

# Unreliability of International Prostate Symptom Score (IPSS) and Residual Urine for the Evaluation of Bladder Outlet Obstruction (BOO)

Muhammad Safdar Khan, Azfar Ali, Abdul Mannan and Riaz A. Tasneem

**Background:** Object of this study was to assess the reliability of the symptomatology and residual urine in assessment of bladder outlet obstruction (BOO) due to benign prostatic enlargement (BPE).

**Methods:** Flowmetry of patients with IPSS greater than 20 and normal residual urine (<100ml) was done. Patients above age of 50 with International Prostate Symptom Score (IPSS) > 20, residual urine < 100 ml and voided volume > 150 ml were included. Those with stricture urethra or TURP were excluded. Study parameters were age, residual urine, maximum flow rate (Q<sub>max</sub>), average flow rate (Q<sub>ave</sub>), flow time and voided volume. SPSS version 15 was used for statistical analysis.

**Results:** Out of 41 (mean age 64.3 years ± 8.49), 17 (41%) were found to have obstruction on the basis of Q<sub>max</sub>, Q<sub>ave</sub>, flow time, and flowmetry tracings. Among the obstructed patients, Pearson correlation between voided volume and Q<sub>max</sub> was (r=0.322, p < .05) while it was (r=-0.528, p = .117) between Q<sub>max</sub> and residual urine.

**Conclusion:** Assessing on residual urine and symptomatology alone would have misdiagnosed 41% and 59% patients respectively.. Therefore IPSS or residual urine alone is not satisfactory and patients should be assessed by combining IPSS, residual urine and uroflowmetry.

**Keywords:** Bladder outlet obstruction, Residual urine, Uroflowmetry

## Introduction

Severity of symptoms associated with benign prostatic enlargement (BPE) correlates poorly with bladder outlet obstruction (BOO).<sup>1,2</sup> Although there is lack of evidence in the literature for relationship between lower urinary tract symptoms (LUTS) and BOO, the urologists continue to rely on symptomatology regarding selection for prostate surgery.<sup>3</sup> It is not possible to diagnose bladder outlet obstruction from symptomatology alone.<sup>4</sup> As a result of this, a large number of patients are treated for bladder outlet obstruction when in fact obstruction may not be present.<sup>1</sup> In addition to symptomatology the other most widely used criteria is residual urine. It has been reported that BOO has no influence over residual urine which is related to detrusor activity.<sup>4</sup> In another study it has been found that residual urine is affected by water intake.<sup>5</sup> It has also been found that residual urine determination is not a reliable criterion for the selection of patients for surgery.<sup>6</sup> It is important to assess the BPE patients properly so that an appropriate form of therapy is selected.<sup>7</sup>

In the present study the patients with severe symptoms and normal residual urine were evaluated by uroflowmetry to see the patients who were obstructed but having normal residual urine. Uroflowmetry was selected because it valuably improves the diagnosis of bladder outlet obstruction.<sup>8</sup>

## Material and Methods

Computer record of uroflowmetry between March 2005 and February 2006 was checked. Patients above the age of 50, having IPSS >20 and post void micturitional residual urine less than 100 ml and voided urine volume greater than 150 ml were included in the study. Patients having previous prostate surgery or history of stricture urethra were excluded from the study. The parameters studied were patients' age, residual urine, traces of uroflowmetry, maximum flow rate (Q<sub>max</sub>), average flow rate (Q<sub>ave</sub>), flow time and voided volume 10-15 ml as equivocal and > 15 ml as unobstructed. SPSS version 15 was used for statistical analysis. For the significance level One sample T test

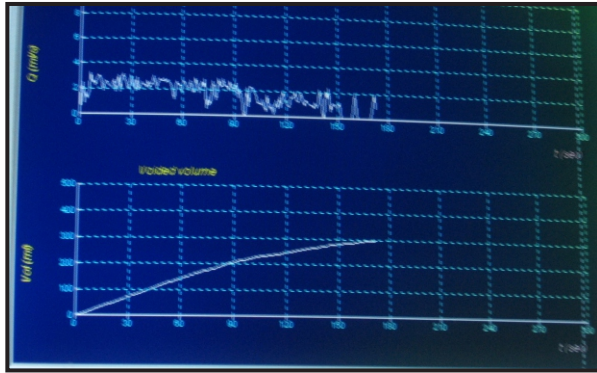


Figure-I: Patient showing obstruction.

