



IPSS, UROFLOWMETRY AND POST VOID RESIDUAL URINE-IS THERE A STRONG CORRELATION?

General Surgery

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ABSTRACT

Benign prostatic hyperplasia (BPH) is one of the most common conditions afflicting men and constitutes a major cause of bladder outlet obstruction. Urinary obstruction due to BPH has been established to some degree since the earliest days of medicine. The objectives of evaluating such patients are to identify the degree of urinary obstruction, the role of BPH in such cases and assessment of the parameters that define significant obstruction. In this study a correlation between International prostate symptom scores (IPSS) and diagnostic studies that define bladder outlet obstruction (BOO) has been established.

KEYWORDS

benign prostatic hyperplasia (BPH), International prostate symptom scores (IPSS).

INTRODUCTION:

The prostate, an accessory sex gland of the male weighs about 18g, assists in reproductive function by secreting a fluid that constitutes about 20% of the ejaculate². The anatomic relationship of the prostate with the bladder neck and the urethra has important clinical implications³.

Obstructive voiding symptoms are seen across a variety of urological diseases which makes it difficult to assign BPH as the cause of it⁴. Additional tests such as urodynamic studies and ultrasound are required to diagnose bladder outlet obstruction secondary to BPH and formulate a treatment plan⁵.

A combination of symptom scores, urodynamic studies and prostate volume has shown to reliably predict bladder outlet obstruction⁶. Also, Post void residual urine has little prognostic value for the risk of BPH related invasive therapy⁷. Hence, do urodynamic studies and ultrasound predict the severity of obstruction and/or an improvement in these parameters bear any relationship to patient's symptoms after transurethral resection of the prostate?

This study was undertaken to assess the predictive value of symptom indexes and urodynamic studies for patients diagnosed to have BPH with bladder outlet obstruction. **Benign prostatic hyperplasia (BPH)**: represents a histologic diagnosis that refers to the proliferation of smooth muscle and epithelial cells within the prostatic transition zone. **Benign prostatic enlargement (BPE)** is defined as prostatic enlargement due to histologic benign prostatic hyperplasia. **Bladder outlet obstruction (BOO)** is the generic term for obstruction during voiding and is characterized by increased detrusor pressure and reduced urine flow rate.

MATERIAL AND METHODS:

Study Design:

Patients with benign prostatic enlargement and who were advised to undergo Transurethral Prostatectomy were selected for this study. Tabulation of the results of various parameters like age, IPSS score, average flow(Q avg) values, Peak Flow values and Post Void Residual Urine were done pre-operatively. The above parameters are again recorded and tabulated post-operatively at 2 to 4 weeks after catheter removal and establishment of successful voiding and in the follow up period three months post-surgery, the same parameters were again recorded and tabulated on an out-patient basis.

Study Size, Type and Duration:

A total of 50 patients were prospectively studied over a period of 12 months.

Method of collection of data:

The International Prostate Symptom Score (IPSS) assessment, residual urine by abdominal ultrasound and uroflowmetry were recorded pre-operatively and post operatively 2 to 4 weeks after catheter removal and during 3 months follow up.

STATISTICAL ANALYSIS:

Analysis of parameter was done using **Paired t-test** & Co-relation of

parameters was done by **Co-relation coefficients Test**.

OBSERVATIONS AND RESULTS:

Majority of patients (68%) had pre operative IPSS score between 20 – 35, 78% of patients had IPSS score between 8-19 post operatively and 40 (80%) patients improved to a score between 8-19 after 3 months post surgery.

Table 1: Before and after Surgery

	IPSS	QAVG	PF	PVRU		IPSS	QAVG	PF	PVRU
						Post op	Post op	Post op	
IPSS	1.000				IPSS	1.000			
QAVG	-0.604**	1.000			QAVG	-0.423*	1.000		
PF	-0.623**	0.594*	1.000		PF	-0.129	0.612**	1.000	
PVRU	0.758*	-0.360*	0.384	1.000	PVRU	0.421**	-0.278	-0.278	1.000
						Post op			

**Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

The IPSS score correlates significantly with the peak flow (PF), average flow (QAVG) and the post void residual urine (PVRU) values. The peak flow correlates significantly with the average flow values. The post void residual urine correlates significantly with the average flow and the peak flow values.

**Correlation is significant at the 0.01 level (2-tailed)

The IPSS score correlated significantly with the post void residual urine and the average flow values.

The IPSS score did not correlate with the post op peak flow values. The post op peak flow values correlated significantly with the post op average flow values.

The post op residual urine values did not correlate with the post op peak flow and post op average flow values.

Table 2: 3 months post-surgery

	IPSS	QAVG	PF	PVRU
IPSS	1.000			
QAVG	-0.310*	1.000		
PF	-0.147	0.542**	1.000	
PVRU	0.400**	0.033	-0.200	1.000

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

The IPSS score correlates significantly with average flow and post void residual urine values.

The IPSS score does not correlate with the post op peak flow values. The post op peak flow correlates significantly with the post op average flow values.

The post void residual urine does not correlate with the post op peak flow and post op average flow values.

