

# Bipolar vs Monopolar Transurethral Resection of the Prostate in Iraqi Patients: A Prospective Study

## Iraklı Hastalarda Prostatın Bipolar ve Monopolar Transüretal Rezeksiyonu: Bir Prospektif Çalışma

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### Abstract

**Objective:** Bipolar transurethral resection of the prostate (TURP) is a minimally invasive procedure that causes fewer problems, and a faster resection, but requires more expensive equipment. It is the treatment of choice for benign prostatic hyperplasia. In this study, its outcomes will be compared to those of conventional monopolar TURP.

**Materials and Methods:** Twenty-seven patients aged between 52 and 65 years underwent either monopolar TURP (Group 1, n: 15) or bipolar TURP (Group 2, n: 12). Preoperative and perioperative data were recorded and analyzed, including the maximal flow rate (Qmax), prostate volume, intraoperatively resected tissue volume, resection velocity, and operation time.

**Results:** Preoperative mean prostate volumes in Groups 1, and 2 were  $82.6 \pm 21$  ml and  $78.8 \pm 12$  ml, respectively ( $p=0.117$ ). Preoperative mean serum sodium levels were  $140.4 \pm 2.3$  mmol/l in Group 1 and  $139.8 \pm 2.2$  mmol/l in Group 2. Preoperative mean serum hemoglobin values were  $15 \pm 0.8$  g/dl in Group 1, and  $14.5 \pm 2.2$  g/dl in Group 2. Postoperative mean serum sodium levels were 130.6 and 136.7 mmol/l, in Groups 1, and 2, respectively. Eight patients from the monopolar TURP group exhibited a notable drop in serum sodium levels. In the monopolar TURP group, there were 5 occurrences of TUR syndrome and 2 patients needed blood transfusions due to a mean decrease of 5 g/dl in hemoglobin levels. Complications were identified in 7 cases.

**Conclusion:** Compared to monopolar TURP, bipolar TURP is associated with a shorter hospital stay, and lower transfusion and complication rates.

**Keywords:** benign prostate hypertrophy, transurethral prostate resection, bipolar, monopolar, saline

### Öz

**Amaç:** Bipolar prostat transüretal rezeksiyonu (TURP), daha az problem ve daha hızlı rezeksiyon oranı sunan, ancak daha pahalı ekipman gerektiren minimal invaziv bir prosedürdür. Benign prostat hipertrofisi için tercih edilen tedavidir. Bu çalışmada, sonuçlar konvansiyonel monopolar TURP ile karşılaştırılacaktır.

**Gereçler ve Yöntemler:** Yaşları 52-65 arasında değişen 27 hastanın 15'ine monopolar TURP (Grup 1, n: 15) ve 12'sine bipolar TURP (Grup 2, n: 12) uygulandı. Maksimal akış hızı (Qmax), prostat hacmi, intraoperatif rezeke edilen doku hacmi, rezeksiyon hızı ve operasyon süresi dahil olmak üzere preoperatif ve perioperatif veriler kaydedildi ve analiz edildi.

**Bulgular:** Preoperatif ortalama prostat hacimleri Grup 1 ve Grup 2'de sırasıyla  $82,6 \pm 21$  ml ve  $78,8 \pm 12$  ml idi ( $p=0,117$ ). Grup 1 için preoperatif ortalama serum sodyum aralığı  $140,4 \pm 2,3$  mmol/l ve grup 2 için  $139,8 \pm 2,2$  mmol/l idi. Preoperatif ortalama serum hemoglobin değerleri Grup 1'de  $15 \pm 0,8$  g/dl, Grup 2'de  $14,5 \pm 2,2$  g/dl idi. Postoperatif ortalama serum sodyum düzeyleri Grup 1 ve Grup 2'de sırasıyla 130,6 ve 136,7 mmol/l idi. Monopolar TURP grubundan sekiz hasta, serum sodyum seviyelerinde dikkate değer bir düşüş sergiledi. Monopolar TURP grubunda 5 kez TUR sendromu görüldü ve 2 hastada hemoglobin düzeyinde ortalama 5 g/dl azalma nedeniyle kan transfüzyonu gerekti. 7 vakada komplikasyon belirlendi.

**Sonuç:** Monopolar TURP ile karşılaştırıldığında, bipolar TURP daha kısa hastanede kalış süresi ve daha düşük transfüzyon ve komplikasyon oranları ile ilişkilidir.