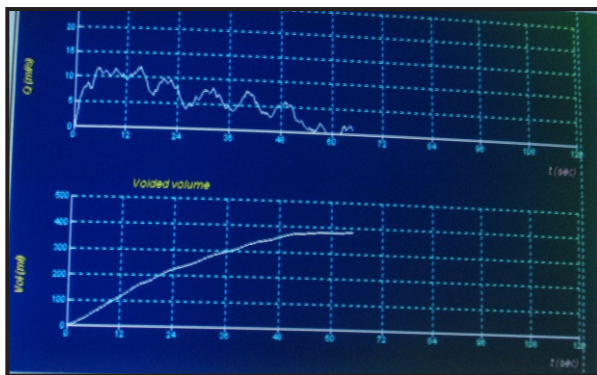


Figure II: Patient with equivocal flow.

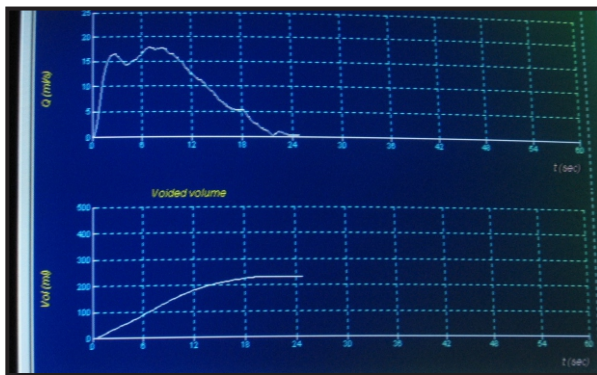


Figure III: Patient with normal flow.

was applied. Correlation between voided volume, residual urine and Qmax was calculated by Pearson correlation coefficient.

## Results

There were 41 male patients suffering from BPE with mean age  $64.3 \text{ years} \pm 8.49$  and range of 50 to 85. The range, means and standard deviations of other parameters are summarized in **Table I**.

Flowmetry traces of obstructed, equivocal and unobstructed pattern are shown in **Figure I, II and**

**III** respectively.

When Qmax was used for defining obstruction, there were ten (24.4%) cases found to be obstructed, eighteen (46.3%) equivocal and thirteen (31.7%) unobstructed. The statistical details of the three groups i.e. obstructed, equivocal and unobstructed are given in **Table II**, which have been calculated by applying one sample T test.

While assessing the obstruction on the basis of uroflowmetry traces, average flow rate and flow time, seventeen (41%) cases were found to be obstructed. The amount of residual urine found in different patients are summarized in figure IV.

Pearson correlation between voided volume and  $Q_{\max}$  was 0.322 ( $p < 0.05$ ) among the obstructed patients. Pearson correlation coefficient was 0.247 ( $p = 0.49$ ) in all studied patients.

Analyzing all the patients it was found that there was Pearson correlation coefficient  $-0.486$  ( $p < 0.001$ ) between  $Q_{\max}$  and residual urine while among the obstructed patients ( $Q_{\max} < 10 \text{ ml}$ ) Pearson correlation coefficient of  $-0.528$  ( $p = 0.117$ ) between Qmax and residual urine was found.

## Discussion

From the results it is evident that if only IPSS was taken into account then 100% of the patients would have been labeled as obstructed because a score of greater than 20 is considered severe.

A group of investigators have found that in BOO cases, on the basis of IPSS, there was no obstruction in 19%, 28.9% and 35% of those with severe, moderate and mild symptoms.<sup>1</sup> In the present study patients with IPSS of greater than 20, 41% were found to be obstructed.

