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Original Article

# Change in Storage Symptoms after Transurethral Resection of Prostate: A Prospective Observational Study

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**Abstract**

**Introduction**: Patients with enlarged prostate generally rate their storage symptoms (frequency, urgency and nocturia) as the most bothersome as these symptoms interfere more with daily activities and have huge impact on quality of life. Effect of transurethral resection of prostate (TURP) on storage symptoms is unknown.

**Objective**: To assess the change in storage symptoms in patients undergoing TURP.

**Methods**: A prospective observational study was conducted at the author's institute from August 2011 to July 2012. Patients undergoing TURP for moderate to severe lower urinary tract symptoms (LUTS) secondary to benign enlargement of prostate were included. Patients were evaluated by International prostate symptom score (IPSS) questionnaires**.** The question number 2, 4 and 7 of the IPSS questionnaire gave the storage symptom subscore (0-15). After initial evaluations, the patients underwent TURP. After 3 months, the IPSS was reevaluated and the change in storage symptom was analyzed.

**Results**: A total of 57 patients who had undergone TURP were eligible for final data analysis. Majority of the patients had severe bothersome LUTS with mean IPSS score of 24.6±6. The baseline storage symptom subscore was 11.1±3. After 3 months of follow-up, there was significant decrease in total IPSS score and both of its subscores. On comparing the mean change in storage and voiding subscore, there was less decrement in storage subscore which was statistically significant (p=0.001).

**Conclusions:** This study showed that after TURP change in voiding subscore occurs more than storage subscore and storage symptoms may not revert to normal.

**Key Words:** frequency, nocturia, storage symptoms, TURP, urgency

## Introduction

Frequency, urgency, nocturia and urgency incontinence are the storage symptoms associated with benign enlargement of prostate. Previously these symptoms were known as irritative symptoms and often attributed to detrusor overactivity or overactive bladder symptoms.[1]

Patients with benign enlargement of prostate (BEP) generally rate their storage symptoms as the most bothersome as these symptoms interfere more with daily activities and have greatest negative impact on the patient's quality of life. Out of these symptoms nocturia is the most bothersome.[2] Transurethral resection of prostate (TURP) for symptomatic BEP often improves voiding symptoms, although its effect on storage symptoms is variable and no consistent data is available.

Current therapies for symptomatic BEP focus on relieving the urinary obstruction. Their effect on storage symptoms is unknown. This study was conducted with the objective of assessing the change in storage symptoms (Δ Storage symptom subscore) in Patients undergoing TURP.

## Methods

A prospective observational study was conducted at urology unit, Department of Surgery (Tribhuvan University Teaching Hospital, Kathmandu) over a period of one year (August 2011 to July 2012). Informed consent was taken from the patients and ethical clearance was taken from Institutional review board. Patients undergoing TURP for moderate to severe LUTS secondary to BEP and those who were able to communicate, understand and comply with study questionnaires were included. The following patients were excluded from the study: patients with neurogenic bladder, prostate cancer, bladder tumor, bladder stone and urethral stricture, indwelling catheter for > 1 month and a history of prostatic and/or urethral surgery.

Patients were evaluated by International Prostate Symptom Score (IPSS) questionnaires[3] and uroflowmetry. The question number 2, 4 and 7 of the IPSS questionnaire gave the storage symptom subscore (0-15).[4] (Fig 1) Transabdominal ultrasonography (TAUS) was used to measure size of the prostate, intravesical protrusion of prostate (IPP) and Postvoid residual urine (PVRU). After the initial evaluations, the patients had undergone standard monopolar TURP. After 3 months, the IPSS was reevaluated (hospital visit or over telephone) and the change in storage symptom was analyzed.

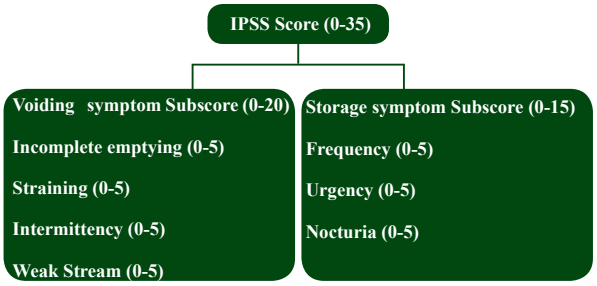


**Fig. 1: International Prostate Symptom Score (IPSS) Subscores [4]**

The paired *t* -test was used to compare the IPSS, storage subscore , voiding subscore and quality of life(QOL) before and 3 months after TURP. One-Sample Kolmogorov-Smirnov Test was used to compare the change in storage and voiding subscores (Δ). Statistical package for social sciences (SPSS) 16.0 version was used for the data analysis. P-value below 0.05 was considered statistically significant.

