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EFFECT OF POSTURE ON MAXIMUM AND AVERAGE FLOWRATES ON UROFLOWMETRY OF MALES WITH VOIDING LOWER URINARY TRACT SYMPTOMS: A RANDOMIZED CONTROL CLINICAL TRIAL.

Dr Abdul Nasir

Armed Forces institute of urology Rawalpindi Post graduate resident.

khanspb@yahoo.com

ABSTRACT

Background: *Benign prostatic hyperplasia (BPH) is a common cause of lower urinary tract symptoms (LUTS) in men. Uroflowmetry is a diagnostic tool used to evaluate LUTS, and voiding position may affect uroflowmetric parameters. This study aimed to investigate the effect of standing and sitting voiding positions on uroflowmetric findings and post-void residual volume in men with BPH.*

Methods: *A randomized controlled trial was conducted with 90 patients with BPH, divided into two groups: standing and sitting voiding positions. Uroflowmetry was performed using the MMS Flowmeter Device, and maximum flow rate (Qmax), average flow rate (Qavg), and post-void residual (PVR) volume were recorded.*

Results: *The results showed that Qmax was significantly higher in the sitting posture (12.14 mL/s) compared to the standing posture (10.2 mL/s) ($p = 0.017$). Qavg was also higher in the sitting posture, although the difference was not statistically significant ($p = 0.056$). There was no significant difference in PVR volume between the two groups.*

Conclusion: *This study demonstrated that voiding in a sitting position results in significantly higher Qmax compared to standing in men with BPH. Incorporating a sitting position into BPH management may have a synergistic effect in improving urinary flow.*

Keywords: *Benign prostatic hyperplasia, lower urinary tract symptoms, uroflowmetry, voiding position, sitting, standing.*

INTRODUCTION

The preferred position for voiding, or urination, varies depending on several factors, including the kind of bathroom available, social norms, and any underlying musculoskeletal conditions [1]. Interestingly, the choice of urination position differs across cultures. In Eastern countries, for example, men tend to prefer sitting, while in West, the more common position is standing [2, 3].

The process of urination, or micturition, is a complex correlation between the urethra and urinary bladder, controlled by the brain. Different factors can affect this process, including age, sex, and psychological characteristics, as well as structure of the urinary system [2,4,5]. The ease and effectiveness of urination are influenced by the bladder's contractility, the extent of bladder obstruction, the posture of the anterior thigh musculature, and the relaxation of pelvic floor muscles.

Uroflowmetry is a simple and commonly used diagnostic tool for evaluating lower urinary tract symptoms (LUTS). Different urination positions significantly affect the factors that influence urination, and several studies have investigated the impact of urination position on uroflowmetric parameters. However, the results

of these studies have been inconsistent, with some finding that voiding position affects uroflowmetric parameters, while others have found no significant impact [6,7,8].

Benign prostatic hyperplasia (BPH) is the main cause of LUTS in men [9]. The uroflowmetric profile of LUTS is typically marked by a decrease in maximum flow rate (Qmax), an increase in voiding time, and a higher post-void residual (PVR) volume. As a result, the standard clinical approach to managing LUTS focuses on improving the uroflowmetric profile, often through pharmacological interventions such as 5a-reductase inhibitors and alpha-blockers [2,3,10].

This objective of our study is to investigate the effect of standing and sitting voiding positions on uroflowmetric findings and PVR in men with BPH. By exploring the relationship between voiding position and uroflowmetric parameters, this study seeks to contribute to the understanding of LUTS management and potentially inform new approaches to treating BPH.

Material and methods:

A randomized controlled trial was carried out at the Armed Forces Institute of Urology in Rawalpindi in 6 months. The study aimed to investigate the impact of sitting and standing urination positions on uroflowmetric findings and post-void remaining volume in men with BPH. 90 patients were included in this study, with 45 patients in each group.

The study included male patients above 50 years of age who had voiding LUTS with a score of more than 7 on the International Prostate Symptom Score (IPSS) and a total prostate volume (TPV) of more than 30ml. Patients were also required to have voided volume of more than 150ml on uroflowmetry and be physically capable of assuming both standing and sitting postures. Those with diseases or procedures affecting the lower urinary tract, neurological disorders, or taking medications that could impact lower urinary tract function were not included.

