



# A Study on Bipolar Transurethral Resection of Prostate (TURP) versus Transurethral Resection and Electro vaporization (TURP-TUVP) Sandwich Procedure

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## Abstract

**Background:** TURP is the gold standard for the endoscopic treatment of BPH. Nonetheless, it remains associated with significant morbidity, especially in terms of hemorrhage leading to possible blood transfusion and delayed hospital discharge. TUVP is associated with reported improvements in subjective and objective measures but a high rate of postoperative irritative symptoms and lack of tissue for histologic examination. The concept behind TURP and TUVP sandwich procedure is to overcome the drawbacks of the two procedures.

**Objective:** To compare the outcome of bipolar transurethral resection of prostate (TURP) and bipolar transurethral resection and electrovaporization of prostate (TURP-TUVP) sandwich procedure in patient with benign prostatic hyperplasia.

**Methods:** This quasi experimental study was conducted in the Department of Urology, National Institute of Kidney Diseases and Urology (NIKDU), Dhaka, Bangladesh from July 2017 to June 2019 over a period of 2 years. Sixty patients with BOO caused by benign prostatic hyperplasia scheduled for transurethral resection of prostate were included in this study. Patients were selected first by purposive sampling and were grouped into A and B with randomization. Group A patients underwent bipolar TURP while group B patients underwent sandwich method. Perioperative findings as well as IPSS Q<sub>max</sub> and PVR after 3 months of operation were compared.

**Results:** Operative time was significantly longer in TURP-TUVP group than in TURP group (P value 0.036). Post operative hospital stay was significantly longer in TURP group (P value <0.001). Catheterization time was significantly higher in TURP group (P value <0.001). Intra-operative irrigation was significantly higher in TURP-TUVP group (P value 0.001). Post operative irrigation time was significantly longer in TURP group (P value <0.001). Hemoglobin decrease was significantly higher in TURP group (P value <0.001). Similarly, sodium decrease was higher in TURP group than that of TURP-TUVP group but not statistically significant (P value 0.81). Clot retention was 2 (6.7%) in TURP group. Short-term follow up at 3 month showed no significant difference in IPSS in TURP and TURP-TUVP groups (P value 0.349), significantly higher Q<sub>max</sub> in TURP-TUVP group (P value 0.022) and significantly higher PVR in TURP group (P value 0.005).

**Keywords:** TURP-TUVP sandwich procedure

**Conclusion:** TURP-TUVP procedure has higher operative time and intraoperative irrigation, but has significantly lower catheterization time, postoperative irrigation time, hemoglobin change and hospital stay.

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## Introduction

Over the last two decades, the urology community has witnessed a procedure-frenzy era with birth and demise of many new BPH surgical instruments, each claiming to be THE treatment (Issa,2008). Young introduced endoscopic electrosurgery for prostate in 1909. In 1926, TURP was introduced by McCarthy. TURP is the gold standard for the endoscopic treatment of BPH. Nonetheless, it remains associated with significant morbidity, specially in terms of hemorrhage complications leading to delayed hospital discharge and possible blood transfusion. Large studies of TURP report morbidity rates as high as 18%.<sup>1</sup>

Prostate vaporization was first performed in 1995. Transurethral Vaporization of the prostate (TUVP) is a technique which combines tissue removal by vaporization with coagulation, thereby reducing the degree of bleeding.<sup>2</sup> TUVP is associated with reported improvements in subjective and objective measures but a high rate of postoperative irritative symptoms and lack of tissue for histologic examination.

To decrease the postoperative irritative symptoms while minimizing intraoperative and postoperative bleeding and also to obtain tissue samples, combined techniques have been proposed.

The objective of this paper was to compare the outcome of transurethral resection of prostate (TURP) and combined transurethral resection and electrovaporization of prostate (TURP-TUVP).

## Patients and Methods

Patients with BPH who undergone TURP in Department of urology, NIKDU between March 2017 to March 2019 were included in this study. One or more of the followings were considered as selection criteria : refractory urinary retention due to BPH, renal insufficiency due to BPH, complications ( recurrent UTI, haematuria, upper tract change),  $Q_{max} < 10 \text{ ml/sec}$ , failed pharmacological management or IPSS > 19. Patients with chronic urinary retention or very high PVR (>200ml), with known neurogenic bladder ,with documented or suspected prostate cancer, with bladder stone or with previous prostatic or urethral surgery were not included in this study. All patients were evaluated by detailed history, physical examination, digital rectal examination, urine analysis and culture and routine preoperative laboratory investigations. All patients were undergone uroflowmetry, prostatic volume and measurement of PVR by abdominopelvic ultrasound.

Preoperatively, IPSS QOL scores and maximum and average flowmetry ( $Q_{max}$ ,  $Q_{ave}$ ) were recorded in all patients.