The difference in the results from the preceding study can be explained by selection of the patients with normal residual urine i.e. if patients with residual urine greater than 100ml were also included then the results would have been different.

In another study it has been suggested that patients are initially referred because of their symptoms but ultimately these are notoriously unreliable guide to bladder output obstruction.<sup>3</sup> If residual urine was the parameter for the assessment of the obstruction, then none (0%) of these subjects would have been found obstructed. A group of authors have reported in their study that residual urine has little relation with BOO.<sup>4</sup> It has been pointed out in this study that residual urine is related to weakened detrusor muscle rather than having any relation with BOO.

From the results of the present study we have found that the mean residual urine was 29.5 ml and it ranged

**Table-1:** Results of studied parameters.

Parameters	Min	Max	Mean	S D $\pm$
Age (Years)	50	85	64.3	08.498
Residual Urine (ml)	0	70	64.5	23.95
Qmax	3.7	30	13.99	05.671
Qave	1.9	16.4	06.81	03.324
Flow Time (Seconds)	22	156	52.44	29.16
Voided Volume (ml)	151	545	297.2	122.2

**Table-2:** Results of patients tested on the basis of  $Q_{max}$ .

	Number	Mean	Standard Deviation	p Value	95% Confidence Interval	
					Lower	Upper
Obstructed	10	7.68	2.3	.011	-3.97	-.67
Equivocal	18	12.38	1.6	.000	2.03	3.7
Qave	13	20.46	4.4	.0001	7.83	13
Total	41	13.99	5.7	.0001	2.21	5.8

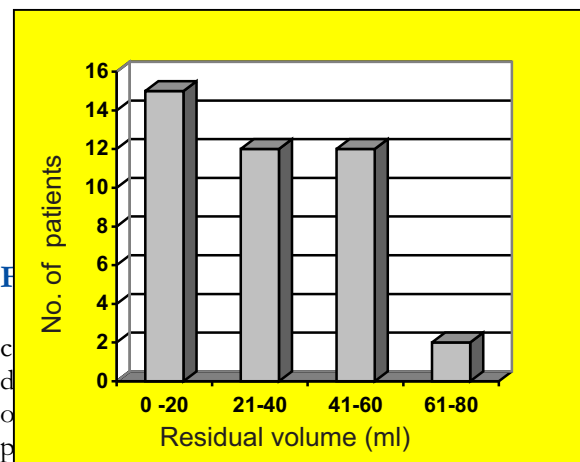
from 0 to 70 ml. If these patients would have been assessed on the basis of residual urine then 41% of these would have been misdiagnosed.

Various authors have investigated the effect of posture on the residual urine and uroflowmetry and have given conflicting results. One group of authors has stated that there is no effect of posture on the voiding volume, residual urine and uroflowmetric parameters.<sup>9</sup> In another study it has been found that posture (standing and crouching) affects  $Q_{max}$ ,  $Q_{ave}$ , flow time and residual urine.<sup>10</sup> General consensus is that posture does not affect the residual urine.

This is being mentioned because our patients had freedom in selecting posture of their choice. For the assessment of BOO, pressure flow studies still remain the gold standard<sup>11,12</sup> but urodynamic studies are complex, invasive and not cost effective.<sup>1</sup> Correlation between the residual urine and  $Q_{max}$  is negative which is according to our expectation i.e. as the residual urine increases  $Q_{max}$  decreases. Wide scattering of patients was noted on the scatter graph and therefore significance was affected, but it is interesting to note that there is clustering of the subjects at residual urine 0-40 ml but dispersion from 41-70 ml volume.

This may be due to smaller sample size rather than reduction in correlation as the volume increases. We have noted a correlation between the voided volume and  $Q_{max}$ . This has also been confirmed in another study.<sup>12</sup>

Various studies have reported that symptomatology<sup>1,12</sup> and residual urine<sup>4</sup> determination are not a reliable criteria for the selection of patients for surgery and pressure flow studies are



symptoms or residual urine alone, we recommend these patients can be assessed properly by a combination of IPSS, residual urine and uroflowmetry.

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