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Effects of open prostatectomy on uroflowmetry parameters on patients having benign prostatic hyperplasia

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Abstract
Objective: to assess the effects of urinary flow rate/ uroflowmetry in patients with benign prostatic hyperplasia preoperatively and following open prostatectomy for three months post operatively.
Materials and Methods: this presoectine was done department of urological surgery AlSader Teaching Hospital between March 2010 to March 2016. Fifty consecutive patients age range 50 years to 80 years, on clinically diagnosed of benign prostatic hyperplasia (BPH) were include in the study, preoperatively uroflowmetry is carried out followed by uroflowmetry post open prostatectomy, after first month, second month and third month.
Result: Mean age 63.62 ± 6.75 years Uroflowmetry parameter among fifty patients before operation are found, mean voiding time 32.37 ± 19.19 seconds, mean flow time 28.57 ± 15.79 seconds, mean time to maximum flow 9.64 ± 6.65 seconds, mean maximum follow rate 7.60 ± 2.41 ml/sec, mean overage flow rate 4.41 ± 1.28 ml/sec and mean voided volume 165.54 ml. postoperative uroflowmetry was carried out after first month, second month and third month. The average of first three months of postoperative follow up uroflowmetry parameter obtained are, voiding time 27.64 ± 11.67 (P = 0.14) seconds, flowtime 25.72 ± 11.00 (P = 0.29) seconds, time to maximum flow 6.59 ± 0.79 (P = 0.05) seconds, maximum flow rate 27.24 ± 5.11 (P = 0.001) ml second, overage flowrate 13.48 ± 2.08 (P = 0.001) ml second, voided volume 240.32 ± 49.91 (P = 0.01) ml.
Conclusion: We conclude that the effects of post prostatectomy all the obstructive uroflowmetry parameters return more or less towards normal levels. As well as excellent improvements in both obstructive and irritative symptoms was also observed.

Keywords: BPH, uroflowmetry, hyperplasia

Introduction

Benign prostatic hyperplasia (BPH) is the most common disorder of the prostate gland. Histologic hyper plastic growth of prostate begins in approximately 40% of men aged 50 years and above. By age eighty, almost 90% of men have histological evidence of benign prostatic hyperplasia [1, 2]. Patients with BPH have early clinical features like hesitancy, intermittency, frequency, nocturia, urgency, terminal dribbling, polyuria, difficulty in micturition, week urinary stream, incontinence of urine, and sometimes heamaturia [3]. Late clinical features will develop more serious sequelae of disease with urinary retention, recurrent urinary tract infection, bladder stone, bladder failure, renal dysfunction [4].

These symptoms may be due to bladder outflow obstruction caused by Benign Prostatic Hyperplasia (BPH) or due to detrusor hyper – reflexia. The informative test to evaluate patients with Benign Prostatic Hyperplasia (BPH) is uroflowmetry. In spite of certain restrictions, uroflowmetry yields a high level of information, besides being a simple, at 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, 6, 7, 8]. The uroflowmetry which is done by an electronic instrument to calculate the velocity of urine flow. Uroflowmetry results in a normal 70 – years old with no evidence of BPH has average flow rate of 12 ml/sec and peak flow rate close to 20 ml/sec having at least 125 – 150 ml in the bladders, with mild enlarged BPH has average flow rates 6 – 8 ml/sec and 11 – 15 ml/sec peak flow rate and severe enlarged BPH has further decrease flow rates 9.

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Material and Methods

This prospective study was conducted at department of Urological Surgery Al – Sadr Teaching Hospital between March 2010 to March 2016. These fifty consecutive patients with benign prostatic hyperplasia (BPH) were included in the study. Pre operatively ureflowmetry was carried out followed by Uroflometry post.prostetactomy and their results were co – related. The age range of the patients included in the study was 50 to 80 years. The average was 63.62 years. (see table No. 1)

Inclusion Criteria

Only those patients who presented with lower urinary tract symptoms due to enlarged prostate but neither have developed retention of urine, nor catheterized were included in this study.