**Anahtar kelimeler:** benign prostat hipertrofisi, transüretal prostat rezeksiyonu, bipolar, monopolar, salin

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## Introduction

One of the most prevalent issues in older men is benign prostatic hyperplasia (BPH), which causes lower urinary tract symptoms (LUTS). With the aim of reducing side effects and improving quality of life (QoL) of the patients, numerous treatment methods are being used [1]. The gold standard for treating symptomatic BPH associated with prostate volumes ranging between 30 and 80 cc is monopolar transurethral resection of the prostate (TURP) [2]. It is approved as a treatment for LUTS secondary to BPH, but despite numerous technical advancements, it has drawbacks. Considering that it still has a morbidity rate of 11% and a death rate of 0.1%, we are looking for a new procedure that will produce the best possible functional outcomes [3]. The bipolar TURP is now being compared to the traditional monopolar TURP, with efficacy similar to the monopolar procedure but with reduced perioperative problems, insignificant TUR symptoms, lesser blood loss, and shorter catheter dwell time [4-6]. As a lengthy procedure a large prostate can be safely removed under normal saline irrigation [7]. We planned a three-arm trial with a focus on perioperative and postoperative complications as well as immediate functional outcomes because there was a lack of prospective randomized studies comparing monopolar and bipolar TURP. The aim of this study is to compare the outcomes of bipolar and monopolar TURP. To our knowledge, this two-part study is the first prospective randomized trial to compare monopolar TURP versus bipolar TURP [8-12].

## Materials and Methods

The study was conducted prospectively on patients who underwent TURP from December 2020 to December 2022. BPH patients with normal PSA, and a prostate volume not exceeding 100 cm<sup>3</sup> were included in the study. The patients with an abnormal PSA, any malignancy, stones or prostate volume exceeding 100 cm<sup>3</sup> were not included in the study.

Surgical indications were retention of urine, failure of medical therapy, and presence of hematuria. Monopolar TURP (Group 1) was applied to fifteen and bipolar TURP (Group 2) to twelve patients. Karl Storz brand 24 F cystoscopes were used for both groups. The irrigation fluid was distilled water in monopolar TURP, and normal saline in bipolar TURP. Twenty-one patients had been on an alpha-1-adrenoreceptor blocker and fifteen patients on a combination of an alpha-1-adrenoreceptor blocker and 5-alpha-reductase inhibitors for an average duration of 9 months before the surgery. At the end of the monopolar and bipolar TURP, a 22 or 24 Fr 3-way urethral Foley catheter was inserted and normal saline irrigation was used. Continuous saline irrigation was done until the urine drained from the urethral Foley catheter became clear with time. The catheters were removed when the urine became clear without continuous saline irrigation within postoperative 3-5 days. Preoperative and perioperative data were recorded and analyzed, including International Prostate Symptom Score (IPSS), maximal flow rate (Q<sub>max</sub>), prostate volume, intraoperatively resected prostatic tissue volume, resection velocity, operative time, changes in the serum levels of hemoglobin, and sodium, length of postoperative hospital stay.

## Statistical Analysis

All statistical analyzes were performed with SPSS (version 25, Armonk, US). Continuous variables were defined as mean and standard deviation (SD), and categorical variables as frequencies (n) and percentages (%). Continuous variables were compared with Mann-Whitney U test and categorical variables with Pearson chi-squared test. P-values of less than 0.05 were deemed statistically significant.

## Results

Preoperative prostate volumes were 82.6 ± 21 ml in Group 1 and 78.8 ± 12 ml in Group 2 (p=0.117) (**Table 1**). The preoperative mean serum sodium, and hemoglobin values were 140.4 ± 2.3 mmol/l vs 15 ± 0.8 g/dl in Group 1, and 139.8 ± 2.2 mmol/l vs 14.5 ± 2.2 g/dl, in Group 2, respectively. The postoperative mean serum sodium levels in Groups 1, and 2 were 130.6 and 136.7 mmol/l, respectively. Eight patients from the monopolar TURP group exhibited a notable drop in serum sodium levels. In these patients, the average decrease in serum sodium was 9 ± 1.22 mmol/l. Significant reduction in postoperative serum sodium levels below 125 mmol/l causing the TUR syndrome. The mean operative time was 55 ± 18.4 min in Group 1 and 63 ± 29.8 min in Group 2, (p=0.001). The mean resected prostate volumes were 40.6 ± 12.2 ml in Group 1 and 45.4 ± 10.9 ml in Group 2 (p<0.001). Seven patients in the monopolar TURP group had complications. There were five cases of TUR syndrome in the monopolar group where patients presented with blurred vision and disturbed consciousness. These patients were treated with IV furosemide and hypertonic saline, and 2 patients needed blood transfusions because their hemoglobin levels had decreased on average by 5 g/dl. The alterations in hemoglobin levels are statistically significant, and the bipolar group did not require blood transfusions as a result of postoperative changes in hemoglobin levels.