Ninety patients were enrolled in the trial after meeting the eligibility criteria after obtaining permission from the hospital's ethical review committee and approval of the synopsis from the College of Physicians and Surgeons Pakistan (CPSP) Research Evaluation Unit (REU). Every patient provided written informed consent, and they were randomly divided into two equal groups using the lottery method. The severity of LUTS was noted using the IPSS questionnaire.

Group A patients underwent uroflowmetry in the standing position, while Group B patients underwent uroflowmetry in the sitting posture. The uroflowmetry was performed using the MMS Flowmeter Device, and the maximum flow rate (Qmax) and average flow rate (Qavg) was recorded. All patients were treated with respect and care, and their comfort was ensured during the study.

SPSS-23 was used for data analysis, and descriptive statistics were used to calculate the mean and standard deviation of age, TPV, IPSS, Qmax, and Qavg. The mean Qmax and Qavg in both groups were compared using an independent sample T-test.

Results:

The maximum flow rate (Qmax) was higher in the sitting posture, with a mean value of 12.14 mL/s, compared to 10.2 mL/s in the standing posture ($p = 0.017$). The average flow rate (Qave) was also higher in the sitting posture, but not significant (p value= 0.056).

The voiding time was not significantly different between the two groups, with a mean value of 42.87 seconds in the standing posture and 41.87 seconds in the sitting posture ($p = 0.29$). Similarly, the time to maximum flow was not statistically significant ($p = 0.187$).

The post-void residual (PVR) volume was lower in the sitting posture, with a mean value of 73.42 mL, compared to 86.8 mL in the standing posture, but not significant ($p = 0.089$).

Table 1: Uroflowmetry findings of standing (Group A) and sitting (Group B) postures.

	Group A	**Group B**	
Parameter	**Mean±SD**	**Mean±SD**	**P value**
Qmax (mL/s)	10.2± 4.9	12.14± 5.2	0.017

Qave (mL/s)	4.8±3.18	5.78±3.11	0.056
Voiding time (sec)	42.87± 8.22	41.87±9.76	0.29
Time to maximum flow (sec)	13.12±8.2	11.24±5.3	0.187
PVR (mL)	86.8±45.14	73.42±43.26	0.089

SD: Standard Deviation

Discussion:

Our study has shown that voiding in a sitting position results in higher maximum flow rates (Qmax) compared to standing. This finding is supported by Salem et al. [2], which also concluded that sitting yielded better uroflowmetry results in BPH patients.

Various explanations have been proposed for the differences in uroflowmetric findings between sitting and standing positions. Some researchers, such as El-Bahnasawy and Fadl [6], suggest that more relaxation occurs in the sitting position due to position of thigh and pelvis musculature. Others, like Eryildirim B et al. [13], propose that the elevated intra-abdominal pressure in the sitting position is transmitted to the bladder, resulting in better flow.

Often older males are prone to falls, tend to contract their pelvic muscles while standing to stabilize themselves, say De Jong et al. [3]. This contraction can disrupt urinary flow. In contrast, urinating in a sitting position with supported feet allows these muscles to relax, leading to improved urinary flow. The sitting position also decreases tension in the hip muscles, which can inhibit detrusor muscle activity and negatively impact uroflowmetric profiles.

Previous research by Salem et al. [2] found that mean average flow rate (Qave) increased and mean time to maximum flow decreased as mean maximum flow rate (Qmax) increased. However, the current study did not find statistically significant differences in these parameters. Uroflowmetry is important in evaluating obstruction in LUTS in males, with Qmax being a better indicator of bladder outlet obstruction than others. [10,14].

The role of post-void residual (PVR) in BPH management is still debated. Roehrborn et al. found that PVR was a weak predictor of outcomes in BPH treatment [15], and other studies have also found weak correlations between PVR and LUTS severity [10,16]. The current study found no significant difference in PVR between the two groups, which is consistent with previous findings.

In contrast, PVR is decreased significantly in sitting posture, and patients had longer voiding times [1]. The current study found that mean voiding time was not statistically different between sitting and standing positions, which may be due to the fact that all patients in the study used a standing position routinely. Another study found lower PVR in the sitting position, but the difference was not significant [4].

The study's limitations include a small sample size. Additionally, the relation between uroflowmetry findings and volume of prostate was not assessed.

Conclusion:

This randomized controlled trial demonstrated that voiding in a sitting position results in significantly higher maximum flow rates (Qmax) compared to standing in men with BPH. Although the differences in average flow rate (Qave) and post-void residual (PVR) volume were not statistically significant, the study suggests that Using a sitting position in conjunction with BPH treatment may improve urine flow in a complementary way.

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