

## A Three Year Review of the Use of Sterile Water as an Irrigation Fluid for Transurethral Resection of the Prostate (TURP)

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### ABSTRACT

**Background:** Irrigating fluid is necessary for transurethral resection of the prostate (TURP). Initially, water was used and paved way for newer irrigating fluids such as glycine because of attendant complications noted. Water is now used safely in many centres as an irrigating fluid. **Aim:** To determine the serum level of sodium and safety of sterile water as irrigating fluid for transurethral resection of the prostate. **Patients and Methods:** This prospective study was conducted at a private specialist hospital in Port Harcourt on 53 patients from November 2012 to April 2015. All patients who presented with lower urinary tract symptoms, diagnosed as benign prostate hyperplasia (BPH) and planned for TURP were evaluated further for their serum sodium level preoperatively as well as postoperatively. Patients analysis used were number of patients, age, preoperative and postoperative serum sodium, packed cell volume. **Results:** The change in plasma sodium concentration was not statistically significant, however hyponatremia was observed in 8 patients. There was postoperative hematuria requiring blood transfusion in 5 patients and no clinical evidence related postoperative renal impairment. **Conclusion:** Sterile water is a relatively safe solution as an irrigating fluid for TURP but attention must be paid to the inevitable blood loss during surgery.

**Keywords:** Transurethral resection of the prostate, Sodium, Hyponatraemia, Hematuria

### INTRODUCTION

Transurethral resection of the prostate (TURP) is a urological operation used to treat benign prostatic hyperplasia (BPH) [1]. It is performed by visualizing the prostate through the urethra. It is also considered to be effective measure for BPH [2]. The procedure is carried out under spinal or general anaesthesia and considered as gold standard [3]. It is the second most common surgical procedure, after cataract extraction done in men over the age of 65 years. Advancement in technology has enabled the urologist to reach all corners of the urinary system using endoscopes, causing minimal trauma to the patient [4]. The various clinical manifestations produced due to the absorption of large quantities of irrigating fluid during endourological procedures together are called TURP syndrome, occurring in 20% of the patients. TURP syndrome occurs in other endourological procedures using irrigating fluid such as percutaneous nephrolithotomy and retrograde intra-renal endo surgeries [5]. Dilutional hyponatremia, water intoxication, glycine and ammonia toxicities have been postulated as the causes for TURP syndrome. Acute hyponatremia with blood sodium concentration below 115-120meq/L could be potentially serious to the patient. Significant hyponatremia has been reported following TURP in 11-41% of the patients.

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Due to lower cost, sterile/distilled water is still widely used in many areas of the world for TURP. It remains important to investigate and prevent TURP syndrome to which we believe hemolysis and hyponatremia are important contributors. We conducted this

prospective study to evaluate the incidence of hyponatremia and its clinical effects following TURP using water. The variation in electrolytes has been correlated with other determinants such as duration of the procedure, height of the irrigating fluid column, volume of irrigating fluid used and weight of gland resected.

