



SERUM SODIUM LEVEL IN TRANSURETHRAL RESECTION OF THE PROSTATE (TURP) (A CROSS SECTIONAL DESCRIPTIVE STUDY AT TWO HOSPITALS)

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ABSTRACT

OBJECTIVE: To determine the serum sodium level in transurethral resection of the prostate (TURP)

PATIENTS AND METHODS: This cross sectional type descriptive study was conducted at a private hospital Hyderabad and at tertiary care hospital attached with Ghulam Muhammad Maher Medical College, Sindh Pakistan from June 2009 to November 2009. All patients above 45-75 years of age present with history of urinary frequency, urgency, urgency incontinence, voiding at night, weak urinary stream, hesitancy, intermittency, through outdoor patient department (OPD) of the hospital, diagnosed as benign prostate hyperplasia (BPH) and planned for TURP were evaluated further for their serum sodium level preoperatively as well as postoperatively. The independent t test was applied at 95% confidence interval to compares the mean serum sodium level and the p values ≤ 0.05 was considered as statistically significant.

RESULT: Total 40 patients underwent for TURP with mean age 58.57 ± 8.72 (SD). The urinary frequency and urgency was observed in 32(80%) patients, urgency incontinence in 34 (85%) patients, voiding at night in 28(70%) patients, weak urinary stream in 15(38%) patients and hesitancy in 33(83%) patients. The hyponatremia was observed in 28(70%), preoperatively mean serum sodium was 140.7500 ± 1.0561 where as postoperatively it was 128.9500 ± 8.7617 ($p < 0.001$).

CONCLUSION: Our study identified the decrease in serum sodium level (hyponatremia) during transurethral resection of the prostate.

KEY WORDS: Sodium, Transurethral resection of the prostate, TURP, TURR, Hyponatremia.

INTRODUCTION:

Transurethral resection of the prostate (TURP) or transurethral prostatic resection (TURP) is a urological operation used to treat benign prostatic hyperplasia (BPH).¹As the name indicates, it is performed by visualizing the prostate through the urethra and removing it to be considered the effective measure for BPH.²The procedure is carried out thru spinal as well as general anesthetic, considered as gold standard and 95% of simple prostatectomy done endoscopically.³A large triple lumen is used for irrigation and drainage of bladder after the end of procedure and carried a good outcome.⁴

The aging and long term synthesis of testosterone production has a role in BPH but the actual mechanism is yet lacking. However Vom-Saal, et al gave a hereditary hypothesis in BPH.⁵The normal size of the prostate is approximately 20 grams and in BPH is became around 33 grams however it is ≥ 100 grams in the study of Garraway, et al.⁶ The symptoms of BPH is intermittent or weak urinary stream, sensation of incomplete voiding, post urinary dribbling, urinary frequency and urgency, other symptoms are urinary retention, incontinence and a palpable abdominal mass.⁷During digital rectal examination, the enlarged prostate is identified. The symptoms are independent to the size of the prostate on digital rectal examination.⁸The transurethral resection of the prostate is a considerably safe procedure, and has effectively replaced open prostatectomy in majority of cases.⁹Various clinical manifestations produced due to the absorption of large quantities of irrigating fluid during endourological procedures are together called as TURP Syndrome, though the syndrome is characteristically described during Trans

urethral resection of prostate (TURP) in up to 20% of patients.¹⁰TURP syndrome is characterized by dyspnoea, nausea, hypertension, increased central venous pressure, cerebral edema, cardiogenic shock and renal failure.¹¹Dilutional hyponatremia, water intoxication and ammonia toxicities have been postulated as the cause of TURP syndrome. Acute hyponatremia with blood sodium concentration below 115-120meq/L could be potentially serious to patient.¹² Therefore, after reviewing literature and dire need, the present study was conducted at private hospital of Hyderabad. The current study focused on the hyponatremia during transurethral resection of the prostate (TURP). This study provides the knowledge, idea and protocols that have an important role in the management parameters of patient undergoing transurethral resection of the prostate (TURP).

PATIENTS AND METHODS:

This cross sectional type descriptive study was conducted at a private setup (hospital), Hyderabad and at tertiary care hospital attached with Ghulam Muhammad Maher Medical College Sindh, Pakistan from June 2009 to November 2009. All patients above 45-75 years of age present with history of urinary frequency, urgency, urgency incontinence, voiding at night, weak urinary stream, hesitancy, intermittency, through outdoor patient department (OPD) of the hospital, were diagnosed as benign prostate hyperplasia (BPH) and planned for TURP were evaluated and enrolled in the study. The detail history was taken; complete clinical examination and routine investigation were performed. An informed consent was taken from all patients having benign prostate hyperplasia (BPH) and planned for TURP. All such patients were assessed for serum sodium level preoperatively as well as postoperatively by taking 3cc venous blood sample and send to laboratory for analysis. The fluctuation in the value of serum sodium level was estimated according to their parameters and reference range i.e. 135 mmol/L - 145 mmol/L (normal), whereas the value <135 mmol/L and >145 mmol/L was considered as disturbed i.e. hyponatremia and hypernatremia, respectively. The data was collected on pre-designed proforma. During the study all the relevant rules of medical ethics were kept in mind. The patients who refused to participate in the study, the patients who are already on diuretic therapy, the patients with diarrhea or vomiting, known cases of renal failure, congestive cardiac failure and liver cirrhosis were considered in exclusion criteria. The informed consent was taken from every

