


Original Research Article

A comparative evaluation of Transurethral Electro-Vaporization of Prostate (TUEVP) versus Transurethral Resection of Prostate (TURP) for Benign Prostatic Hyperplasia (BPH)

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Abstract

Background: Benign prostatic hyperplasia (BPH) is considered as an important health problem in the elderly men. TURP is unique surgery for BPH but has prolonged hospital stay and higher complications. TUEVP gives comparable benefits and efficacy with the TURP.

Material and methods: A prospective, randomized, comparative study was conducted on patients diagnosed with benign prostatic hyperplasia in the Surgery Department of tertiary care hospital. Eighty patients of symptomatic BPH who were candidates for operative treatment with prostate weighing seventy grams or less would be included TURP and TUEVP was done by using standard operative procedures. Follow up was done after 3 months.

Results: This study had shown that, most of the patients were aged above 55 years. The mean operative time was higher in TUEVP group than TURP group. The hospitalization was prolonged in case of TURP in comparison with the TUEVP. The percentage of improvement in IPSS was 82.8% in TUEVP and 85.3% in TURP, QOL was 80.9% in TUEVP and 81.1% in TURP, PVRV was 64% in TUEVP and 68.6% in TURP, maximum flow rate was 124.5% in TUEVP and 150.6% in TURP, Average flow rate was 104.3% in TUEVP and 135.6% in TURP.

Conclusion: The benefits and complications of TUEVP were comparable with transurethral resection of prostate.

Key words

TUEVP, TURP, Benign Prostatic Hypertrophy, IPSS, QOL.

Introduction

Benign prostatic hyperplasia (BPH) is one of the most common health problems in elderly men. It mainly interferes with quality of life (QOL) even though it is not a life threatening disorder [1, 2]. The histological hyperplasia of the prostate begins approximately in 40% of the men aged 50 years and above. By the age of eighty, almost 90% of the men have histological evidence of benign prostatic hyperplasia [3, 4].

The lower urinary tract symptoms (LUTS) caused by bladder outlet obstruction (BOO) secondary to BPH continue to pose a major problem for the contemporary medical care system. Patients with BPH present with obstructive (decreased force and caliber of stream, hesitancy, sensation of incomplete bladder emptying, straining to urinate and post void dribbling) and irritative symptoms (urgency, frequency and nocturia) collectively referred to as lower urinary tract symptoms (LUTS) [5].

At the present point of time most surgeons accept that a patient of enlarged prostate with features of bladder outlet obstruction is best treated with Transurethral Resection of Prostate (TURP) as it is associated with best results and with a very high patient satisfaction rate. Various risks and complications associated with TURP are major hemorrhage, perforation of prostatic capsule with extravasation of urine, TUR syndrome, urinary tract infection, incontinence, erectile dysfunction, retrograde ejaculation and bladder neck stenosis [1 6, 7]. Along with these complications, TURP is also associated with the relatively long hospital stay (3 – 5 days), which adds to the costs of the procedure [6].

Efforts are on to minimize these complications and at the same time keep the merits of TURP but one such technique showing such potential is Transurethral Electro-Vaporization of Prostate (TUEVP). It is a modification of the existing

transurethral technology, is most recent promising alternative to TURP. It is based on the principal of using electric current to vaporize and desiccate prostatic tissue. Vaporization is done using high cutting current (up to 300 W) and desiccation is done using coagulation current (between 40 W and 70 W) [8, 9].

The studies available reports that the TUVF has shown to be equivalent in the symptomatic outcome to TURP with reduced complication rates and shorter hospital stays [10]. This study was undertaken to study the effectiveness and complications of TUEVP with TURP.

Materials and methods

A prospective, randomized, comparative study was conducted on patients diagnosed with benign prostatic hyperplasia in the Surgery department of tertiary care hospital. Eighty patients of symptomatic BPH who are candidates for operative treatment with prostate weighing seventy grams or less would be included in the study from December 2018 till December 2019. These patients would be randomly assigned to two groups- A and B using online random number generator. Forty patients were randomly selected patients of group A had undergone TUEVP and the remaining Forty patients of group B had undergone TURP. Clearance from institutional ethical committee was obtained before the study was started. An informed consent was obtained from each patient before they were included into the study.

The sample size was derived by setting significance level at 5% and power at 80%. A difference of improvement in IPSS score more than 15% will be taken as clinically significant [11]. All the outcomes are in terms of mean plus minus standard deviation so for sample size calculation used suitable formula. A sample size of 30 patients in each group was thus obtained. Assuming a 16% attrition rate, sample size was

increased to 40 in each group. Patients presenting with prostate weight up to 70 gm with history of urinary retention, recurrent gross hematuria and recurrent UTI were included in to the study. Patients having history or digital rectal examination suggestive of malignancy (DRE showing nodularity, ulceration or hard prostate), urethral stricture, with diabetes mellitus with poor control of disease and diabetic neuropathy, neurological disorder, taking drugs like anticholinergics, α agonists or antidepressants were excluded from the study.

