SAFETY AND EFFICACY OF MONOPOLAR TRANSURETHRAL RESECTION OF PROSTATE IN LABORATORY PARAMETERS

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ABSTRACT

Objective: *This study aims to assess the safety and effectiveness of transurethral resection of prostate using preoperative and postoperative laboratory parameters.* ***Material & Methods:*** *This was a retrospective study of all patients treated with transurethral resection of prostate at Karawang Hospital from January – August 2018. The laboratory parameters are measured in the preoperative and postoperative period, including haemoglobin, leucocyte, and electrolyte. The outcomes of the study were the comparison of laboratory parameters before and after monopolar transurethral resection of prostate.* ***Results:*** *A total of 142 patients were enrolled in this retrospective study. The mean age was 68 years. Transurethral resection of prostate was performed in all patients. The mean of preoperative level of haemoglobin was higher compared to postoperative level (13.21 gr/dL vs 12.79 gr/dL; p = 0.000). The mean preoperative level of leucocyte was higher during postoperative time compared to preoperative time (13.450 vs 7503.52 p = 0.000). The sodium level was lower postoperative than preoperative (137.76 vs 139.39; p = 0.000). The potassium level was higher preoperative than in postoperative (4.12 vs 4.02, p = 0.000). The logistic regression was performed and shows no significant association between prostate resected weight and length of surgery compared to laboratory parameters. There was no patient who needed blood transfusion or having electrolyte derangement.* ***Conclusion:*** *Based on laboratory parameters, monopolar transurethral resection of prostate is safe and effective in the treatment of benign prostate hyperplasia.*

Keywords: *Monopolar, transurethral resection of prostate, laboratory parameters.*

ABSTRAK

Tujuan: *Penelitian ini bertujuan untuk menilai keamanan dan efektivitas reseksi prostat transurethral menggunakan parameter laboratorium pra operasi dan pasca operasi.* ***Bahan & Cara:*** *Penelitian ini merupakan penelitian retrospektif terhadap semua pasien yang dirawat dengan reseksi prostat traunsurethral di RSUD Karawang dari Januari – Agustus 2018. Parameter laboratorium diukur pada periode pra operasi dan pasca operasi, termasuk hemoglobin, leukosit, dan elektrolit. Hasil penelitian adalah perbandingan parameter laboratorium sebelum dan sesudah reseksi prostat monopolar transurethral.* ***Hasil:*** *Sebanyak 142 pasien terdaftar dalam penelitian retrospektif ini. Usia rata-rata adalah 68 tahun. Reseksi prostat transurethral dilakukan pada semua pasien. Rerata kadar hemoglobin sebelum operasi lebih tinggi dibandingkan dengan tingkat pasca operasi (13.21 gr/dL vs 12.79 gr/dL; p = 0.000). Rata-rata kadar leukosit sebelum operasi lebih tinggi pada waktu pasca operasi dibandingkan dengan waktu sebelum operasi (13.450 vs 7503.52 p = 0.000). Tingkat natrium lebih rendah pasca operasi daripada pra operasi (137.76 vs 139.39; p = 0.000). Tingkat kalium lebih tinggi sebelum operasi daripada pasca operasi (4.12 vs 4.02; p = 0.000). Regresi logistik dilakukan dan tidak menunjukkan hubungan yang signifikan antara berat prostat yang direseksi dan lama operasi dibandingkan dengan parameter laboratorium. Tidak ada pasien yang membutuhkan transfusi darah atau mengalami gangguan elektrolit.* ***Simpulan:*** *Berdasarkan parameter laboratorium, reseksi prostat monopolar transurethral aman dan efektif dalam pengobatan hiperplasia prostat jinak.*

Kata Kunci: *Monopolar, reseksi prostat transurethral, parameter laboratorium.*

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INTRODUCTION

Benign Prostatic Hyperplasia (BPH) is the most significant urologic problem among men in Indonesia. Despite many modern techniques such as Transurethral Needle Ablation of the prostate and Vaporization using laser, Transurethral Resection of Prostate TURP remains the gold standard of BPH.[1,2]