TABLE: 01
SERUM SODIUM DURING TRANSURETHRAL RESECTION OF PROSTATE (TURP)

Serum sodium	n = 40	%
Hyponatremia	28	70%
Normal	12	30%

TABLE: 02
MEAN SERUM SODIUM LEVEL DURING TRANSURETHRAL RESECTION OF PROSTATE (TURP)

SERUM SODIUM			
	Preoperative (mmol/L)	Postoperative (mmol/L)	P value
Serum sodium level	140.7500 + 1.0561	128.9500 + 8.7617	<0.001*

Results are expressed as Mean + Standard deviation

*P value is statistically significant

patient or from attendant of patients. The data was entered, saved and analyzed in SPSS version 10.00. The mean and standard deviation was calculated for age and serum sodium level. The frequency and percentage of sodium level in TURP was also calculated. The independent t test was applied to compares the means of serum sodium preoperatively as well as postoperatively at 95% confidence interval and the p values ≤ 0.05 was considered as statistically significant.

RESULTS:

Total 40 patients of BPH underwent for TURP with mean age 58.57 ± 8.72 (SD). In our study we found hyponatremia during TURP, their frequency, percentage and mean serum sodium level preoperatively as well as postoperatively is given in Table: 1-2. The urinary frequency and urgency was observed in 32(80%) patients, incontinence in 34 (85%) patients, voiding at night in 28(70%) patients, weak urinary stream in 15(38%) patients and hesitancy in 33(83%) patients.

DISCUSSION:

The transurethral resection of the prostate is a less invasive procedure than open surgery treatment options and recovery time is usually quicker. The findings of present study is consistent with the study by Ali MN, hypothesized that transurethral resection of the prostate is a considerably safe procedure and can effectively replace open prostatectomy in majority of cases with an acceptable morbidity and low mortality rates.¹³

Transurethral resection of the prostate (TURP) is complicated by fluid absorption of fluid (≥ 1000 mL) which leads to hypervolemia and electrolyte imbalance called as TURP-syndrome present as neurologic and circulatory disturbances.¹⁴In our study we identified hyponatremia in patients underwent for transurethral resection of the prostate (TURP) and it is similar with the study by Miyao et al.¹⁵Water intoxication with hyponatremia has been postulated as the primary cause for the genesis of TURP syndrome. In present study the significant change in sodium levels was noted which was independent of the type of irrigating fluid (1.5% glycine or sterile water) used for the procedure; however Moskovitz et al, demonstrates no any significant electrolyte changes when distilled water used for irrigation.¹⁶The safety for distilled water is also reported by Shih et al,¹⁷ A study by Norlen, et al also have confirmed that more the height of fluid used larger is the variation of sodium levels.¹⁸HahnRG presented a new hypothesis that the absorption of irrigating fluid into the blood during transurethral resection of the prostate is associated with diffusion of sodium ions from the interstitial fluid space into the plasma, some of this sodium is "trapped" and removed from the body in connection with bleeding and excretion of urine, the amount of trapped sodium increased with the amount of blood lost and two thirds was trapped with the plasma loss and one-third with the osmotic diuresis. This mechanism contributes to the absolute loss of sodium from the body.¹⁹The total sodium loss, however, accounts for one

third of the maximum hyponatraemia and is still dominated by the plasma-derived sodium excreted during the glycine-induced osmotic diuresis. The results of study by Shariat, et al had somewhat different presentation and displayed no statistically significant changes in serum electrolytes but other identified variables were hypotension (8.3%), hypertension (7.8%), nausea (6.4%), and vomiting (2.8%).²⁰ However, regarding the complications our study noticed hypertension in 14(35%) patients, nausea in 28(70%) patients, vomiting in 30(75%) of patients and headache in 10(25%) patients. It is very difficult to avoid occurrence of electrolyte disturbance during TURP, the best prevention could be obtained by adopting a correct surgical technique. Procedures lasting for more than 60 minutes and prostate glands weighing more than 60 grams could be associated with more complications.