A detailed history of lower urinary tract symptoms (LUTS) was taken in men with presumptive BPH. Symptoms described by patients were evaluated on International Prostate Symptom Score (IPSS) together with evaluation of quality of life (QOL). Complete general physical examination, digital rectal examination and neurological examination was performed on all patients. Routine and special investigations including transabdominal ultrasonography, Serum levels of Prostate Specific Antigen (PSA), Preoperative uroflowmetry was performed mainly to assess peak flow rate and mean flow rate.

On table urethrocystoscopy was done to assess the prostate and to rule out any urethral and bladder pathology. TURP and TUEVP was done by using standard operative procedures.

Follow up was done after 3 months. IPSS score and QOL was assessed at every visit. Uroflowmetry was repeated 3 months after discharge. Ultrasound abdomen was repeated at 3 months. A note was made of any complication (urinary retention, urinary tract infection, incontinence, impotence, retrograde ejaculation, urethral stricture, bladder neck contracture).

Results

Most of the patients in TUEVP group belonged to 61 – 65 years age group and 40% of the patients in TURP group belonged to 56 – 60 years age group. But there was no statistically

significant difference between two groups and hence were comparable with respect to age (**Table – 1**).

Table – 1: Distribution of study groups according to age group.

| Age group | TUEVP n (%) | TURP n (%) |
|--------------------|----------------|---------------|
| Less than 50 years | 8 (20.0) | 6 (15.0) |
| 51 – 55 years | 7 (17.5) | 4 (10.0) |
| 56 – 60 years | 7 (17.5) | 16 (40.0) |
| 61 – 65 years | 13 (32.5) | 6 (15.0) |
| 66 – 70 years | 1 (2.5) | 5 (12.5) |
| More than 70 years | 4 (10.0) | 3 (7.5) |
| Total | 40 (100) | 40 (100) |

χ^2 Value = 10.014, df=5, p value=0.075, NS

The mean operative time in TUEVP group was 42 minutes and 38.5 minutes in TURP group. The hospitalization was prolonged in case of TURP in comparison with the TUEVP. There was no statistically significant difference in IPSS scores, QOL, prostate size, Post void residual Urine volume, maximum flow rate and average flow rate at the baseline (**Table – 2**).

The percentage of improvement in IPSS was 82.8% in TUEVP and 85.3% in TURP, QOL was 80.9% in TUEVP and 81.1% in TURP, PVRV was 64% in TUEVP and 68.6% in TURP, maximum flow rate was 124.5% in TUEVP and 150.6% in TURP, Average flow rate was 104.3% in TUEVP and 135.6% in TURP. All the percentage differences were not significant between the two groups (**Table – 3**).

UTI, Impotence, retrograde ejaculation, Urethral stricture were the complications encountered in the TUEVP group and clot retention, catheter block and UTI were commonly seen in the TURP group (**Table – 4**).

Discussion

Benign prostatic hypertrophy (BPH) has been regarded as an important problem in elderly men. The disease is not life threatening but impairs the QOL. TURP is associated with a number of risks

and complications including major haemorrhage, perforation of prostatic capsule with extravasation of urine, TUR syndrome, urinary tract infection, incontinence, erectile dysfunction, retrograde ejaculation and bladder neck stenosis

[6, 7]. TUEVP turned out as promising procedure to reduce the risk and complications of TURP. This study was mainly undertaken to study the merits and complications of TUEVP over TURP.

Table – 2: Baseline and Operative characteristics of the study group.

| Mean \pm SD | TUEVP | TURP | T value | P value |
|---|------------------|------------------|---------|------------|
| Operative time (in minutes) | 42.0 \pm 10.0 | 38.5 \pm 7.6 | 1.763 | 0.082, NS |
| Total days for which patient was hospitalized | 2.1 \pm 0.3 | 3.1 \pm 0.4 | 12.193 | 0.000, Sig |
| International Prostate Symptom Score Pre-operatively | 24.8 \pm 3.8 | 24.0 \pm 3.6 | 0.966 | 0.337, NS |
| Quality of life | 5.02 \pm 0.8 | 4.55 \pm 0.78 | 2.63 | 0.01, NS |
| Prostate size pre-operatively (in grams) | 51.9 \pm 6.75 | 50.9 \pm 7.73 | 0.596 | 0.553, NS |
| Post Void Residual Urine Volume pre-operatively (in milliliters) | 137.1 \pm 71.6 | 146.2 \pm 68.0 | 0.584 | 0.561, NS |
| Maximum Flow Rate pre-operatively (in milliliters per second) | 8.36 \pm 2.07 | 7.73 \pm 2.24 | 1.304 | 0.196, NS |
| Average Flow Rate pre-operatively (in milliliters per second) | 4.01 \pm 1.2 | 3.6 \pm 0.9 | 7.744 | 0.085, NS |

Table – 3: Comparison of baseline and follow up scores between the two groups.