Exclusion Criteria

Following patients were excluded from study:
1. With carcinoma prostate.
2. With urethral stricture.
3. With bladder neck stricture.
4. With diabetes mellitus.
5. Patients taking drugs for BPH.
6. Catheterized patients.
7. With bladder atonia.
8. urinary incontinenc

Age of the patients
Total No. of patients = 50
Age range: 50 – 80 years
Average age: 63.62 years

Table 1: Age of patients

Age range in year	No. of patients	Percentage
50 – 55	5	10%
56 – 60	17	34%
61 – 65	7	17%
66 – 70	14	28%
71 – 75	5	10%
76 – 80	2	4%

Weight of prostatic gland (Ultrasound)
Minimum weight of prostate = 37 mIs
Maximum weight of prostate = 77 mIs
Average weight of prostate = 60.46 mIs

Table 2: Weight of prostate

Weight of prostate in mIs	No. of patients	Percentage of patients
1 – 30	0	0%
31 – 40	3	6%
41 – 50	8	16%
51 – 60	13	26%
61 – 70	19	38%
71 – 80	7	14%

Pre – operative uroflowmetry parameters
Pre – operative parameters

Table 3: Uroflowmetry Parameters

Voiding time (n = 50)	32.27 ± 19.19 seconds (27.5)
Flow time (n = 50)	28.57 ± 15.76 seconds (24.0)
Time to max: Flow (n = 50)	9.64 ± 6.65 seconds (6.00)
Max: Flow rate (n = 50)	7.60 ± 2.41 ml/sec (7.5)
Average flow rate (n = 50)	4.44 ± 1.28 ml/sec (4.55)
Voided volume (n = 50)	165.54 ± 49.60 ml (170.0)

Pre-operative assessments

A care full history especially about the symptoms was taken in all fifty patients. A through 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) was also done. Anesthesia fitness was taken. The average weight of prostate gland on ultrasound finding was 60.46 mIs while minimum weight of prostate gland 34 mIs. (see table No. 2).Majority of patients were operated under spinal anesthesia and in few patients under general anesthesia. Foleys catheter removed on tenth Or twelve day post operatively. Patients were discharged with adequate urinary flow.

Post-operative follow up studies

The follow up studies were done for three months after removal of catheter post – operatively on following periods, with uroflowmetry, after first, second and third month of removed of catheter.

Results

Pre-operative uroflowmetry parameters

Among fifty patients before operation the mean voiding time was found 32.37 ± 19.19 sec (mean $\pm$ S.D), median time was 27.5 sec, The mean flow time was found 28.57 ± 15.79 sec (mean $\pm$ S.D), median time was 24.0 sec. The mean time to maximum flow was 9.64 ± 6.65 sec (mean $\pm$ S.D), median time 6.0 sec. The mean maximum flow rate was 7.60 ± 2.41 ml/sec (mean $\pm$ S.D), median value 7.5 ml/sec. The mean average flow rate was 4.44 ± 1.28 ml/sec (mean $\pm$ S.D), median value 4.44 ml/sec. The mean voided volume was 165.54 ± 49.60 ml (mean $\pm$ S.D), median value 170.0 ml, (Table: 3).

Post – operative follow up (after first month, second month and third month) uroflowmetry parameters:

At the end of the first to third month of operation mean voiding time of fifty patients was 28.26 ± 14.68 sec, 27.08 ± 11.12 sec and 27.75 ± 12.01 sec respectively with median values were 25 seconds. The average of first three months post – operative was 27.64 ± 11.67 sec with median value 27.64 sec. The change in average time from first to third month of operation was found statistically non – significant with $P > 0.014$, when tested by F – Statistics.

Mean flow time of fifty patients from first to third month was 26.1 ± 13.2 sec, 25.12 ± 10.70 sec and 26.14 ± 11.27 sec respectively and their median values were 23.5, 22.5 and 23.5 sec respectively. The average of first three months of post – operative follow up was 23.33 sec. The change in average time from first to third month of operation was found statistically non – significant with $P > 0.29$

The mean time to maximum flow of fifty patients from first to third month 6.48 ± 1.19 sec, 6.64 ± 1.08 sec and 6.85 ± 1.10 sec, with their median values 7 sec, 7 sec, 7sec respectively. The average of the first three months of the post – operative was 6.59 ± 0.79 sec. The change in average time from first to third month if operation was found statistically significant with $P < 0.05$.

