

Bipolar versus monopolar transurethral resection of the prostate (TURP): A prospective study of two urology centers.

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Abstract

Background and objectives: Recently, using of bipolar transurethral resection of the prostate has challenged the formal monopolar transurethral resection of the prostate. The aim of this study was to evaluate the efficacy and safety of bipolar transurethral resection of prostate versus monopolar transurethral resection of prostate in the treatment of prostate enlargement. **Methods:** From September 2018 to April 2019, appropriate sample of 44 patients with symptomatic benign prostate hyperplasia randomly assigned to two groups, first group (n=21) operated on by monopolar transurethral resection of prostate, second group (n=23) operated on by bipolar transurethral resection of prostate in Rizgary Teaching Hospital and Zheen International Hospital, all patients were fully assessed preoperatively and postoperatively by serum electrolyte, hemoglobin, operative time. **Results:** Mean resection time was 56.7 ± 5.8 minutes (monopolar) and 63.1 ± 4.7 minutes (bipolar). The mean volume of irrigant was 17.6 ± 1.6 liter (monopolar) and 20.4 ± 1.8 liter (bipolar). The monopolar group showed a greater decrease in serum Sodium (5.7 mEq/L) in contrast to the bipolar group (1.4 mEq/L), a statistically significant difference was detected. The monopolar group showed a statistically significant decrease in Hb (2.5 gm/dl) in contrast to the bipolar group (0.4 gm /dl). **Conclusions:** The study showed that bipolar transurethral resection of prostate was superior to monopolar transurethral resection of the prostate with regards to less reduction in serum Sodium level and less decline in hemoglobin level as well as less hospital stay and catheterization days.

Key words: Prostate, transurethral resection of the prostate, Bipolar, Monopolar.

Introduction

The weight of prostate gland is 20 – 25 grams, embraces the bladder's neck and covered with the prostatic capsule. When the prostate enlarges due to prostatic stromal cells hyperplasia or hypertrophy, it compresses the prostatic urethra making restriction of urinary flow. This makes uncomfortable symptoms such as frequency, urgency, nocturia, intermittency, decreased stream, and hesitancy. As Benign prostatic hyperplasia progresses, complications such as urinary tract infection or vesical stone may occur. In severe cases, the affected man may develop urinary retention, obstructive uropathy or renal failure¹. Benign prostatic hyperplasia (BPH) is a common disease of aging male where up to 15-25% of men matured 50-65 years have lower urinary tract manifestations². Ways utilized for diagnosis are; urine analysis, a digital rectal examination (DRE),

prostate-specific antigen (PSA) level analysis as well as imaging modalities². The enlarged organ causes LUTS by means of two ways; direct bladder outlet obstruction from enlarged tissue (static part) and expanded smooth muscle tone and opposition inside the developed organ (dynamic segment)³. Treatment of benign prostatic hyperplasia composed of α -1-blockers, 5- α -reductase inhibitors, anti-muscarinic and phosphodiesterase-5-inhibitors, laser therapy, transurethral resection of the prostate and open prostatectomy. Transurethral resection of the prostate TURP is a usual operative procedure for treating benign prostate hypertrophy, usually, it's done under spinal or general anesthesia. The irrigant fluids that are used with TURP are Glycine, Normal saline, Sorbitol and Mannitol. The complications which happen in TURP are the absorption of irrigant fluid by the patient, bringing about

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the transurethral resection (TUR) syndrome with marked morbidity and mortality, usually Normal saline is utilized as a physiologic fluid, but it is conducting electricity for that reason cannot be utilized with monopolar cautery⁴. In any case, with the improvement of bipolar cautery normal saline can be utilized securely. Utilizing bipolar cautery demonstrated a lower occurrence of TUR disorder, earlier hospital discharge and less complications⁵. With utilizing a bipolar generator, both the dynamic and return electrodes are contained inside a similar instrument. The principle advantage is that you can utilize isotonic fluid, for example, ordinary saline or ringer lactate which destroys the danger of electrolytic unsettling influence from foundational takes-up, for example, TUR-syndrome⁶. The aim of this study was to evaluate the efficacy and safety of bipolar transurethral resection of prostate versus monopolar transurethral resection of prostate in the treatment of prostate enlargement

Patients and methods

This is a prospective randomized trial—a comparative study, carried out between September 2018–April 2019, Rizgary Teaching Hospital and Zheen International Hospital, a total number of 44 patients who underwent either monopolar or bipolar transurethral resection of the prostate (21, unipolar and 23, bi-polar TRUP) for symptomatic BPH in Rizgary Teaching Hospital and Zheen International Hospital were included in this study. Inclusion criteria were; failed medical therapy, acute urinary retention with failed voiding trial, recurrent urinary tract infection and hematuria. Exclusion criteria were; patients with documented or suspected prostate cancer, neurogenic bladder, previous prostate surgery, urethral stricture, associated bladder stones, and renal impairment. Well-created questionnaire by the researcher was utilized for information accumulation which secured the accompanying things; quiet age, weight, and tallness, finding of preoperative blood examinations included total hemogram, serum PSA, liver and renal function tests, chest X-ray and electrocardiogram just as finding of imaging ponders including abdomen-pelvic ultrasound which was done to assess urinary tract and to gauge the post-voiding residual volume (PVR) was accounted for.

