SAFETY OF MINERAL WATER AS AN IRRIGATING FLUID DURING TRANSURETHRAL RESECTION OF PROSTATE

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ABSTRACT
Objective: *To assess the safety, efficacy and results of drinking mineral water as an irrigating fluid in Trans-Urethral Resection of Prostate (TURP).*
Design: *A prospective quasi-experimental study from December 1999 to December 2006.*
Setting: *Dept. of Urology, Nawabshah Medical College Hospital, Nawabshah.*
Patients: *A total of 400 patients who underwent TURP.*
Methodology: *Detailed data of the patients was collected. All underwent TURP using drinking mineral water as an irrigating fluid. Details of the operation and the outcome were noted in each case.*
Results: *Excellent electro-resection and haemostasis was observed in almost all cases. The optical clarity of the mineral water was also very good. The mean resection time was one hour and the mean irrigating fluid volume 28 liters. The mineral water is a hypotonic solution, containing very low content of minerals, but no significant complications were observed in terms of haemorrhage and only six cases of TUR syndrome were noted. The mean weight of the resected tissue was 45 gms, mean post-operative irrigation time 22 hours, and the mean hospital stay 4.3 days.*
Conclusion: *Drinking mineral water, used as an irrigating fluid, is safe and inexpensive, and could be widely used in TURP; especially where glycine and other solutions are either non-available or pose financial strain.*

KEY WORDS: *Prostatectomy, TURP, TUR Syndrome, Irrigation Fluid, Drinking Mineral Water*

INTRODUCTION

Although transurethral resection of the prostate was first introduced in 1926 and popularized in the1930s, it was not until the 1940s that the trasnurethral syndrome was first understood[1,2]. The syndrome results from clinical alterations in the cardiovascular, neurological and renal functions which manifest at the end of or shortly after TURP. The syndrome may be heralded by an elevation or a decrease in the blood pressure and bradycardia; neurological symptoms like irritability, twitching, confusion, convulsions and coma; accompanied by shortness of breath, cyanosis, oliguria and renal failure. These changes are a direct response to the relatively sudden intravascular absorption of large volumes of irrigating solutions that are used during TURP. At present the association of marked hypervoleamia and dilutional hyponatraemia is thought by many to be the pathophysiological basis of the transurethearal resection syndrome[2].

Until 1946 sterile water had been used exclusively for irrigation during TURP[2]. In 1947 Creevy first suggested the use of 4% glucose solution, but although glucose eliminated haemolysis, it was largely abandoned due to the hypergylcaemia, and the stickiness of the gloves it caused during surgery[2].

In 1948 Nebsit described the criteria for an ideal solution to substitute for sterile water and first proposed the use of glycine and reported 45 resections using 2.1% glycine with out any post-operative haemolysis[3]. The present study was carried out to find out the efficacy of drinking mineral water as an irrigation fluid.

PATIENTS & METHODS

A total of 400 patients with benign enlargement of the prostate, who underwent transurethral resection of the

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prostate from Dec. 1999 to Dec. 2006 at Nawabshah Medical College Hospital were included in the study. Their ages ranged from 40-95 years, mean age being 60 years.

Diagnostic workup included digital rectal examination, urinary tract ultrasonography and uroflowmetery (where indicated). Base line investigations included complete blood picture, urine analysis and Culture, blood sugar and urea, serum electrolytes and creatinine, plasma osmolality, ECG, X-ray chest. Blood grouping and cross matching were obtained before electroresection. All patients were submitted for TURP after controlling pre-existing urinary infections.

All trans urethral resections of prostate were performed under spinal anaesthesia using the continuous irrigating resectoscope 26Fr. Peri-operative antibiotics were given to all the patients. Drinking mineral water was used during resection as an irrigating fluid. Head of pressure in fluid delivery system kept at 60 cms from operating table. Volume of irrigating fluid and resection time was recorded in every case. Three way Foleys catheter (24 Fr) was passed and continuous irrigation with normal saline solution carried out. The resected prostatic tissue was submitted for weight and histopathology.