Table 3
IPSS and the urodynamic data before surgery, after surgery and during follow up period.

	Pre-op		Post-op		3 months post-op	
	Mean	S.D	Mean	S.D	Mean	S.D
IPSS	22.06	5.96	10.48	3.41	10.92	3.71
QAVG	7.96	2.89	15.9	2.32	18.24	2.51
Peak Flow	13.12	3.08	23.52	4.61	27.58	5.21
PVR	166.9	58.1	70.74	26.44	54.68	25.3

The mean improvement in IPSS score between pre-operative period and post-operative period is 11.58 and between pre-operative period and 3 month follow up was 11.14

The mean improvement in Average flow between pre-operative period and post-operative period is 7.94 and between pre-operative period and 3 month follow up was 10.28

The mean improvement in peak flow between pre-operative period and post-operative period is 10.40 and between pre-operative period and 3 month follow up was 14.46

The mean improvement in post void residual urine between pre-operative period and post-operative period is 96.16 and between pre-operative period and 3 month follow up was 112.22

The improvements in the parameters compared to pre operative status showed a mean improvement of 0.997 which was significant (p-value 0.003).

The analyses of the parameters showed a poor correlation between the IPSS and the peak flow post operatively and during the 3 month follow up. Significant correlation existed between the IPSS, post void residual urine and average flow post operatively and during the 3 month follows up.

Benign prostatic hyperplasia (BPH) is one of the most common problems in old age and one of the major causes of bladder outlet obstruction. Although urinary obstruction secondary to BPH has been well established, lower urinary tract symptoms (LUTS) can be caused by a variety of disease processes affecting the urogenital system. Moreover, the various diagnostic tests available to assess the severity of BPH induced bladder outlet obstruction (BOO) have not been cross examined with the patients' quality of life after Transurethral resection of the prostate (TURP). Benign prostatic hyperplasia has been traditionally diagnosed and graded by a digital rectal examination (DRE). The severity of obstructive symptoms are graded by the international prostate symptom score (IPSS) 7 point questionnaire formulated by the American urological association (AUA).

Objective assessment of symptoms was done by urodynamic studies and estimating the prostate size and the post void residual urine by ultrasound. Urodynamic studies have been the gold standard for evaluating patients with bladder outlet obstruction due to BPH. Most urodynamic measurements improve after surgery, but studies have not established a strong relationship between urodynamics and treatment outcomes. Similarly, intention to treat analysis has not shown correlations between prostate volumes, post void residual urine and symptom scores.

The aim of this study was to study the association between symptoms and the diagnostic tools used to define bladder outlet obstruction. The study was also undertaken to identify a correlation between the symptoms of bladder outlet obstruction and the diagnostic tests done in patients with Benign Prostatic Hyperplasia.

In the study of 50 patients of benign prostatic hyperplasia with bladder outlet obstruction, there has been a good association between LUTS and uroflowmetry measurements esp. average flow. There is also a good association between LUTS and post void residual urine. The peak flow and the average flow measurements also maintain a good association.

However, the symptoms did not correlate with the peak flow measurements. Also, the post void residual urine does not correlate with uroflowmetry measurements post operatively and during the follow up period.

Previous studies have failed to establish a strong relationship between symptom scores and flow rates with a few exceptions.

Due to the lack of a strong correlation between symptoms and other measures for BPH, symptoms scores and/or a single diagnostic test alone should not be used to pre select patients for further studies. In the determination of the prevalence of BOO, it is necessary to combine the presence of the symptoms with other measures such as increased prostate volume and abnormal values of physiological measures such as flow rate and post void residual urine.

These results suggest that patients who would most benefit from TURP are those who had obstructive flow patterns on urodynamic studies coupled with significant residual urine as demonstrated by ultrasound.

Conclusions:

Total of 50 patients with benign prostatic hyperplasia were enrolled into this study. All patients underwent an assessment of symptoms based on IPSS. The severity of obstruction was also objectively determined by uroflowmetry and ultrasound studies. These parameters were also recorded post-operatively and during the 3 month follow up.

Analysis revealed a good association between symptom scores, uroflowmetry measurements and post void residual urine pre-operatively. There is also good correlation between individual parameters pre-operatively. However, post-operatively and during the follow up correlations exist between symptom scores, post void residual urine and average flow. There is poor or no correlation between the individual parameters post-operatively and during the follow up.

Therefore, patients with symptoms of bladder outlet obstruction should be assessed with a combination of symptom scores and objective tests. Urodynamic studies, in particular average flow (Qavg) and post void residual urine have a strong association to severity of BOO. Patients have to be assessed clinically as post void residual urine does not correlate with urodynamic studies during the follow up.

1. Benign prostatic hyperplasia causes a varied pattern of bladder outlet obstruction on urodynamic studies.
2. The outcome of surgical therapy, namely TURP for BOO secondary to benign prostatic hyperplasia depends largely on the severity of obstruction.
3. Such outcomes can only be met based on a careful selection of patients using a combination of symptom scores, post void residual urine and urodynamic studies.

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