

Bipolar Diathermy; A Step Ahead of Conventional Monopolar TURP

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Abstract

➤ Objective:

To compare the mean perioperative blood loss in monopolar versus bipolar transurethral resection prostate in patients with benign prostatic hyperplasia (BPH).

➤ Methodology:

This Randomized Controlled Trial was conducted at Urology Department, Galway University Hospital, Galway, Republic of Ireland from 1st January 2018 to 31st December 2018. Total 100 patients with benign prostatic hyperplasia (BPH) were included. The patients were divided into two groups. Group-A (Monopolar TURP), while Group-B (Bipolar TURP). Pre-operative hematocrit of each study patient was recorded. Patient were followed up after 24 hours of surgery in which hematocrit level was estimated. Blood loss was calculated by recording pre-operative and post-operative (after 24 hours) hematocrit level. Perioperative blood loss in both groups was compared through independent t-test. Data were stratified for age, duration of BPH and size of prostate. A p-value <0.05 was considered significant.

➤ Results:

One hundred patients fulfilling the inclusion criteria were included in this study. Patients were divided in two groups i.e. Group-A (Monopolar TURP) and Group-B (Bipolar TURP). The mean age of patients in group-A was 65.4±17.4 years and in group-B was 63.6±14.9 years. In group-A, mean peri-operative blood loss was 351.3±14.84 ml and 299.4±13.01 ml in group-B with a p-value of 0.000001, which is statistically significant.

➤ Conclusion:

There is a difference of mean perioperative blood loss in monopolar versus bipolar transurethral resection prostate in patients with benign prostatic hyperplasia (BPH).

Keywords:- Monopolar, Bipolar Transurethral Resection Prostate, Benign Prostatic Hyperplasia (BPH).

I. INTRODUCTION

BPH (benign prostatic hyperplasia) is an illness of old age men¹. It is categorized by epithelial cells and smooth muscle proliferation in prostate gland zone which causes symptoms of lower urinary tract². Prevalence of BPH is 20% in men with age 40-50 and 50% in age 50-60 and it increases about 90% in men older than 80 years of age.³ Aim of treatment revolves around three aspects to eliminate the symptoms of lower urinary tract (LUTS), hamper disease progression, and to reduce complications. There are many treatment modalities for BPH comprising surveillance, medical therapy and surgical management.⁴ First line treatment is medical therapy but surgical treatment is considered when medical therapy fails or patients develop complications due to BPH.⁵

Transurethral monopolar resection is considered to be the Gold standard operation for the surgical management of BPH in light of long term results shown in randomized controlled trials. It involves endoscopic removal, by use of diathermy, of inner prostate gland.⁶ This technique has great significance in improving urine flow rate, symptoms score and other parameters but it is also linked with morbidities e.g. TUR syndrome, urinary incontinence, erectile dysfunction, retrograde ejaculation and peri- and post-operative bleeding.⁷ To minimize these TURP linked complications many minimal invasive techniques introduced e.g. plasma kinetic bipolar loop resection, Holmium Laser Enucleation of the prostate (HoLEP), Photosensitive vaporization etc, which are similar to monopolar but different in rate of complications.⁸

In bipolar resection of Prostate, a special resectoscope loop used that joins both return and active electrodes, this method of flow of current minimize the risk of current flow stay.⁹ In bipolar we use normal saline as an irrigation fluid that has theoretical advantage of preventing TUR syndrome and minimizing blood loss. Bleeding has always been a significant problem in monopolar TURP and often requires blood transfusion.¹⁰ Reduced loss of blood in bipolar than monopolar has been focused in many studies.¹¹ In one study, results demonstrated that in bipolar TURP there is less intra-operative blood loss than monopolar TURP (238.5±69.43ml vs. 289.6±89.47ml).¹¹ In another study, Bipolar TURP associated with significantly less blood loss than monopolar TURP (300.0±2.47ml vs. 349.0±3.5ml).¹²

Since its introduction, Bipolar TURP has extended popularity and had challenged monopolar TURP in terms of less perioperative blood loss but there is no data

available regarding comparison of amount of blood loss between these two techniques. Rationale of the study is to find out if blood loss with bipolar is significantly less. If we are able to prove this then patients with expectant larger blood loss with monopolar diathermy may be treated with bipolar TURP. If the role of bipolar diathermy can be established in less perioperative bleeding during transurethral resection, we would be able to control an important complication (bleeding) linked with monopolar TURP.

➤ **Objective:**

To compare the mean perioperative blood loss in monopolar versus bipolar transurethral resection in patients with benign prostatic hyperplasia (BPH).

II. METHODOLOGY

This Randomized Controlled Trial was conducted at Urology Department, Galway University Hospital, Galway, Republic of Ireland from 1st January 2018 to 31st December 2018. Total 100 patients with benign prostatic hyperplasia (BPH) were included. The inclusion criteria was, patients with age between 55-75 years, having BPH. The exclusion criteria was Bleeding Disorder (PT, INR >1.5 times deranged), Chronic liver disease (AST, ALT >40 u/l) and Patients with uncontrolled hypertension (140/90 mmHg) and diabetes mellitus (FBS as 240 mg/dl).

The patients were divided into two groups. Group-A (Monopolar TURP), while Group-B (Bipolar TURP). Demographic data were recorded. Investigations including complete blood picture, urine complete and ultrasonography of abdomen and pelvis were done. Pre-operative hematocrit of each study patient was recorded. Patient were followed up after 24 hours of surgery in which hematocrit level was estimated. Blood loss was calculated

by recording pre-operative and post-operative (after 24 hours) hematocrit level.

Perioperative Blood loss in the operation and post-operative period for 24 hours was measured by hematocrit and in ml. Benign prostatic hyperplasia was defined as patients presenting with difficulty in micturition and USG shows enlarged prostate (>30 ml).