| Mean \pm SD | TUEVP | TURP | T value | P value |
|---|------------------|------------------|---------|-----------|
| Percentage of improvement of International Prostate Symptom Score at 3 months of follow up | 82.8 \pm 7.66 | 85.3 \pm 3.87 | 1.819 | 0.073, NS |
| Percentage of improvement in QOL at 3 months of follow up | 80.9 \pm 12.9 | 81.1 \pm 9.0 | 0.067 | 0.947, NS |
| Reduction of prostate Size (in grams) at 3 months of follow up | 73.4 \pm 4.4 | 72.2 \pm 4.7 | 1.121 | 0.266, NS |
| Percentage improvement in Post Void Residual Urine Volume at 3 months of follow up | 64.0 \pm 31.3 | 68.6 \pm 29.4 | 0.669 | 0.506, NS |
| Percentage improvement in Maximum flow rate (in milliliters per second) at 3 months of follow up | 124.5 \pm 77.9 | 150.6 \pm 94.5 | 1.349 | 0.181, NS |
| Percentage improvement in Average Flow Rate (in milliliters per second) at 3 months of follow up | 104.3 \pm 99.8 | 135.6 \pm 80.8 | 1.545 | 0.126, NS |

This study had shown that, most of the patients were aged above 55 years. In contrary the findings of this study, Kaplan et al have observed that the mean age was 72.8 years [12]. In a study by McAllister et al, the mean age of the patients

undergoing TURP was 69.7 years and 70.2 years in TUEVP group [13].

The mean operative time was higher in TUEVP group than TURP group. The hospitalization was prolonged in case of TURP in comparison with

the TUEVP. In a study Kaplan, et al., the mean duration of hospitalization was 2.6 +/- 0.9 in TUEVP versus 1.3 +/- 0.5 days in TURP cases [12]. In a study by Kupeli et al, the mean hospital stay in TURP cases was 4.5 days and in TUEVP cases the mean hospital stay was 2.5 days [13]. There was no statistically significant difference in IPSS scores, QOL, prostate size, Post void residual Urine volume, maximum flow rate and average flow rate at the baseline. The percentages of improvement in IPSS scores were comparable between the TUEVP and TURP groups in this study. In a study by Kaplan, et al., at 1 year IPSS decreased 66% of patients and 67% in TURP groups [12]. Hammadeh, et al.,

both groups showed a comparable significant and maintained decline in the mean IPSS, from 26.5 to 4.4 (TUVp) and from 26.6 to 5.9 (TURP) [14]. The percentage of improvement in QOL was 80.9% in TUEVP and 81.1% in TURP group. In a study by McAllister et al, the mean IPSS QoL was 4.9 at baseline, 2.3 after 2 months of follow up and 1.6 after 6 months of follow up in TURP group. In TUEVP group, the mean IPSS QoL was 4.6 at baseline, 2.6 after 2 months of follow up and 2 after 6 months of follow up [15]. In a study by Verregoso, et al., the median quality of life before surgery was 4 and after surgery was 2 [16].

Table – 4: Distribution of the study group according to complications.

| Complications | TUEVP n (%) | TURP n (%) |
|-------------------------|----------------|---------------|
| None | 34 (85.0) | 35 (87.5) |
| Clot retention | 0 | 2 (5.0) |
| Catheter block | 0 | 1 (2.5) |
| Urinary tract infection | 2 (5.0) | 2 (5.0) |
| Impotence | 1 (2.5) | 0 |
| Retrograde ejaculation | 1 (2.5) | 0 |
| Urethral stricture | 1 (2.5) | 0 |
| Total | 40 (100) | 40 (100) |

χ^2 Value = 7.014

df=6

p value=0.320, NS

PVRV was 64% in TUEVP and 68.6% in TURP group. In a study by McAllister, et al., the PVR was 171 ml at baseline, 78 ml after 2 months of follow up and 71 ml after 6 months of follow up in TURP cases. In TUEVP group, the mean PVR was 181 ml at baseline, 59 ml after 2 months of follow up and 71 ml after 6 months of follow up [15].

Maximum flow rate was 124.5% in TUEVP and 150.6% in TURP group in this study. In a study by Kaplan et al, the peak urinary flow increased 9.7 ml. per second (135%) in TUEVP and 11.3 ml per second (136%) in TURP group [12]. In a study by Hammadeh et al, the maximum flow rate increased from 8.6 to 20.8 mL/s [corrected] (TUVp) and 8.6 to 22.8 mL/s (TURP) after 1 year of follow up [14]. In a study by Verregoso,

et al., the median values for before and after treatment maximum flow rate values were 8.3 and 22.1 mL/s [16].

This study had shown that, average flow rate was 104.3% in TUEVP and 135.6% in TURP. UTI, Impotence, retrograde ejaculation, Urethral stricture were the complications encountered in the TUEVP group and clot retention, catheter block and UTI were commonly seen in the TURP group. In a study by Kaplan et al, there were no major complications in the electrovaporization group while in the resection group 1 patient required transfusion (5 units) and in 1 a clinical transurethral resection syndrome developed [12]. In a study Hammadeh, et al., two patients in each group developed urethral strictures (4%) and two patients in each group

required re-operation for residual adenoma (4%); two patients undergoing TURP had a bladder neck stricture (4%) [13].

Conclusion

The benefits and complications of TUEVP were comparable with transurethral resection of prostate.

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