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# Comparative Analysis between Monopolar and Bipolar TURP - A Single Institute Prospective Controlled Study

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## ABSTRACT

**Background:** The 'gold standard' surgical treatment of clinically obstructive BPH is TURP, but life-threatening complications such as transurethral resection syndrome are occasionally observed. This has traditionally been provided as monopolar TURP, but morbidity associated with MTURP has led to the introduction of other surgical techniques.
**Objectives:** To compare the effects of bipolar and monopolar TURP.
**Methods:** In this prospective comparative study, 50 patients of each group undergo transurethral resection of prostate were enrolled and randomized to surgery by M-TURP or B-TURP. International Prostate Symptom Score (IPSS), uroflowmetry, ultrasonography, prevoid, postvoid and international prostate symptom score (IPSS), maximum urinary flow rate (Qmax), postvoid residual urine (PVRU) volume, and prostate volume (PV). Complications and sequelae also assessed. Comparisons performed.
**Results:** No significant differences found in baseline characteristics or operative data, No differences found in IPSS, Qmax or PVRU volume.
**Conclusions:** Based on this controlled trial, there is not significant variation in effectiveness and safety between M-TURP and Bipolar - TURP for the treatment of BPH. Accordingly, M-TURP continues to be a valid option for the treatment of BPE.

***Key words*** **-** Transurethral resection of prostate, Monopolar, Bipolar

## INTRODUCTION

BPE causes lower urinary tract symptoms (LUTS), and the management of these patients is a major concern for urological professionals.

Transurethral resection of prostate (TURP) is a standard operative procedure for patients with benign prostrate hypertrophy. Irrigants used range from distilled water to a variety of non-hemolytic solutions like glycine, saline, sorbitol and mannitol. Irrigant fluid absorption by the patient is a potentially serious complication of TURP, resulting in the TURP syndrome with appreciable morbidity and mortality [(1,2)].

As an isotonic electrolyte medium, normal saline is the most physiologic irrigant for TURP, but its electrical conducting properties prohibit its use with conventional monopolar cautery. The development of bipolar resection systems now permits the use of normal saline as an irrigant. Use of bipolar cautery has been reported to be associated with less collateral and penetrative tissue damage, lower incidence of TURP syndrome, shorter catheter indwelling times and earlier hospital discharge [(3,4)]. This study was undertaken to compare the safety and efficacy of bipolar cautery using saline as an irrigant with conventional monopolar cautery using glycine as an irrigant.

We compared the preoperative, early postoperative, and long-term urinary functions of bipolar vs conventional

monopolar TURP in a prospective randomized trial in patients with BOO attributable to BPH.

## METHOD

Between 2015 and 2018, 100 men with BPH-related LUTS were enrolled in the study and prospectively randomized in 50 patients monopolar TURP and in 50 patients bipolar TURP group. Informed consent was obtained from all patients, and the study was approved by the institutional ethics committee. A full medical history was obtained from all patients, and the patients were evaluated preoperatively using physical examination and DRE, urine analysis, urine culture, serum electrolytes, kidney function, complete blood count, PSA, the IPSS, inclusive of the question on quality of life, and uroflowmetry.

In addition, prostate volumes and post-void residual urine volumes (PVRs) were measured using TRUS and abdominal ultrasonography, respectively.

### Inclusion criteria

Patients were required to have symptomatic BPH that required surgery owing to urinary retention or failed medical therapy.

### Exclusion criteria

Patients with neurogenic bladder dysfunction, previous prostatic or urethral surgery, prostate cancer, bladder calculus and coagulopathy were excluded.

Bipolar resection was performed using the Gyrus bipolar resection system. Generator settings for cutting and coagulation were 160-180 W and 100-120 W respectively. Monopolar resection was performed using ERBEE cautery with cutting and coagulation setting of 95 and 70 W respectively.

The resectoscope used was 26 Fr Modified Iglesias double sheath continuous irrigation resectoscope with thumb operating working element. The height of the irrigation fluid was 60 cm in all cases. A 22 Fr triway catheter was inserted into all patients postoperation for 48 h, and bladder irrigation with normal saline was continued. Postoperative irrigation was used to ensure clear catheter drainage. Catheter removal was done on postoperative Day 2 in all cases.

Patients were followed-up at 1, 3, 6 and 12 months with the IPSS reassessment and Qmax obtained using rotating disc type uroflowmeter.

The Student-t- test and ANOVA test was used to compare hemoglobin (Hb), packed cell volume (PCV), osmolarity, serum electrolyte changes, IPSS and Qmax in the groups p value $< 0.05$ was considered significant.

## RESULTS

Our series consisted of 100 patients, with BPE were divided into two groups, 50 patients in monopolar TURP and 50 patients in Bipolar TURP group between 2015 and 2018 comparison of outcome between two groups was done.