The present study evaluated the serum electrolyte disturbances i.e. hyponatremia during TURP, the current study open a forum of discussion and provides an initial review and changes observed during TURP procedure. The study should be continued in advance and extended phase at different clinical setups to provide more knowledge regarding electrolyte changes during transurethral resection of the prostate.

CONCLUSION:

Our study identified the decrease in serum sodium level (hyponatremia) in transurethral resection of the prostate and emphasized on appropriate measure to prevent serious and fatal complications. The preoperative levels of sodium should be estimated and effective measures should be made before taking up the patient for transurethral resection of the prostate.

REFERENCES:

1. Rassweiler J, Teber D, Kuntz R, Hofman

- R. Complications of Transurethral Resection of the Prostate (TURP)—Incidence, Management, and Prevention. *Eur Urol* 2006;50(5):969-80
2. Anson K, Nawrocki J, Buckley J, Fowler C, Kirby R, Lawrence W, et al. A multicenter, randomized, prospective study of endoscopic laser ablation versus transurethral resection of the prostate. *Urology* 1995;46(3):305-10
 3. Rajput MJ, Memon AS, Shaikh NA. Transurethral Resection of Prostate versus Transvesical Approach: Frequency of Postoperative Urinary Incontinence: Two Year Study. *J Liaquat Uni Med Health Sci* 2009;8(2):139-142
 4. D'Ambrosio DJ, Ruth K, Horwitz EM, Chen DY, Pollack A, Buyyounouski MK. Does Transurethral Resection of Prostate (TURP) Affect Outcome in Patients Who Subsequently Develop Prostate Cancer?. *Urology* 2008;71(5):938-41
 5. vom Saal FS, Timms BG, Montano MM, Palanza P, Thayer KA, Nagel SC, et al. Prostate enlargement in mice due to fetal exposure to low doses of estradiol or diethylstilbestrol and opposite effects at high doses. *Proc Natl Acad Sci USA* 1997;94(5):2056-61.
 6. Garraway WM, Collins GN, Lee RJ. High prevalence of benign prostatic hypertrophy in the community. *Lancet*. 1991;338(8765):469-71.
 7. Thorpe A, Neal D. Benign prostatic hyperplasia. *The Lancet* 2003;361(9366):1359-67
 8. Nickel JC. Inflammation and Benign Prostatic Hyperplasia. *Urol Clin North Am* 2008;35(1):109-15
 9. Zepnick H, Steinbach F, Schuster F. Value of transurethral resection of the prostate (TURP) for treatment of symptomatic benign prostatic obstruction (BPO): an analysis of efficiency and complications in 1015 case. *Aktuelle Urol* 2008;39(5):369-72
 10. Okamura K, Terai A, Nojiri Y, Okumura K, Saito S, Ozawa H, et al. Evolution of common clinical path for transurethral resection of prostate (TURP). *Nippon Hinyokika Gakkai Zasshi* 2007;98(1):3-8
 11. Gravenstein D. Transurethral resection of the prostate (TURP) syndrome: a review of the pathophysiology and management. *Anesth Analg* 1997;84(2):438-46
 12. Moorthy HK, Philip S. Serum electrolytes in turp syndrome – is the role of potassium under estimated?. *Indian J Anaesth* 2002;46(6):441-444
 13. Ali MN. The outcome of Transurethral Resection of the Prostate *J Coll Physicians Surg Pak* 2001;11(12):743-6
 14. Gravenstein D. Transurethral resection of the prostate (TURP) syndrome: a review of pathophysiology and management. *Anaesth Analg* 1997;84:438-46.
 15. Miyao H, Tanaka K, Kotake Y, Kawazoe T, Fujioka T. Distribution of irrigating fluid in intracellular and extracellular spaces during transurethral prostatectomy II—TUR syndrome and hyponatremia. *Mausi* 1996;46:948-54
 16. Moskovitz B, Ross M, Bolker M, Rosenberg B, Levin DR. The use of distilled water as an irrigating fluid in patients undergoing transurethral resection of the prostate. *Eur Urol* 1989;16(4):267-70
 17. Shih HC, Kang HM, Yang CR, Ho WM. Safety of distilled water as an irrigating fluid for transurethral resection of the prostate. *Zhonghua Yi Xue Za Zhi (Taipei)* 1999;62(8):503-8.
 18. Norlen H, Allegen LG. A comparison between intermittent and continuous transurethral resection of the prostate. *Scand J Urol Nephrol* 1993; 27(1):21-5.
 19. Hahn RG. Trapping of electrolytes during fluid absorption in transurethral resection of the prostate. *Scand J Urol Nephrol* 1997;31(3):259-63
 20. Moharari RS, Khajavi MR, Khademhosseini P, Hosseini SR, Najafi A. Sterile Water as an Irrigating Fluid for Transurethral Resection of the Prostate: Anesthetical View of the Records of 1600 Cases. *South Med J* 2008;101(4):373-75