There are two techniques of TURP, monopolar TURP and bipolar TURP.[3] Monopolar TURP is widely used in Indonesia because it is more cost-effective and available in many hospitals. However, monopolar TURP is associated with some morbidity.[4] Some TURP complications include blood loss intraoperative or postoperative, electrolyte derangement, and Transurethral Resection Syndrome.[5]

The irrigants used in monopolar TURP is hypoosmolar, such as distilled water, glycine, and dextrose.[6] This hypoosmolar solution may result in serious complication such as Transurethral Resection Syndrome (TURS) which have significant morbidity and mortality. The use of an iso-osmolar solution such as normal saline reduces this complication, however, it only can be used in bipolar TURP.[7]

MATERIAL & METHODS

This was a retrospective study conducted in Karawang Hospital, from January – August 2018. The patients that underwent TURP was included in this study. The technique used in TURP was monopolar using Dextrose irrigation solution. The laboratory parameters such as haemoglobin and electrolyte levels was taken preoperative and postoperative in TURP. The data was analyzed using SPSS 23 version using dependent T-test, Chi-Square, and Logistic Regression.

The exclusion criteria in this study was proven prostate cancer, and malignancy. All patients are evaluated by medical history taking, physical examination including DRE, complete blood count, serum electrolyte levels, and transabdominal ultrasonography.

Monopolar TURP was performed with a resectoscope, monopolar single-stem working element, and a standard thin-loop electrode. Several electrosurgical units were utilized and electrical generator. Dextrose 5% was used for the irrigation solution. All patients were given cephalosporin preoperatively and postoperatively. The length of surgery and resected prostate volume was recorded.

Three way foley catheter was inserted after surgery with normal saline irrigation. The catheter was removed 2-4 days postoperative. The patients was stayed in hospital for 3-5 days. During the hospital stay, sign of hyponatremia such as headache, nausea, and vomiting were observed. The laboratory parameters was taken after surgery, including haemoglobin, leukocyte, and electrolyte.

OBJECTIVE

This study aims to assess the safety and effectiveness of transurethral resection of prostate using preoperative and postoperative laboratory parameters.

RESULTS

The total patients included in this study is 142 patients.

Table 1. Demographic characteristics.

Characteristic		Mean	Standar Deviation
Age		68	
Prostate volume		52.84±7.89	7.89
Previous surgery	yes	8.45%	
	no	91.55%	
5-alpha reductase	yes	72.54%	
	no	27.46%	
Urinary infection	yes	69.72%	
	no	30.28%	
History of Urinary Retention	yes	80.28%	
	no	19.72%	
Comorbidity HT	yes	35.21%	
	no	64.79%	
Comorbidity DM	yes	14.79%	
	no	85.21%	
Serum creatinine		1.10	.215
Weight of tissue resected		28.08	9.37
Length of Surgery		55.19	3.52

There was significant decrease of haemoglobin in preoperative (13.21 ± 1.13 gr/dL) and postoperative (12.29 ± 1.19 gr/dL) period (Table 2). However, this decrease is not clinically significant. There was significant decrease of sodium (139.39 ± 4.67 and 137.76 ± 4.77, p = .000) and potassium (4.12 ± 0.57 and 4.02 ± 0.53, p = .000) after transurethral resection of prostate (Table 2). This decrease is still on normal level. There was no patients had electrolyte derangement or transurethral resection of prostate.

Table 2. Comparison of laboratory parameters before and after surgery.

	Preoperative		Postoperative		p value
	mean	SD	mean	SD	
Haemoglobin	13.21	1.13	12.79	1.19	.000
Leukocyte	7503.521	1447.590	8265.070	1357.313	.000
Sodium	139.39	4.67	137.76	4.77	.000
Potassium	4.12	0.57	4.02	0.53	.000

Table 3. Comparison of haemoglobin level pre and post-surgery.