Data were analyzed by using SPSS 25. The quantitative data like age, duration of BPH, size of prostate and blood loss were presented in the form of Mean±S.D. Perioperative blood loss in both groups was compared through independent t-test. The value of p <0.05 was significant.

III. RESULTS

One hundred patients include in this study. Patients were divided in two groups i.e. Group-A (Monopolar TURP) and Group-B (Bipolar TURP). The patients mean age in group-A was 65.4±17.4 years and in group-B was 63.6±14.9 years.

In group-A, there were 24(48.0%) in 55-65 years age group, while 26(52.0%) were in 66-75 years age group. In group-B, there were 27(54.0%) in 55-65 years age group, while 23(46.0%) were in 66-75 years age group. In group-A, 30(60.0%) had duration of BPH <2 years, while 20(40.0%) had >2 years. In group-B, 25(50.0%) had duration of BPH <2 years, while 25(50.0%) had >2 years.

In group-A, 24(48.0%) had size of prostate <45 ml, while 26(52.0%) had >45 ml. In group-B, 25(50.0%) had size of prostate <45 ml, while 25(50.0%) had >45 ml. In group-A, mean peri-operative blood loss was 351.3±14.84 ml and 299.4±13.01 ml in group-B with a p-value of 0.000001, which is statistically significant.

Age groups	Groups		Total	p-value
	Group-A (Monopolar TURP)	Group-B (Bipolar TURP)		
55-65 years	24	27	51	0.548
	48.0%	54.0%	51.0%	
66-75 years	26	23	49	
	52.0%	46.0%	49.0%	
Total	50	50	100	
	100.0%	100.0%	100.0%	

Table 1:- Comparison of Age Distribution between Groups

Duration of BPH	Groups		Total	p-value
	Group-A (Monopolar TURP)	Group-B (Bipolar TURP)		
<2 years	30	25	55	0.315
	60.0%	50.0%	55.0%	
>2 years	20	25	45	
	40.0%	50.0%	45.0%	
Total	50	50	100	
	100.0%	100.0%	100.0%	

Table 2:- Comparison of Duration of BPH between Groups

Size of Prostate	Groups		Total	p-value
	Group-A (Monopolar TURP)	Group-B (Bipolar TURP)		
<45 ml	24	25	49	0.841
	48.0%	50.0%	49.0%	
>45 ml	26	25	51	
	52.0%	50.0%	51.0%	
Total	50	50	100	
	100.0%	100.0%	100.0%	

Table 3:- Comparison of Size of Prostate between Groups

Peri-operative Blood Loss	Groups	n	Mean	Std. Deviation	p-value
	Group-A (Monopolar TURP)	50	351.36	14.85	0.000001
Group-B (Bipolar TURP)	50	299.40	13.01		

Table 4:- Comparison of Peri-Operative Blood Loss between Groups

IV. DISCUSSION

BPH commonly affects older men that often leads towards troublesome symptoms and decreased quality of life. For BPH, medical therapy is first line management then surgery required eventually by men almost 20%.¹³ TURP is the most common performed surgery for BPH and a large amount of data has been accumulated over the years demonstrating its efficacy and safety.¹³

Even though TURP has a low mortality rate, there is some concern regarding perioperative morbidity, especially hemorrhage, dilutional hyponatremia, and TUR syndrome.

Hyponatremia and TUR syndrome are caused by using the non-conducting irrigation fluid glycine (1.5%) in TURP, which is hypo-osmolar.¹⁴⁻¹⁶ Mebust et al. reported a 2% incidence of TUR syndrome during M-TURP.¹⁷

TURP’s new modification is B-TURP. Due to current flow mechanism, B-TRUP permits the surgeon to do resection using saline irrigation., decreasing the risk of TUR syndrome and dilutional hyponatremia.¹⁸⁻²⁰ This method also allows long operation time in the large gland resecting. There is cut and seal effect in B-TURP and this one claimed to get best hemostasis than M-TURP.

In our study, the mean prostate size of patients undergoing M-TURP was 39.5 ± 8.3 ml, and the mean prostate size of patients undergoing B-TURP was 45.4 ± 7.2 (p=0.001). The difference was statistically significant. In contrast to this, at least one study shows a trend toward operating larger glands using monopolar technology as compared to bipolar technology, although the difference was not statistically significant.²¹

According to other studies reported in the literature, the mean prostate size varied from 42 to 82 ml for the M-TURP group and for the B-TURP group it varied from 39 to 82 ml.²²⁻²⁴ Our study shows that there are a fair number of men who present with markedly enlarged prostates.

Possible reasons for this might be a lack of awareness and lack of access to health care, resulting in late presentation to a medical facility, by which time prostate gland would have grown considerably larger. Moreover, our study shows a surgeon's "preference" for operating on the larger gland using bipolar technology. A possible explanation for this might be surgeon's perception that "larger glands may be safely operated using bipolar technology."²⁵

In our study, patients who underwent M-TURP had a mean peri-operative blood loss, 351.3 ± 14.84 ml vs 299.4 ± 13.01 ml who underwent B-TURP. This was a statistically significant difference (p=0.000001). Reduced loss of blood in bipolar than monopolar has been focused in many studies.¹¹ In one study results demonstrated that in bipolar TURP there is less intra-operative blood loss than monopolar TURP (238.5 ± 69.43 ml vs. 289.6 ± 89.47 ml).¹¹ In another study, Bipolar TURP associated with significantly less blood loss than monopolar TURP (300.0 ± 2.47 ml vs. 349.0 ± 3.5 ml).¹²

V. CONCLUSION

Bipolar diathermy usage in TURP is found to be a very effective alternative to monopolar diathermy in terms of reducing blood loss and post-operative morbidity.

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