## Results

A total of 57 patients who had undergone TURP were eligible for final data analysis. The patient demographics are shown in Table 1. Majority of the patients had severe bothersome LUTS with mean IPSS SCORE OF 24.6±6. The baseline storage symptom subscore was 11.1±3. After 3 months of follow up, there was significant decrease in total IPSS score and both of its subscores (storage and voiding domain) which was statistically significant (Table 2).

On comparing the mean change in storage and voiding subscore, there was less decrement in storage subscore which was statistically significant (p=0.001) (Table 3). This finding proves that post-TURP change in voiding subscore occurs more than storage subscore and storage symptoms may not revert to normal.

**Table 1: Patient Demographics**

| Variable | Mean±SD |
|---|---|
| Age | 68.6±6.7 |
| IPSS total | 24.6±6 |
| Storage symptom subscore | 11.1±3 |
| Voiding symptom subscore | 13.4±4.3 |
| QOL | 5.1±0.9 |
| Size of the prostate(gm) | 48.6±19.9 |
| IPP(mm) | 15.5±8.8 |
| PVRU(ml) | 129.1±12.5 |
| Qmax (ml/sec) | 12±6.8 |

**Table 2: Outcomes after 3 months of TURP**

| Variable | Baseline | After 3 months | Mean Change(Δ) | p-value* |
|---|---|---|---|---|
| IPSS(Total) | 24.6±6 | 5.4±2.9 | -19.1±6 | 0.001 |
| Storage symptom subscore | 11.1±3 | 3.5±1.7 | -7.5±3.2 | 0.001 |
| Voiding symptom subscore | 13.4±4.3 | 1.9±1.8 | -11.5±4.5 | 0.001 |
| QOL | 5.1±0.9 | 0.75±0.6 | -4.4±1.1 | 0.001 |
| Frequency | 3.7±1.3 | 1±0.8 | -2.7±1.4 | 0.001 |
| Urgency | 3.3±1.6 | 0.7±0.8 | -2.6±1.7 | 0.001 |
| Nocturia | 4±1.2 | 1.8±0.8 | -2.1±1.3 | 0.001 |

*Paired t-test

**Table 3: Comparison of Change in storage and voiding symptom subscore**

| Variable | Mean | Kolmogorov Smirnov Z | p-value** |
|---|---|---|---|
| Δ Storage symptom subscore | -7.5 | 2.1 | 0.001 |
| Δ voiding symptom subscore | -11.5 | 2.6 | |
| Storage subscore after 3 months | 3.5 | 2.5 | 0.001 |
| Voiding subscore after 3 months | 1.9 | 2.3 | |

** One-Sample Kolmogorov-Smirnov Test

## Discussion

This is one of the first studies dedicated to storage symptoms after TURP. Changes that occur on bladder due to benign prostatic obstruction may not revert despite removal of obstruction. Our study shows that majority of patients undergoing TURP are in the seventh decade with severe LUTS with poor quality of life due to bothersome symptoms. Mean size of the prostate in patients who had undergone TURP was 48.6 gm. In most of the recent series, the average size of prostate in man who had undergone TURP was 46.1 gm to 60 gm.[5, 6] The mean age of the patients who had undergone TURP is also similar to the findings of Gacci et al with mean age of 68 years.[6] This finding reaffirms that benign enlargement of prostate is disease of the elderly male.