**Table 1 – Age, height and weight profile**

| Variable | Monopolar (SD) | Bipolar (SD) | Significance |
|---|---|---|---|
| Mean Age (year) | 64.96 (5.2) | 65.86 (5.5) | $p > 0.05$ not significant |
| Mean Height (cm) | 163.4 (5.9) | 162.9 (5.4) | $p > 0.05$ not significant |
| Mean Weight (kg) | 56.86 (6.7) | 57.23 (8.3) | $p > 0.05$ not significant |

Demographic profiles in both the groups were comparable (table no.1). Preoperative parameters Hb, hematocrit, osmolarity and serum electrolytes also comparable. Prostate size on ultrasound ranged from 35-90 cc. Weight of resected gland, resection time and volumes of irrigant used were comparable.

The monopolar glycine group showed a greater decline in serum sodium (2.12 meq/L) compared to the bipolar saline group (1.1 meq/L). However, this was not statistically significant between the groups. Serum osmolarity declined in the monopolar glycine group by 4.2 mosm/L as compared to 0.5 mosm/L in the bipolar glycine group. This decline in osmolarity from the preoperative value was not significant in

either group. Serum potassium values showed no significant change in either group (p >0.05). The monopolar glycine and bipolar saline group not showed statistically significant decline in Hb and hematocrite (p >0.05) from the preoperative value (Table 2). The surgeons reported better coagulation and a clearer operative field with the bipolar resectoscope.

**Table 2 - Comparison of Variables between Monopolar and Bipolar groups**

| Variable | Monopolar (SD) | Bipolar (SD) | Significance |
|---|---|---|---|
| Sodium declined (mEq/L) | 2.12 | 1.1 | p > 0.05 not significant |
| Potassium declined (mEq/L) | .2 | .4 | p > 0.05 not significant |
| Osmolarity declined (mMol/L) | 4.2 | .5 | p > 0.05 not significant |
| Hematocrit declined (%) | 06.1 | 04.2 | p > 0.05 not significant |

Patient follow-up (1, 3, 6 and 12 months postoperatively) demonstrated an improvement in IPSS and Qmax in both the groups. The improvement in IPSS was comparable in both groups.

## DISCUSSION

For over 8 decades, transurethral resection of the prostate (TURP) has been considered the cornerstone of surgical management for benign prostatic obstruction, due to the procedure's outstanding, well-documented, long-term treatment efficacy. [(5)] Nevertheless, the morbidity of the procedure, notably TURP-syndrome, bleeding and urethral stricture, remains significant at 11.1%, based on a prospective, multicentre study of 10 654 men. [(6)]

In recent years, other techniques, including the use of bipolar TURP (B-TURP) have challenged conventional monopolar TURP (M-TURP). With the use of a bipolar generator, both the active and return electrodes are contained within the instrument. The principal advantage is the possible use of isotonic irrigating fluid, such as normal saline or lactate ringer, which eliminates the risk of electrolytic disturbance from systemic uptake, such as TUR syndrome.

Nevertheless, one must be fully aware that isotonic irrigants will *not* be able to prevent severe cardiac/pulmonary failure in cases of large volume uptake. Accordingly, B-TURP offers the *theoretical* advantage to provide more time to perform resection and to control hemostasis without compromising safety. Unfortunately, the true merits of this modification of conventional M-TURP remain unclear to many urologists. [(7)]

To date, several randomized trials comparing bipolar and monopolar TURP have been conducted. Although a few trials have suggested that bipolar resection is effective and potentially safer for the treatment of benign prostatic hyperplasia, most others are inconclusive and fail to demonstrate superior outcomes for B-TURP. [(8,9)] The most noteworthy study by Mamoulakis and colleagues provides the largest, multinational, meta-analysis of 16 randomized, controlled trials (RCTs) with 1406 patients [(10)]. In short, no clinically relevant differences in short-term (12 months) efficacy were detected. Data on follow-up beyond 1 year are scarce for B-TURP, which precludes an evaluation of long-term efficacy. Interestingly, the authors observed that treating 50 and 20 men with B-TURP would result in 1 less TURP-syndrome and 1 less clot retention, respectively.

The participation of multiple surgeons with varying levels of surgical skills and experience could be considered a limitation of the study.

However, our objective was to analyze the outcomes of both surgical techniques in the daily practice.

## CONCLUSIONS

Based on the observations of this prospective study suggest that the B-TURP and M-TURP are both safe and effective surgical interventions for the treatment of BPE, there is no significant variation effectiveness and safety between M-TURP

and Bipolar-TURP for the treatment of BPH.

Accordingly, M-TURP continues to be a valid option for the treatment of BPE.

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