Both TURP and TURP-TUVP procedure were performed under spinal anesthesia. Initial cystoscopy was done for all patients and examination under anesthesia. An Olympus 24 F resectoscope with plasmaButton electrode (Model:WA22557c) was used for TUVP and a regular loop electrode (Model:WA22302D) for TURP. The Olympus electrosurgical generator ESG-400 was set at 200 W in the pure cutting mode for TUVP, 120 W for fulguration while 0.9% saline solution was used for irrigation. The procedure commenced at the 12 o'clock position starting with vaporization from the bladder neck to the verumontanum and continuing circularly. This was followed by resection and the procedure was concluded with vaporization again, especially in the apical lobe area. Adequate hemostasis at the end of procedure was confirmed by complete absence of visible blood in the irrigation fluid effluent. A 22F three way Foley catheter was placed transurethrally to monitor postoperative irrigation.

All data belongs patients such as operative time, mean serum hemoglobin and hematocrit changes was reported preoperatively and within 24 hour postoperatively in both groups. Hospital stay and catheterization time were also reported. Volume and period of irrigation intraoperative and postoperative were calculated for all patient in both groups. Details of any complications were noted.

Short term follow-up was performed 3 months after surgery for all patients. Follow up with uroflowmetry , PVR, IPSS and QOL score were reported.

## Results

Overall, 60 patients were indicated for TUR due to BPH. Among them, 30 patients were underwent TURP-TUVP sandwich procedure and 30 were undergone the classic TURP. Mean age at surgery was  $66.87 \pm 5.96$  years and  $65.13 \pm 6.36$  years in TURP and TURP-TUVP groups respectively. Mean prostate size was  $57.20 \pm 7.27$  gram and  $56.00 \pm 7.94$  gram in TURP and TURP-TUVP groups respectively.

Preoperative IPSS,  $Q_{max}$ , PVR, hemoglobin and sodium level were reported in Table 1. Almost all the data were insignificant because the indications for the surgery were the same in both groups.

**Table 1**

|                           | TURP           | TURP-TUVP      | p-value |
|---------------------------|----------------|----------------|---------|
| Age (years)               | 66.87 ± 5.96   | 65.13 ± 6.36   | 0.281   |
| Prostate size (gram)      | 57.20 ± 7.27   | 56.00 ± 7.94   | 0.544   |
| IPSS                      | 27.10 ± 5.20   | 25.70 ± 4.62   | 0.275   |
| Q <sub>max</sub> (ml/sec) | 7.78 ± 3.07    | 7.96 ± 3.54    | 0.828   |
| PVR (ml)                  | 213.00 ± 41.37 | 211.87 ± 41.86 | 0.916   |
| Hemoglobin (g/dl)         | 12.90 ± 1.61   | 12.55 ± 1.67   | 0.408   |
| Sodium level (g/dl)       | 139.99 ± 3.40  | 139.81 ± 3.28  | 0.835   |

Unpaired t test was done to measure the level of significance

Perioperative data were registered in Table 2. Operative time was significantly longer in TURP-TUVP group than in TURP group (*P* value 0.036). Post operative hospital stay was significantly longer in TURP group (*P* value <0.001). Catheterization time was significantly higher in TURP group (*P* value <0.001). Intra-operative irrigation was significantly higher in TURP-TUVP group (*P* value 0.001). Post operative irrigation time was significantly longer in TURP group (*P* value <0.001).

Hemoglobin decrease was significantly higher in TURP group (*P* value <0.001). Similarly, sodium decrease was higher in TURP group than that of TURP-TUVP group but not statistically significant (*P* value 0.81).

Table 3 shows post operative complication in two groups. Transfusion requirement was higher in TURP group (10.0%) than that of TURP-TUVP group (3.3%) but the difference was not statistically significant. Clot retention was 2(6.7%) in TURP group.

**Table II**

|                                    | TURP          | TURP-TUVP     | p-value |
|------------------------------------|---------------|---------------|---------|
| Operative time (min)               | 48.20 ± 16.39 | 57.47 ± 16.98 | 0.036   |
| Hospital stay (days)               | 4.20 ± 1.10   | 2.57 ± 1.41   | <0.001  |
| Catheterization time (days)        | 3.43 ± 1.07   | 2.10 ± 1.18   | <0.001  |
| Intra-operative irrigation (L)     | 10.53 ± 4.48  | 14.03 ± 3.35  | 0.001   |
| Postoperative irrigation time (hr) | 27.07 ± 10.32 | 16.67 ± 8.36  | <0.001  |
| Hemoglobin decrease(g/dl)          | 1.47 ± 0.54   | 0.82 ± 0.20   | <0.001  |
| Sodium decrease (g/dl)             | 2.18 ± 0.84   | 1.95 ± 0.40   | 0.181   |