		Preoperative		Postoperative		p value
		mean	SD	mean	SD	
Hypertension	Yes	13.324	1.21	12.702	1.27	.000
	No	13.053	0.992	12.925	1.057	.000
Five alpha-reductase inhibitor	Yes	13.077	1.154	12.831	1.2	.000
	No	13.342	1.097	12.759	1.181	.000

The mean preoperative and postoperative haemoglobin level in patients with hypertension is 13.324 and 12.702 gr/dL, respectively (p = 0.000) (Table 3). Patients without the use of five alpha-reductase inhibitor have significant decrease of haemoglobin level (13.342 and 12.759, p = 0.000) (Table 3).

Table 4. Logistic regression analysis of predictors of haemoglobin decrease.

	B	SE	P-value
Length of surgery	0.001	0.021	0.314
Hypertension	0.497	0.152	0.001
Five alpha-reductase Inhinbitor	-0.275	0.165	0.098
Prostate resected weight	0.002	0.007	0.777

From logistic regression, there is significant association between hypertension and haemoglobin decrease (p = 0.001). There is no significant association between length of surgery, five alpha-reductase inhibitor, and prostate resected weight with haemoglobin decrease (p = 0.314 and p = 0.777, respectively) (Table 4).

Table 5. Logistic regression analysis of predictors of natrium decrease.

	B	SE	P value
Length of surgery	-0.11	0.029	0.706
Prostate resected weight	0.1	0.011	0.368

There is no significant association between length of surgery and prostate resected weight with natrium decrease (p = 0.706 and p = 0.368, respectively) (Table 5). There is no significant association between length of surgery and prostate resected weight with kalium decrease. (Table 6)

Table 6. Logistic regression analysis of predictors of kalium decrease.

	B	SE	P-value
Length of surgery	-0.01	-0.067	0.433
Prostate resected weight	0	-0.044	0.607

DISCUSSION

Monopolar transurethral resection of prostate causes some complications such as bleeding and electrolyte derangement.8 The absorption of hypotonic irrigation solution may cause TUR Syndrome that have significant morbidity and mortality.[9]

One of the complications of TURP is blood loss during surgery.[10] There is statistically significant decrease in haemoglobin, sodium, and potassium after transurethral resetion of prostate. However, this decrease is not clinically significant. The mean haemoglobin levels are still within normal limit, both preoperatively and postoperatively. However, there is blood transfusion administered in two patients with haemoglobin levels below 10 gr/dL. This blood transfusion rate is the same as other study.[1]

Monopolar Transurethral Resection of Prostate use glycine or Dextrose 5% as irrigation fluid. Dextrose 5% is more physiological than glycine. It is hypotonic with osmolality 285 mOsm/L (serum osmolality is 290 mOsm/L). This is beneficial in reducing the risk of cerebral edema. Study shows that Dextrose 5% shows lower risk of TUR syndrome, lower catheterization period, and shorter hospital stay compared to glycine.

Absorption of hypotonic irrigation solution (Dextrose 5%) may cause electrolyte.[11] In this study, there is decrease level of sodium and potassium before and after surgery ($p = 0.000$). The sodium level was 139.39 ± 4.67 and 137.76 ± 4.77 ($p = 0.000$), before and after surgery, respectively. However, the changes is still within normal values (Sodium >135 and potassium > 3.5). There is no patient with electrolyte derangement dan TUR Syndrome. The other study had the same result.[12] Therefore, routine post surgery electrolyte serum test is not indicated.

Theoretically, the length of surgery adversely affect the electrolyte levels.[13] The longer the surgery, more irrigation solution are absorbed to circulation.[14] In this study, there is no significant association between length of surgery and electrolyte levels. The urinary catheter is removed after 2-4 days and the voiding trial was success in all patients. There is no urinary retention after transurethral resection of prostate. The length of stay was 3-5 days post surgery. This indicates that monopolar transurethral resection of prostate is safe and effective in treating benign prostatic hyperplasia.[15]

Further prospective study with larger samples is needed to evaluate the clinical outcome of monopolar transurethral resection of prostate.

CONCLUSION

Monopolar Transurethral Resection of the Prostate has good safety and efficacy based on laboratory parameters, length of stay, and post surgery urinary retention. Based on this study, routine electrolyte laboratorium test and blood preparation are not indicated in transurethral resection of prostate because there is no clinically significant electrolyte derangement and blood transfusion rate.

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