patients, while 50-59 ml prostate volume was resected in 4.5% patients.

Frequency of pre and post-operative IPSS is shown in figure 1 and 2.

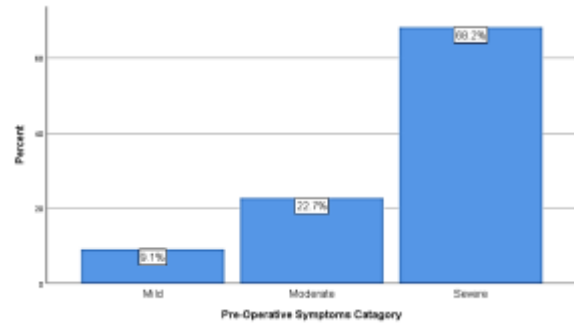


Figure 1: Frequency of prostate symptoms (pre-operatively)

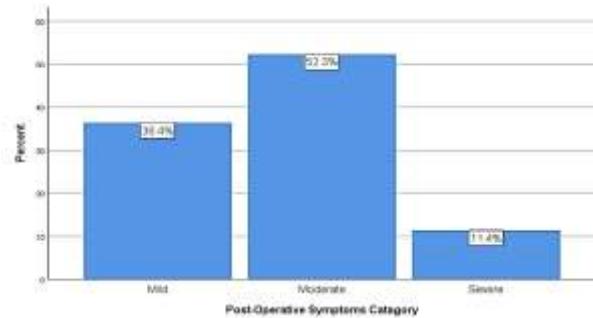


Figure 2: Frequency of prostate symptoms (post-operatively)

Pearson's Correlation Test was applied to determine the correlation between change in IPSS and prostate volume resected. The correlation coefficient found was 0.280 while it was not statistically significant i.e. P value was 0.065 which is greater than 0.05 significant values (Figure 3).

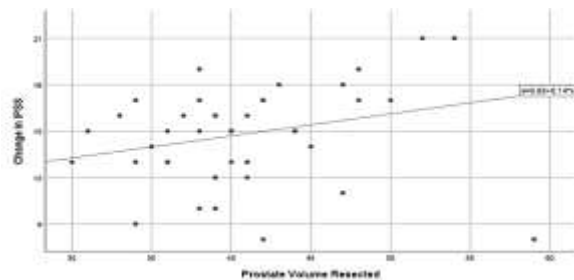


Figure 3: Pearson's correlation between prostate volumes resected and changes in IPSS

Table 1: Degree of difference between means of pre-operative IPSS and post-operative IPSS

Variables	Mean	Standard Deviation	T Value	P Value
Pre-Operative IPSS	22.27	± 7.31	14.558	0.000
Post-Operative IPSS	9.39	± 5.48		
Paired Samples t Test	12.89	± 5.87		

$r = 0.280$
 $P \text{ Value} = 0.065$

Paired sample t test was applied to determine the degree of difference between means of pre-operative and post-operative IPSS. The Mean \pm Standard Deviation after applying t test was 12.87 ± 5.87 with t value 14.558 which was statistically significant i.e. P Value equal to 0.000 (Table - 1).

DISCUSSION

Benign prostatic hyperplasia (BPH) is a major cause of the increased morbidity in ageing men; resulting in lower urinary tract symptoms (LUTS) that impair quality of life. The natural history of

BPH is that of a progressive disease, characterized by a deterioration of LUTS over time⁸. Symptoms severity is an important parameter than volume of the prostate in the management of BPH⁹. Most of the guidelines including American urology association and European urology association practice guideline recommend the use of international prostate symptom score (IPSS) to evaluate severity of BPH and as assessment tool in the follow up¹⁰.

BPH is generally considered the disease of old age, but the age of presentation is variable. Some patients may present as early as in the fourth decade. In the current study, the mean age of patients was 57.89 ± 14.18 years. This was higher in the work of others; like in the study of Basawaraj NG et al. the mean age was 65.06 years¹¹ and in that of Singla S et al. mean age was 67.7 years¹². The bother caused by LUTS may be caused by different symptoms in different patients. Nocturia was a commonest bothersome symptom found in 70% of patients in a study by Mostafa et al¹³. Basawaraj NG et al. also reported nocturia as commonest bothersome symptom found in 93.6 % patients and it was main reason for the patients to seek medical help¹¹.

In contrast to the open prostatectomy, the trans urethral resection of the prostate removes tissue up to the extent where enough channel is made for urine passage. How much resection is needed; and the impact of resected tissue on the improvement is controversial. There are contrasting results in the published literature on this issue. We found positive but weak correlation between change in IPSS with change in the prostate volume i.e. $r = 0.280$, $P = 0.065$; which is statistically not significant. The study of Turgut O et al¹⁴ and Tsukamoto et al¹⁵ showed that a change in IPSS was associated with a change in prostate volume. Whereas Antunes AA et al¹⁶, Aagaard J et al¹⁷, and Agrawal MS et al¹⁸ showed no relationship between change in prostate size and IPSS score. The difference of results in the literature may be confounded by age, body habitus, duration of symptoms, bladder status, neurogenic element, perception of change in IPSS and the pathophysiology of LUTS. To agree upon; high quality work up is necessary to establish the percent of resection needed for reasonable improvement in the patient symptoms.

The prostate volume increases with age, but the direct correlation of age with IPSS is variable. Ultrasonography of prostate is routinely performed in the evaluation to assess prostate morphology, size, echo-pattern and median lobe enlargement. In addition the trans abdominal ultrasonography helps in the assessment of urinary bladder, kidneys and ureters as well as prevoid and postvoid residual urine volume can also be measured. The final decision to proceed is based on the patient clinical symptoms, prostate volume and ultrasonography findings. In the current study, no correlation between age and IPSS was calculated. It is similar to the study by Basawaraj NG et al¹¹ and Agrawal et al¹⁹. However, Bosch JL et al¹⁹ and S vesely et al.²⁰ found very weak but statistically significant correlation between the IPSS and age ($r = 0.25$, $P = 0.0001$). This relation of age and LUTS is not straight forward and a number of contributing factors in the advanced age may cause LUTS.

The grading of prostate volume is important in the management of BPH patients, as it helps in the selection of appropriate treatment modality. Wang JY et al. in his study reported, the designation as grade a, b & c. Prostate volume < 20ml were labeled as grade a, prostate volume between 20 to 40 ml grade b and prostate volume greater than 40ml as grade c²¹. Although symptoms leads in managing the BPH patients, but the size of prostate is important in selection of approach among multiple options.

The IPSS of BPH patients at presentation or at the time of intervention is variable. In our study 9.1% were in mild, 22.7 % in the moderate, 68.2% in the severe IPSS group. A Nigerian study in 2012 reported that 71% of their patients were in the moderate symptom group²². However, Overland et al. in their study found 23.6% of their patients had moderate symptoms and only 5% of the patients had severe symptoms²³. The difference may be partly

due to socioeconomic conditions of the locality; the patients with easy access to health care facility and good economy visit earlier for their health related issues.

CONCLUSION

The correlation between change in prostate volume and change in International Prostate Symptoms Score is positive but very weak. In other words, the strength of association between these two is very low i.e. $r = 0.280$ or 7.8% (0.280^2) and that the correlation coefficient is not statistically significant ($P = 0.065$).

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