Benign enlargement of prostate is a common condition in middle-aged and elderly men [7] causing urinary symptoms with a subjective decrease in quality of life.[8] Surgical treatment is indicated for severe lower urinary tract symptoms (IPSS>20 with poor quality of life), failure of medical treatment, refractory retention, chronic retention, back pressure changes with functional renal impairment, hematuria and complications like stones, diverticuli or recurrent infection.[9] Aim of the surgery is to reduce urinary symptoms, thus restoring a good quality of life. During the last 50 years TURP has been the reference standard for the surgical treatment of BPH upto the size of 80 ml. [10]

The common clinical methods used for evaluating men for the surgical treatment of BPH include ultrasonography and uroflowmetry e.g. maximum flow rate (Q max). In addition, IPSS, a self administered questionnaire [11] is also a valuable tool for the clinical decision making, which assesses lower urinary tract symptoms (LUTS) and quality of life (QOL) before and after treatment. In our study the total IPSS before TURP was 24.6±6 with QOL score of 5.1±0.9. In the study done by Chalise et al[5] the preoperative IPSS and QOL score were 23.4 and 5.2 respectively. Similarly in the study done by Gacci et al[6] from Italy the preoperative IPSS and QOL score were 19.5 and 3.41 respectively. This finding shows that in our population the preoperative IPSS and QOL are higher than those in the patients from the western world. The reason behind this might be the delayed presentation of our patients only after the symptoms become severe and QOL worsens. Some of our patient even think that LUTS is part of old age and never think of seeking medical advice for treatment for many years.

Lower urinary tract symptoms may be classified into voiding (obstructive) and storage (irritative) symptoms.[4] The cause of BEP induced storage symptoms is multifactorial. Bladder outlet obstruction (BOO) induces detrusor dysfunction by smooth muscle cell hypertrophy, collagen deposition, bladder ischemia and reperfusion injury.[12] There are many explanations of detrusor overactivity in BEP such as increase in sympathetic stimulation, supersensitivity to acetylcholine, increase in nerve growth factor and local changes producing segmental contractions.[12] BEP often results in a reduced functional bladder capacity because of bladder outlet obstruction induced detrusor overactivity/ involuntary detrusor contractions, or high post-void residuals (PVR).[13] These factors ultimately lead to frequency, urgency and nocturia with or without urgency incontinence which are collectively known as storage symptoms.

In our study the baseline storage symptom score was 11.1±3, which 3 months after TURP reduced to 3.5±1.7 with net change of -7.5±3.2. Despite this the decrement in storage subscore was less than the decrement in voiding subscore. This finding shows that post-TURP change in voiding subscore occurs more than storage subscore and storage symptoms may not revert to normal. This finding is supported by the available literatures. In the study done by Gacci et al[6] prostatectomy resulted in a significant improvement in obstructive (mean 9.68 to 3.38) and irritative symptom (6.70 to 3.06). After surgery the IPSS score showed significant improvements in urinary symptoms, with the IPSS showing more significant changes for obstructive

symptoms than for irritative symptoms or quality of life. Similarly in the study done by Chalise et al[5] after TURP obstructive symptoms improved (82.4%) significantly more than irritable symptoms (46.3%). Recently, Kang YJ et al[14] have studied the effect of TURP on storage symptoms in patients with benign prostatic hyperplasia of less than 30 ml. They had concluded that the improvement in the storage symptoms of patients with a prostate size of less than 30 ml was not significant; it was in patients with a prostate size greater than 30 ml. So, if we operate on patients with small gland, it is unlikely that the storage symptoms will decrease. Fu CZ et al[15] had done a study on 86 patients to explore the LUTS, especially those in the urinary storage phase, following TURP, and to improve the postoperative management and patients' quality of life after TURP. Over a period of one month they found that the LUTS following TURP, especially those in the urinary storage phase, are correlated with preoperative bladder function, and get improved gradually after surgery.

Our study was a single-centre study relying upon small sample size with 3 months of follow-up. Nevertheless this study is an attempt to disclose the fate of storage symptoms in our patients who had undergone TURP. Preoperative and postoperative urodynamic evaluation and uroflowmetry on follow up might have given extra scientific power to the study.

## Conclusion

Post-TURP reduction in storage symptoms subscore occurs less than the voiding subscore. The newer storage subscore remains at significantly higher level than the voiding subscore. Despite good TURP, storage symptoms may persist especially nocturia and frequency. To elucidate the factors causing persistence of storage symptoms, more researches are required, especially in the field of urodynamics, bladder imaging and molecular biology.

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