Original Article

Effects of Transurethral Resection of Prostate on Flow Rate and Voided Volume on Patients with Benign Prostatic Hyperplasia

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ABSTRACT

OBJECTIVE: To assess urinary flow rate/uroflowmetry in patients undergoing transurethral resection of the prostate (TURP) for benign prostatic hyperplasia (BPH), during three postoperative months.

STUDY DESIGN: Prospective observational study.

MATERIALS AND METHODS: This study was conducted at Department of Urological Surgery and Transplantation, Jinnah Postgraduate Medical Centre (JPMC) Karachi-Pakistan, between March 2002 and March 2005. Fifty consecutive clinically diagnosed cases of BPH who never went in retention of urine and underwent TURP were included in this study. Preoperative urinary flow rate was measured. Uroflowmetry was postoperatively carried out after every month for three months period and observations were analysed.

RESULTS: Mean±SD age of the subjects was 63.62±6.75 years. Preoperatively mean±SD values were maximum flow rate 7.60±2.41 ml/sec, average flow rate 4.44±1.28 ml/sec and voided volume 165.54±49.60 ml. Post-TURP mean±SD values after three months were maximum flow rate 27.24±5.11 ml/sec, average flow rate 13.48±2.08 ml/sec and voided volume 240.32±49.91 ml. The variation in means of uroflowmetry parameters from first to third post-TURP month found statistically significant (P<0.001).

CONCLUSION: We conclude that the effects of post-transurethral resection of prostate, all the obstructive uroflowmetry parameters return towards normal levels. It indicates that there is excellent improvement relief in both obstructive and irritative symptoms.

KEY WORDS: BPH, uroflowmetry, TURP.

INTRODUCTION

Benign prostatic hyperplasia (BPH) is the most common disorder of the prostate gland. Approximately 80% Hyperplastic growth of prostate begins in men at the age of 50 years and above. By age eighty, almost 90% of men have histologic evidence of benign prostatic hyperplasia.[1,2]

Patients with BPH have early clinical features of frequency, nocturia, urgency, terminal dribbling, polyuria, difficulty in micturition, weak urinary stream, pain, acute retention of urine, overflow incontinence, sometimes heamaturia, and renal insufficiency[3]. Late clinical features will develop more serious sequelae of disease with urinary retention, recurrent urinary tract infection, bladder stone, bladder failure, and renal dysfunction[4]. These symptoms may be due to bladder outflow obstruction caused by BPH or due to detrusor hyper-reflexia.

The informative test to determine patients with BPH is the uroflometry. Inspite of certain restrictions, uroflometry yields a high level of information, besides being a simple, any time reproducible, and non-invasive procedure. Due to its low costs, it should be the primary step in diagnostics in the clinic as well as for practitioners[5-8].

The uroflowmetry is done by an electronic instrument to calculate the velocity of urine flow. Uroflometry results in a normal 70-year old male with no evidence of BPH has average flow rate of 12ml/sec and peak flow rate close to 20ml/sec with void at least 125-150ml, with mild enlarged BPH has average flow rates 6-8ml/sec and 11-15ml/sec peak flow rate, and severe enlarged BPH has further decreased flow rates[9].

Transurethral resection of prostate (TURP) is the most widely accepted method of treating prostatic urethral obstruction in patient with BPH and is considered the “gold standard” against which other treatments should be compared[10,11].

Comparison of the results of uroflometry performed in patients in large or small adenomas showed that TURP was successful in both groups. The age of operated patients seemed to have no influence on the results of uroflometry after TURP[12,13].

MATERIAL AND METHODS

This prospective study was conducted at Department of Urological Surgery and Transplantation at Jinnah Postgraduates Medical Center (JPMC) Karachi, between March 2002 and March 2005. These fifty

consecutive patients with benign prostatic hyperplasia (BPH) were included in the study. Pre-operatively uroflometry was carried out followed by uroflometry post TURP after thirty days, sixty days, and ninety days, and their results were co-related.

The patients who presented only with symptoms of prostatism and did not develop retention of urine, non-catheterized were included in the study. However, patients excluded from the study were those who presented with carcinoma prostate, urethral stricture, bladder neck stricture, diabetes mellitus, taking drugs for BPH, bladder atonia and urinary incontinence.

A careful history, especially about the symptoms was taken in all patients. A thorough physical digital rectal examination of the prostate gland was done. All the necessary investigations including ultrasound KUB, x-ray KUB, blood CP and group, urine DR, urine C/S, renal function tests, and blood sugar were carried out. In selected patients intravenous urography and prostatic specific antigen (PSA) were also done. Fitness for anesthesia was assessed.

Foley's catheter removed on second or third day post-operatively. Patients were discharged with adequate urinary flow.

The follow up studies were done for three months after removal of catheter post-operatively with uroflometry, after first, second and third month of removal of catheter.

F-test was applied to determine the significance of differences among mean urine volumes and flows. SPSS version 14.0 was used to analyse the data. P-value up to 0.05 was considered significant.