Preoperative International Prostate Symptom Score (IPSS), Qmax (maximum flow rate in mL/second) and prostate volume by transrectal ultrasound were recorded. Standard and post-procedure hemoglobin and hematocrit, resection time, the volume of irrigant used, weight of the resected gland, duration of hospital stay, the volume of blood transfusion, clot retention, duration of catheterization and duration of surgery in both groups were likewise recorded. The serum Sodium, Potassium, and osmolality at baseline, during surgery and postoperatively, were also reported. Statistical Package of Social Sciences form 20 was utilized for information passage and investigation, the mean and defamed deviation was utilized to speak to the continuous information. Independent student T-test and paired sample T-test were used to confirm significance, p-value ≤ 0.05 was considered significant. The study had been approved by the ethical committee of Kurdistan Board for Medical Specialties (KBMS) Name of the patients was kept anonymous.

Results

A sum of 44 patients was selected in this examination. The mean age of patients who were treated by M-TURP was not differing significantly from those who are treated by B-TURP (64, 63 years of age) respectively. There was no significant difference regarding presurgical prostate size, PSA level, QMAX, IPSS, QoL score, PVR, Hb%, serum Sodium level and serum Creatinine (p-value > 0.05 for all) as displayed in the, Table 1.

Table (1)Presurgical findings of the studied group.

Parameters	Mono-polar(n=21)		Bi-polar(n=23)		p-value
	Mean	SD	Mean	SD	
Prostate size	62.7	4.9	61.9	5.1	0.4
PSA	2.1	0.8	1.8	0.4	0.2
Q MAX	7.2	1.3	7.3	1.2	0.4
IPSS	21.8	2.4	21.7	2.3	0.6
Qol score	3.6	0.6	3.5	0.9	0.4
PVR	142.6	21	132	31	0.2
Hb%	13.8	0.7	13.6	0.8	0.4
Serum sodium	141.1	1.3	140.7	1.2	0.3
Creatinine	0.9	0.3	0.8	0.2	0.6

The volume of irrigant liquid was utilized with bi-polar TURP was significantly greater than that utilized with the monopolar system (20.4, 17.6 Liter) respectively, p-value=0.01. The examination exhibited there was a critical contrast (p-value =0.03) concerning resection time between two groups, where the B-TURP was finished with mean time of 63.1 minutes while the M-TURP with mean time of 56.7 minutes. The mean weight of the resected prostate with B-TURP has not differed significantly from that of the monopolar method (19.4, 18.9 gms) respectively, p-value =0.4.

The present investigation exhibited that the postoperative mean estimation of Sodium level in patients treated by B-TURP was essentially higher than the individuals who were worked on by M-TURP (138.3, 135.4 mEq/L) respectively=0.01. The outcomes appeared there was a critical contrast between two groups with respect to post-operative Hb level where the drop in Hb level was altogether lower in the bipolar group than monopolar group (p-value =0.02). The mean duration of irrigation calculated in hour was significantly higher in monopolar group in compare to bipolar group (36.4, 23.2 hours) respectively. Significant difference between two groups also reported with regard to mean duration of hospital stay and duration of catheterization in days, where the monopolar group reported higher duration of hospital stay and catheterization in compare to bipolar group (3.4, 2.3 days for hospital stay- 7.3, 5.1 for catheterization) respectively as seen in Table 2.

Table (2)Postoperative parameters of the patients

Parameters	Mono-polar		Bi-polar		p-value
	Mean	SD	Mean	SD	
Serum sodium mEq/l	135.4	1.2	139.3	1.4	0.01
Hb gm/dl	11.3	0.4	13.2	0.3	0.02
Duration of Irrigation/ hours	36.4	4.2	23.2	4.8	0.01
Duration of hospital stay /in days	3.4	0.4	2.3	0.2	0.01
Duration of catheterization /in days	7.3	0.9	5.1	1.2	0.02
IPSS	6.4	1.2	6.1	1.3	0.6
Q max	16.6	1.4	17.7	1.1	0.03

The outcomes demonstrated that the Hemoglobin level was fundamentally dropped in monopolar group than bipo-

lar group where it was dropped from 13.8 ± 0.7 mg/dl to 11.3 ± 0.4 mg/dl (the mean decrease level was 2.5 ± 0.0 mg/dl) in the monopolar group while dropped from 13.6 ± 0.8 to 13.2 ± 0.4 mg/dl (the mean decrease level was 0.4 ± 0.1 mg/dl) in bi-polar group as appeared in Figure 1.