Serum electrolytes, plasma osmolality and haematocrit were studied in every case at 6 hours and 24 hours post operatively for evidence of dilutional hyponatraemia. Urethral catheter was removed on the 4th or 5th post-operative day. Intra-operative and post-operative complications were recorded.

RESULTS

Excellent electroresection and haemostasis was observed in almost all cases. Mean resection time was one hour while mean irrigating fluid volume was 28 liters as shown in Table I.

Clinical evidence of TUR syndrome was observed in 6 (1.5%) cases while insignificant dilutional hyponatraemic changes were seen in 140 (35%) cases. Primary hemorrhage was noted in 5 (1.25%) cases due to failure of effective electro-coagulation and irrigating fluid was replaced with 5% dextrose water. Capsular perforation was seen in 8 (2%) and secondary haematuria in 30 (7.5%) cases (Table II).

The mean post-operative irrigation time was 22 hours and mean urethral catheterization time four days. The mean cost of irrigating mineral water per TURP was Rs.375/- and mean hospital stay 4.3 days (Table I).

Table I. Operative and Post-operative details of TURP

Variable	Value
Mean resection time	1 hour
Mean irrigating fluid volume	28 L
Mean hospital stay	4.3 days
Mean urethral catheter. time	4 days
Mean post-op. irrigation time	22 hours
Mean cost of mineral water per TURP session	Rs. 375/-
Mean weight of resected tissue	45 gms

DISCUSSION

Transurethral resection of prostatic (TURP) is a very common endourological procedure. Various non-electrolytic irrigating fluids are in use for TURP depending upon surgeon's choice, economy and hospital setup. The use of glycine 1.5%, 5% dextrose water and sterile water is definitively associated with some problems like non-availability, increased cost, water toxicity and possible bacterial contamination of sterile water storage containers.

It has been recognized for many years that the use of hypotonic solutions for the irrigation of bladder cavity during transurethral resection of the prostate may result in hyponatraemia and water intoxication due to rapid and excessive absorption of the solution from exposed prostatic bed, the clinical manifestations of which is termed TUR syndrome[4-7].

Use of sterile water as an irrigating fluid for TURP is an acceptable irrigant fluid option and is very economical but is potentially associated with problems of hyponat-

Table II. Intra-operative and post-operative complications of TURP

Complications	No.	%
Primary haemorrhage	05	1.25
Secondary haemorrhage	30	7.50
TUR syndrome	06	1.50
Capsular perforation	08	2.00
Dilutional hyponatraemia	140	35.00

raemia, water intoxication, bacterial contamination and other impurities[8]. The use of 5% dextrose water as an irrigating fluid for TURP is relatively inexpensive but is unsafe in diabetic patients due to its hyperglycaemic and hyponatremic effects[1,4,5].

Glycine is an ideal non-electrolyte solution, but is expensive, not easily available and is potentially associated with possible Ammonia Toxicity[6-21]. This limits its use in our hospital setup. There have been many reports in medical literature on the continuous use of sterile water as an irrigating fluid during TURP in various centers of the world[5], but none so far on the use of drinking mineral water as an irrigating medium.

The oldest patient in our series was 95 years. The mean resection time was one hour, mean irrigating fluid volume 28 liters and mean resected tissue weight was 45 gms while the mean calculated cost of mineral water per TURP session was Rs.375/-. TUR syndrome was seen in 6 (1.2%) cases. This clearly shows its inexpensiveness in terms of economy and relative clinical safety.

Other complications like primary hemorrhage and capsular perforation are related to operative techniques and nothing to do with mineral water irrigating fluid, while insignificant dilutional hyponatremic changes ranging between 125-135 mEq/L are purely related to excess water resorption from prostatic bed. These hypodilutional changes were mild and clinically insignificant, especially when the resection time is kept at the minimum possible.

CONCLUSION

TURP is a very common endourological procedure. Various non-electrolytic irrigating fluids are being used in TURP, depending upon surgeon's choice, economy and hospital setup. The use of drinking mineral water is a newer innovation in the list of irrigating fluids and can be considered as an alternate irrigating medium. It is a hypotonic solution with low mineral content, but is safe, inexpensive, and has good optical clarity, excellent electroresective properties with very low incidence of TUR syndrome and other complications.

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