Postoperatively mean duration of hospital stays were 3 ± 2.3 days in Group 1 and 1 ± 1.3 days in Group 2 (p<0.001). The length of hospital stays for patients in the bipolar TURP group was less than those in the other group. Postoperative 6-month IPSS results revealed statistically significant improvement. In none of the TURP groups any urethral or meatal strictures were not noted during the 6-month follow-up period.

**Table 1.** The clinical outcome comparison between monopolar vs bipolar TURP

	Group 1 (monopolar, n=15)	Group 2 (bipolar, n=12)	P value
Age of patients, years	52-65	52-65	0.783
Prostate volume, ml	82.6±21	78.8±12	0.117
Resected volume, ml	40.6±12.2	45.4±10.9	<0.001
Operative time, min	55±18.4	63±29.8	0.001
Hospitalization, days	3±2.3	1±1.3	<0.001
Transfusion rate, n (%)	2 (13.3)	0	0.03

## Discussion

Treatment-refractory urinary retention, hematuria, bladder stones, recurrent infections, failure of drug therapy, or patient preference are the main indications for surgical treatment in BPH. In the 1920s and 1930s, conventional TURP underwent its initial development in the United States. TURP is acknowledged as the gold standard for the surgical treatment of BPH as more improvements in surgical instruments and techniques have been made with time [13]. IPSS and Qmax scores improve in about 80% of patients who undergo TURP [14].

Throughout the past three decades, TURP-related morbidities have decreased [15]. Perioperative bleeding and TUR syndrome, a result of excessive absorption of hypotonic solution, are still serious complications, and 2% of patients experience TUR syndrome. If the gland is larger than 45 ml and the excision takes more than 90 minutes, the risk is higher. If it occurs, abort the procedure and give diuretics and hypertonic saline [16]. According to our findings, bipolar TURP reduced the chance of developing TUR syndrome compared to monopolar TURP due to a lesser amount of change in serum sodium levels. Compared to monopolar TURP, bipolar TURP allows surgeons to perform the procedure more slowly and to remove more prostate tissue. Also, compared to monopolar TURP, bipolar TURP appears to be more effective at removing tissue and controlling bleeding [17]. In contrast to the need for blood transfusion in two cases in the monopolar TURP group, no transfusions were necessary in the bipolar TURP group. At this point, we should consider the fact that the use of 5-alpha reductase inhibitors such as dutasteride decreases the bleeding because of a decrease in gland vascularity.

Bipolar TURP also required shorter postoperative hospital stay than the other group. According to Starkman et al., individuals who underwent Gyrus bipolar TURP had their catheters withdrawn on average 1.4 days sooner than those who underwent monopolar TURP [18]. Eaton and Francis found that with the Gyrus method, 32 out of 40 patients could be discharged on the same day of the operation. Operators preferred bipolar TURP over monopolar TURP in multicenter research of the procedure due to cleaner resection surfaces (64%) and greater efficacy when resecting the apex of the prostate glands (93%) [19]. The utilization of monopolar TURP in large prostate glands is limited, Bhansali et al. compared bipolar TURP with monopolar TURP in their series of 70 patients with prostate glands >60 ml and reported that bipolar TURP showed excellent results in terms of perioperative blood loss, change in serum sodium levels, and duration of catheterization [20].

The main limitation of our study is very limited number of patients who were included in the study. However, due to the lack of prospectively designed studies on this subject, we think that our current study will contribute to the literature.

## Conclusions

Shorter hospital stays, low rate of transfusions, and fewer complications like TUR syndrome were advantages of bipolar TURP that were comparable to those of monopolar TURP in terms of alleviating voiding symptoms. However, there is a need for multicenter, prospective randomized studies with a higher number of patients to support our results.

**Ethics Committee Approval:** The study was approved by the Ethics Committee of Al-Iraqia University College of Medicine (Approval date, and registration number: 05.03.2023-FM.SA/36).

**Informed Consent:** An informed consent was obtained from all the patients.

**Publication:** The results of the study were not published in full or in part in form of abstracts.

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**Conflict of Interest:** The authors declare that they have no conflict of interest.

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