At the end of the first, second and third month of operation, mean maximum flow rate of fifty patients was 26.03 ± 7.15 ml/sec with median value 26.45 ml/sec, 27.5 ± 5.33 ml/sec with median value 27.55 ml/sec, 37.39 ± 4.91 ml/sec respectively. The average of first three months post – operative follow up was 27.24 ± 5.1 ml/sec. The change in average from first month to third month of operation was found statistically significant with

P< 0.001.

The main average flow rate of fifty patients in first, second and third months was 12.66 ± 3.0 ml/sec, with median value 12.45 ml/sec, 13.69 ± 2.53 ml/sec with median value 13.2 ml/sec and 13.76 ± 2.05 ml/sec with median value 13.5 ml/sec respectively. 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.

From first to third month of operation mean voided volume was 234.20 ± 70.44 ml with median value 210 ml, 249 ± 77.63 ml with median 230 ml, and 234.58 ± 38.22 ml with median 230 ml. 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, (See Table No: 4).

Table 4: Post – operative uroflowmetry parameters (n = 50)

Parameters	First month follow up	First month follow up	First month follow up	Average of three follow up
Voiding time (n = 50)	28.26 ± 14.68 (22.50)	27.08 ± 11.12 (26.0)	27.75 ± 12.01 (25)	27.64 ± 11.67 (27.64) *P*> 0.14 T = 1.48
Flow Time (n = 50)	26.1 ± 13.20 (23.5)	25.12 ± 10.70 (22.50)	26.14 ± 11.27 (23.5)	25.72 ± 11.00 (23.33) *P*> 0.29 T = 1.05
Time to Max Flow (n = 50)	6.48 ± 1.17 (7.00)	6.64 ± 1.08 (7.0)	6.58 ± 1.10 (7.00)	6.59 ± 0.79 (6.33) *P*< 0.05 T = 3.06
Max: Flow Rate (n = 50)	26.03 ± 7.15 (26.45)	27.53 ± 5.33 (27.55)	37.39 ± 4.91 (27.25)	27.24 ± 5.11 (26.9) *P*< 0.001 T = 23.12
Average Flow rate (n = 50)	12.66 ± 3.01 (12.45)	13.69 ± 2.53 (13.2)	13.76 ± 2.05 (13.5)	13.48 ± 2.08 (13.17) *P*< 0.01 T = 24.33
Voided Volume	234.20 ± 70.44 (210)	249.79 ± 77.63 (230)	234.58 ± 38.22 (230)	240.32 ± 49.91 (231.0) *P*< 0.01 T = 7.44

Discussion

Benign prostatic hyperplasia is a disease of old men which leads urinary problems due to effects on both obstructive and irritative symptoms of enlarged prostate such as hesitancy, frequency, urgency, dribbling of urine and dysuria make the troublesome life style, especially during night times. Patients with lower urinary tract symptoms generally seek help for relief of their symptoms and the best indicator for the successful treatment is relief of symptoms14. In the present study, preoperative maximum flow rate (Qmax) was found to be 7.6 ml/sec ± 2.41. This rate is 9.5 ml/second, and 7.1 ml/second reported by Nielsen – KT et al (1989) [15] and Larosa M. *et al*. (1993) [19] 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 pre operatively. In a study by Nielsen – KT et al (1989) [15], maximum flow rate at three months follow up is found to be 17.0 ml per second in 84 consecutive patients. In other study by Dorflinger – T et al (1988) [20] at three months follow up, the maximum flow rate 21.5 ml/second in nineteen patients20. The average of first three months post – operative follow up of our patient (27.24 ± 5.11 ml/sec) was significantly improved like those reported by above mentioned workers, the flow rate in these studies remains stable throughout the follow up period. Among the uroflowmetry parameters analyzed, the best correlation was observed between the degree of prostatic obstruction and the degree of maximum flow rate (Qmax) 21. In the present group the pre – operative average flow rate was found to be 4.44 ± 1.28 ml/second and average first three months of post – operative follow up was 13.48 ± 2.08 ml/second. It is analyzed that there is significant improvement in average flow rate after open prostatectomy in comparison to pre – operative. The rest of the uroflowmetry parameters in respect to patients with benign prostatic hyperplasia are not well documented, but we are of opinion that significant improvement also occur in other parameters as well.

Conclusion

We concluded that the effects of open prostatectomy 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. We are of opinion that open prostatectomy is still gold standard in improving the obstructive symptoms of benign prostatic hyperplasia.

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