RESULTS

The age range of the patients included in the study was 50-80 years. The average age was 63.62 years **(Table I)**. The average weight of prostate gland on ultrasound finding was 60.46-ml while minimum weight of prostate gland 37-ml **(Table II)**. Among fifty patients before operation the mean maximum flow rate was 7.60±2.41-ml/sec, median value 7.5-ml /sec. The mean average flow rate was 4.44±1.28-ml/sec median value 4.55-ml/sec. The mean voided volume was 165.54±49.60-ml, median value 170.0-ml. The average of first three months postoperative follow up was 27.24±5.11-ml/sec. The change in average from first month to third month of operation was found statistically significant with P<0.001 when tested by F statistics. The average of first three months of post operative follow up was 13.48±2.08-ml/sec, with median value 13.17-ml/sec. The change in average from first to third month of operation was found statistically significant with P<0.01 when tested by F. statistics. The average of first three months of post operative follow up was 240.32±49.91-ml, with median value 231.00-ml. The change in average from first month to third month of operation was found statistically significant with P<0.01, when tested by F. statistics **(Table III)**.

TABLE I:
AGE OF THE PATIENTS

Age (in years)	No. of Patients	Percentage
50-55	5	10
56-60	17	34
61-65	7	14
66-70	14	28
71-75	5	10
76-80	2	4

TABLE II:
WEIGHT OF PROSTATIC GLAND (ULTRASOUND)

Weight of prostate (in mls)	No. of patients	Percentage
31-40	3	6
41-50	8	16
51-60	13	26
61-70	19	38
71-80	7	14

DISCUSSION

Benign prostatic hyperplasia (BPH) is a disease of old men which leads to urinary problems due to effects on both obstructive and irritative symptoms of prostatism associated with decreased urinary flow rate and troublesome life-style, especially during night times. Patients with prostatism generally seek help for relief of their symptoms which is best indicator for the successful treatment[14]. The mean ages of the patients is reported in a couple of Pakistan based studies is 63.4 years and 65.6 years respectively[15,16]. In other study Mebust et al display the average age of 69 years for benign prostatic hyperplasia[17].

Mean age of our patients (63.62 year) is comparable to the above two Pakistani studies but it is somewhat lower than that of reported by Mebust et al[15-17]. The patients of our study as well as those of other Pakistani studies are younger than the western patients. It is probably due to fact that most of our elderly patients do not know their correct date of birth, so the date of birth entered in hospital proforma is by rough estimations.

In the present study pre-operative maximum flow rate (Qmax) was found to be 7.6±2.41-ml/sec. This rate is

TABLE III:
PRE AND POST-OPERATIVE UROFLOWMETRY PARAMETERS (n=50)

Parameters	Preoperative	First Month Follow up	Second Month Follow up	Third Month Follow up	Average of Three Follow Up
Max: Flow rate	7.60± 2.41 ml/sec (7.5)	26.03±7.15 (26.45)	27.53±5.33 (27.55)	27.39±4.91 (27.25)	27.24±5.11 (26.9)
Average Flow rate	4.44± 1.28 ml /sec (4.55)	12.66±3.01 (12.45)	13.69±2.53 (13.2)	13.76±2.05 (13.5)	13.48±2.08 (13.17)
Voided Volume	165.54± 49.60 ml (170.0)	234.20±70.44 (210)	249.79±77.63 (230)	234.58±38.22 (230)	240.32±49.91 (231.0)

Results are presented as Means±SD (Medians)

9.5-ml/second, and 7.l ml/second reported by Nielsen KT et al and Larosa Metal respectively[18,19]. These findings are more or less similar to that of our study.

It has been observed that in all patients there was obstructed symptom and significantly reduced maximum flow rate preoperatively.

In a study by Nielsen KT et al after transurethral resection of the prostate, maximum flow rate at three months follow up is found to be 17.0-ml per second in 84 consecutive patients[18]. In other study by Dorflinger T et al after transurethral resection of the prostate at three months follow up, the maximum flow rate was 21.5-ml second in nineteen patients[20].

The average of first three months postoperative follow up of Our patients (27.24±5.11-ml/sec) was significantly improved like those reported by Neilsen KT et al and Dorflinger T et al, the flow rate in these studies remains stable throughout the follow up period[18,20]. Among the uroflowmetry parameters analysed, the best correlation with degree of prostatic obstruction, is degree of maximum flow rate (Qmax) [20, 21].

In the present group the preoperative average flow rate was found to be 4.44±1.28-ml/ second and average first three months of postoperative follow up was 13.48± 2.08-ml/ second.

It is analysed that there is significant improvement in average flow rate after TURP in comparision to preoperative flow rate.

CONCLUSION

We conclude that the effects of transurethral resection of prostate (TURP) on uroflowmetry parameters are significantly improved postoperatively. Our study indicates that there is excellent improvement in the maximum flow rate, average flow rate in all postoperative follow up visits.

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