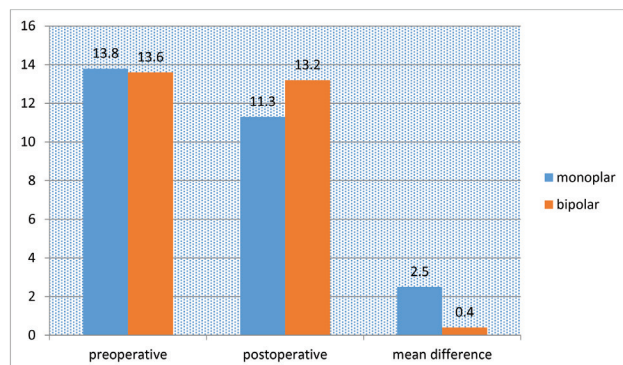


Figure (1): Difference in the mean value of Hemoglobin level (pre and post-operative) for mono and bipolar TURP. The results revealed that 23.8% of patients who were treated by M-TURP presented with clot retention while only 8.6% of patients who are managed by B-TURP were presented with clot retention. Personal satisfaction was equivalent between the two groups.

Discussion

Current study showed a fall of 1.4 mEq/L in the serum sodium concentration in the bipolar group in compare to 5.7 mEq in monopolar group, this result is nearly close to finding reported by Issa et al⁷ where their result was the mean drop in serum sodium concentration was only 1.6 mEq/L in those who used normal saline (bipolar group) in contrast to marked decrease (4.1 mEq) in those who used Glycine (monopolar group). The results of this examination confirming to consequences of an investigation conveyed by Singhania et al⁴ where they found that the drop in serum sodium in the monopolar group was higher than bipolar group (4.12 versus 1.3 mmol/l). The results of this study also demonstrated that the drop in Hemoglobin level was higher in monopolar group as compared to the bipolar group (2.5, 0.4 gm/dl) respectively, this finding was in consistent with Xing et al⁸ where they found that the decrease in Hemoglobin level in bipolar group was (0.71 g/dl) and in monopolar group was (1.15 g/dl) and with finding of Singhania, et al⁴ who has found that the decline in Hemoglobin level was 0.55 g/dl in the bipolar group and 0.97 g/dl in

monopolar group.

This study demonstrated that additional time is required for resection of prostate in bipolar group than in the monopolar group (63.1 ± 4.7 , 54.7 ± 5.8 minutes) respectively and this variation was statistically important, this outcome was correspondence with those found by Michielsen et al⁹ who found that B-TURP required additional time than M-TURP (56 ± 25 versus 44 ± 20 minutes) and result which concerned to resection time was compatible with Acun˘ A-Lo'pez, et al¹⁰ who has discovered that the period of resection for bipolar group was $64.3 \text{ min} \pm 19.4$ and that for monopolar group was $61 \text{ min} \pm 13.5$. Multicenter, Canadian, single-dazzle randomized controlled preliminary (RCT); they found that there was no important difference in resection time between two groups¹¹. This examination demonstrated that more flush liquid was utilized in the bipolar (20.4 ± 1.8 liter) than in the monopolar (17.6 ± 1.6 liter) and this is possibly due to the longer resection time. This outcome was inverse to what was found by Singhania et al⁴, where they revealed that the mean volume of liquid (Glycine) utilized in the monopolar group was 19.8 ± 5.4 liter while the mean volume of liquid (saline) utilized in the bipolar group was 18.76 ± 8.1 liter.

This study showed that there was the shorter term of post-operative irrigation, catheter time and hospital stay in the bipolar group rather than monopolar group (23.2 hours versus 36.4 hours), (5.1 days versus 7.3 days) and (2.3 versus 3.4 days) separately. These outcomes are in unity with the outcomes revealed by Giulianelli, et al¹² (1 versus 2 days for catheter time and 2 versus 3 days for the hospital remain).

Conclusions

Using the isotonic irrigating fluid with B-TURP eliminates the risk of electrolytic disturbance and reduces the incidence of TUR syndrome; in addition, faster recovery and less perioperative bleeding render this technique superior to conventional M-TURP.

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