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 presestine 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 hematuria [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.
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 uroflowmetry was carried out followed by Uroflowmetry post.prostatectomy 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

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 mls while minimum weight of prostate gland 34 mls. (see table No. 2). Majority of patients were operated under spinal anesthesia and in few patients under general anesthesia. Foley’s 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 ± S.D), median time was 27.5 sec. The mean flow time was found 28.57 ± 15.79 sec (mean ± S.D), median time was 24.0 sec. The mean time to maximum flow was 9.64 ± 6.65 sec (mean ± S.D), median time 6.0 sec. The mean maximum flow rate was 7.60 ± 2.41 ml/sec (mean ± S.D), median value 7.5 ml/sec. The mean average flow rate was 4.44 ± 1.28 ml/sec (mean ± S.D), median value 4.44 ml/sec. The mean voided volume was 165.54 ± 49.60 ml (mean ± 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 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

| 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 mls
Maximum weight of prostate = 77 mls
Average weight of prostate = 60.46 mls

| Table 2: Weight of prostate |
|-----------------------------|
| Weight of prostate in mls | No. of patients | Percentage |
| 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) |
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 symptoms. 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 et al. (1989) and Larosa M. et al. (1993) respectively. These findings are more or less similar to that of our study. It has been observed that in all patients there was 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.

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.

References

1. McKelvie GB, Collins GN, Hehir M. Rogers CN. A study of benign prostatic hyperplasia. A challenge to British urology. Br J Urol 1993;71:38-42.
2. Grino PB, Bruskewitz R, Blaivas JG, et al. maximum urinary flow rate by uroflowmetry: Automatic or visual interpretation. J Urol 1993;149(3):339-341.
3. Harding Rains AJ, Charles V. Manna Baily and Love's. Principles of surgery. 6th ed: 1998;9:1753-55.
4. Paul C Peters, Timothy B Boone, Irwin N Frank, John D, MC Conell, Glenn M. Preminger. Schweitz: Principles of surgery, 6th ede 1998;9:1753-55.
5. Karl C, Gerlach R, Hannppel J, Lehnen H. Investigation of Pre and postoperative measurements. Urol, ink 1986;41(4):270-75.
6. Jensen KM–E, Jorgensen JB, Mogensen P: Reproducibility of uroflowmetry in variables in elderly males. Urol Res 1985;13:237-239.
7. Drach GW, Steinbromm DV. Clinical evaluation of patients with prostatic obstruction: correlation of flow rates with voided, residual or total bladder volume. J Urol 1986;135(4):737-40.

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)   | 26.76 ± 11.67 (27.64)     |
| 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)     |
| 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)        |
| 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)       |
| 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)      |
| Voided Volume         | 234.20 ± 70.44 (210) | 249.79 ± 77.63 (230) | 234.58 ± 38.22 (230) | 240.32 ± 49.91 (231.0)    |

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).
8. Gotoh M, Yoshikawa Y, Kondo A, Kato N, Ono Y, Kondo T, et al. Diagnostic values and limitations of conventional urodynamic studies (uroflowmetry residual urine measurement cystometry) in benign prostatic hypertrophy. Nippon Hinyokika Gakkai Zasshi 1996;87(12):1321-30.

9. Emill A, Tanagho, Jack W. McAninch Smith's, General Urology, 14th Ed. 1996, 400-401.

10. Blaivas JG, Chancellor MB. Transurethral incision of the prostate: An alternative to prostatectomy. Prob In Urol 1991;5(3):412-417.

11. Tanaka Y, Masumori N, Tsukamoto T, Furuya S, Furuya R, Ogura H. Long-term results of lower urinary tract symptoms and urinary flow rate after transurethral resection of the prostate. Hinyokika Kiyo 2007;53(6):369-73.

12. Bar K. Evaluation of uroflowmetry in different groups of patients after transurethral resection of prostatic adenoma. Int – Urol – Nephrol (4):345-50.

13. Kojima M, Hayakawa T, Saito T, Mitsuya H, Hayase Y. Age – related changes in lower urinary tract symptoms and urodynamic parameters in patients with benign prostatic hyperplasia treated by transurethral resection of the prostate. Nippon Hinyokika Gakkai Zasshi 2001;92(4):513-9.

14. Frimodt-Moller PC, Jensen KME, Iversen P, madsen PO, Bruskewitz RC. Analysis of presenting symptoms in prostatism. J. Urol 1984;132:272-276.

15. Iqbal T. History of benign prostatic disease and result in: urodynamic study of symptoms of benign prostatic disease (thesis). Lahore: University of the Punjab 1988, 4-15 and 104-134.

16. Saleem M. postoperative evaluation of symptoms and complications following transurethral resection of the prostate gland (thesis). Lahore: university of the Punjab 1992, 65-81.

17. Mebusut WK, Holtgrewe HL, Cockett ATK, Peters PC. and writing committee. Transurethral prostatectomy: Immediate and postoperative complications. A cooperative study of 13 participating institutions evaluating 3885 patients. J Urol 1989;141:243-247.

18. Nielsen KT, Christensen MM, Madsen PO, Bruskewitz RC. Symptom analysis and uroflowmetry 7 years after transurethral resection of the prostate. J Urol 1989;141:1251-3.

19. Larosa M; Ferretti S; Salsi P; Simonazzi M. Uroflowmetry in the assessment of patients with benign prostatic hyperplasia. Acta, Biomed Atenco Parmense 1993:64(1-2):17-22.

20. Dorflinger T, England DM, Madsen PO, Bruskewitz RC. Urodynamic and histological correlates of benign prostatic hyperplasia. J Urol 1988;140(6):1487-90.

21. Gotoh M. Surgery (TUR – P) as a recommended initial treatment modality for the presented case. Hinyokika Kiyo 2005;51(9):603-8.