Unpaired t test was done to measure the level of significance

**Table III**

|                  | TURP     | TURP-TUVP | p-value |
|------------------|----------|-----------|---------|
| TUR syndrome     | 0 (0.0)  | 0 (0.0)   |         |
| Transfusion      | 3 (10.0) | 1 (3.3)   | 0.612   |
| Clot retention   | 2 (6.7)  | 0 (0.0)   | 0.492   |
| Total continence | 0 (0.0)  | 0 (0.0)   | 1.000   |

Fisher's Exact test was done to measure the level of significance

Short-term follow up at 3month showed no significant difference in IPSS in TURP and TURP-TUVP groups (*P* value 0.349), Q<sub>max</sub> was significantly higher in TURP-TUVP group (*P* value 0.022) and PVR was significantly higher in TURP group (*P* value 0.005) [Table-IV]

**Table IV :**

|                           | TURP          | TURP-TUVP     | p-value |
|---------------------------|---------------|---------------|---------|
| IPSS                      | 14.52 ± 2.41  | 13.93 ± 2.44  | 0.349   |
| Q <sub>max</sub> (ml/sec) | 18.90 ± 2.94  | 20.97 ± 3.82  | 0.022   |
| PVR (ml)                  | 45.30 ± 14.07 | 35.43 ± 11.95 | 0.005   |

Unpaired t test was done to measure the level of significance

## Discussion

TURP is still the standard against which all new therapies must be measured. Despite the proved efficacy of this procedure, the morbidity and high cost have led to a universal search for acceptable alternatives. The rationale behind the introduction of various less-invasive therapeutic alternatives for BPH treatment has been the desire to reduce the morbidity and hospital stay, and subsequently the cost.

In this study, mean age was  $66.87 \pm 5.96$  years and  $65.13 \pm 6.36$  years in TURP and TURP-TUVP groups respectively. Mean age of the patients was  $67.42 \pm 6.31$  years in the study of Li et al. (2013) which was almost similar to this study result.

The mean operative time of  $57.47 \pm 16.98$  in this study is however shorter than 69.5 minutes reported by Aisuodionoe-Shadrach & Akporiaye [3] and longer than the 52 minutes reported by Shokeir et al. [4] and the 45 minutes reported by Gupta et al. [5], who used TUVP alone. This is so even where the mean prostatic volume in this study (56.0 g) was more than those treated by Gupta et al.[5] and Shokeir et al.[4] as mentioned above.

Preoperative mean IPSS of the patients was  $25.14 \pm 8.18$  in the study of Li et al. [6] and  $22.2 \pm 4.9$  in the study of Aisuodionoe-Shadrach and Akporiaye [3] which were almost similar to this study result.

Preoperative mean  $Q_{max}$  of the patients was  $7.22 \pm 3.17$  ml/s in the study of Li et al. [6] and  $8.8 \pm 3.7$  ml/sec in the study of Aisuodionoe-Shadrach and Akporiaye [3] which were almost similar to this study result.

Preoperative mean PVR of the patients was  $314.0 \pm 107.1$  in the study of Aisuodionoe-Shadrach and Akporiaye [3] which was almost similar to this study result. Post operative mean IPSS of the patients was  $8.38 \pm 2.91$  in TURP procedure in the study of Li et al.[6] and  $9.0 \pm 3.9$  in TURP-TUVP in the study of Aisuodionoe-Shadrach and Akporiaye [3] which were similar to this study result.

The mean irrigation fluid volume of 10.53L and 14.03L used in this study, considering the mean resection time of 48.20 minutes and 57.47 minutes in TURP and TURP-TUVP procedure respectively, is comparable to the findings of Gupta et al. [5], who reported a mean operative of 60 minutes with a mean irrigation fluid volume of 21L for TURP while the mean operative time and mean irrigation fluid volume for TUVP was 45 minutes and 15L respectively. The mean irrigation fluid

volume used in the study of Aisuodionoe-Shadrach and Akporiaye [3] was 21.5L where mean resection time was 69.5 minutes.

Post operative mean  $Q_{max}$  of the patients was  $18.46 \pm 5.79$  ml/s in TURP procedure in the study of Li et al.[6] and  $17.6 \pm 4.5$  ml/sec in TURP-TUVP in the study of Aisuodionoe-Shadrach and Akporiaye [3] which were similar to this study result.

Post operative mean PVR of the patients was  $70.4 \pm 21.5$  in TURP-TUVP in the study of Aisuodionoe-Shadrach and Akporiaye [3] which was almost similar to this study result.

The significant improvements in the mean values of IPSS,  $Q_{max}$  and PVR at 3 month after the procedure observed in this study are similar to the findings of earlier studies by Hammadeh et al., [7], and Fowler et al.[8], although these workers compared TURP with TUVP as individual procedures. This is similar to the meta-analysis of Poulakis et al. [9] which showed that TURP and TUVP provided comparable improvements in IPSS,  $Q_{max}$  and PVR.

## Conclusion

TURP-TUVP procedure has higher operative time and intraoperative irrigation, but has significantly lower catheterization time, postoperative irrigation time, hemoglobin change and hospital stay.

## Footnotes

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