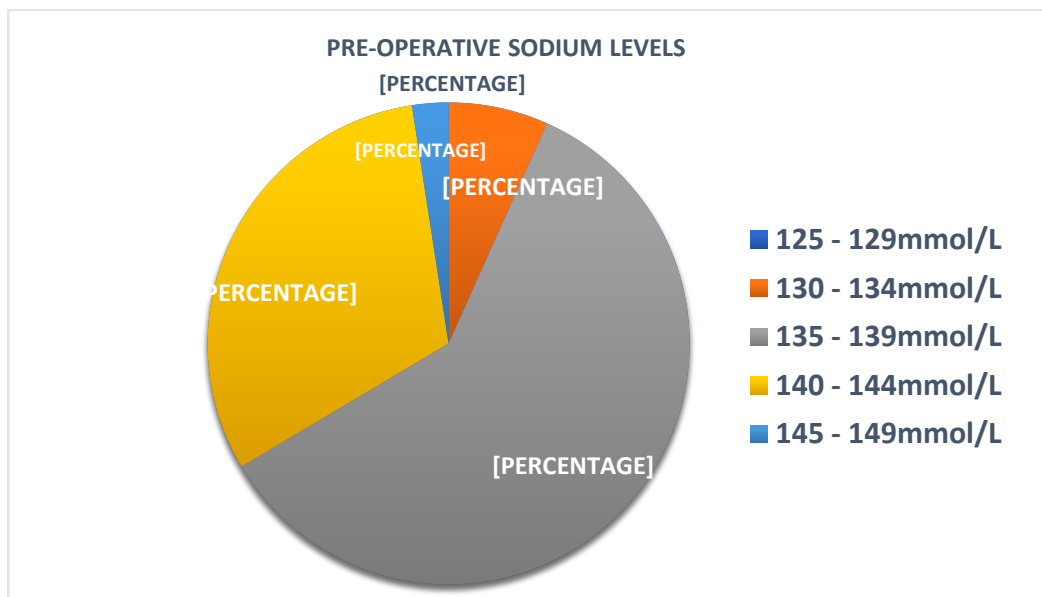
## METHODS

Between November 2012 and April 2015, a prospective study of 53 transurethral resection of the prostate (TURP) patients was done. Patients who had urinary tract symptoms with mean age 69.41 years, diagnosed of benign prostatic hyperplasia were evaluated. Exclusion criteria involved patients with carcinoma of the prostate, percutaneous nephrostomy, percutaneous nephrolithotomy and uteroscopic surgeries. Also, patients with congestive cardiac failure, known cases of renal failure, patients on diuretics and those who are vomiting or with diarrhea. Detailed history, clinical examination and routine investigations were carefully done. An informed consent was taken from all patients having benign prostatic hyperplasia and planned for TURP. TURP was routinely performed with size 26Fr resectoscope. Anaesthesia was subarachnoid block (spinal anaesthesia). Samples for serum sodium were collected preoperatively and 24 hours postoperatively and analyzed with a reference range of 130-145 mmol/L.

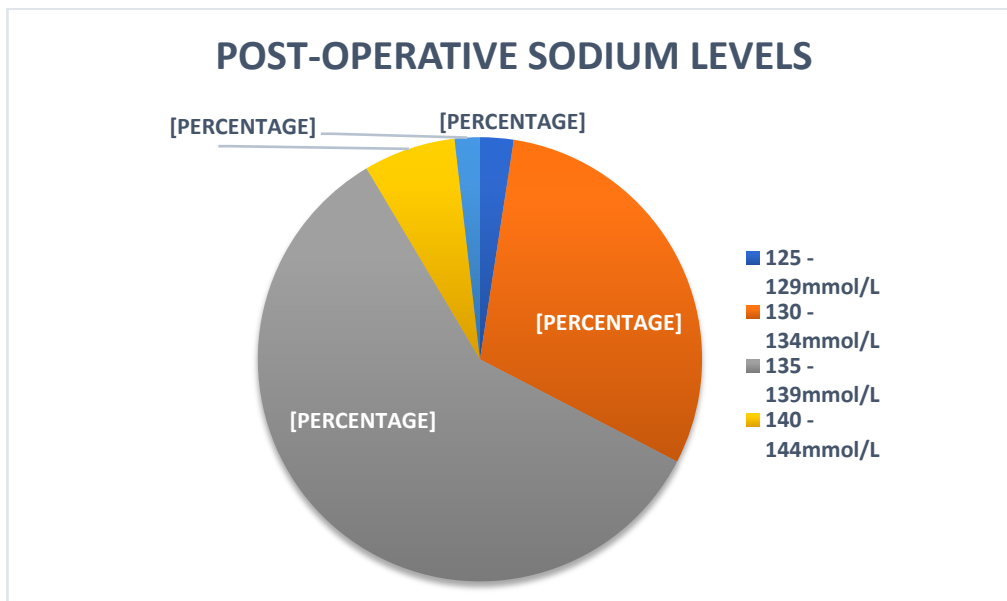
The duration of the procedure, weight of the prostate gland resected and the volume of irrigating fluid used during the procedure were recorded. The irrigating fluid used during the procedure was recorded. The irrigating fluid was kept at 40 cm height measured from the level of the pubic symphysis of the patient on the operating table.

## RESULTS

With the initial preoperative serum sodium as shown in (Figure 1), we then proceeded to performing the TURP. In our study, we found minimal hyponatremia during TURP with 2% having hyponatremia (Figure 2), with mean postoperative serum sodium 135 mmol/L. The average prostate size was 73.87g, the average time was 41.3 minutes. There were no complications in 30(53%) patients, clot retention was seen in 3(5.6%) patients, urinary incontinence seen in 2(3.7%) patients, urethral stricture seen in 3(5.6%) patients, secondary bleeding was seen in 5(9.4) patients, hypotension and drowsiness was seen in 1(1.8%) patients.



**Figure 1: Preoperative serum sodium levels (PIE CHART)**



**Figure 2: Postoperative serum sodium (PIE CHART)**

## DISCUSSION

Transurethral resection of the prostate is a less invasive procedure than open surgery treatment options and recovery time is usually quicker. Transurethral resection of the prostatitis complicated by fluid absorption leading to TURP Syndrome which lacks a stereotypical presentation, occurs at any time perioperatively and has been observed as early as few minutes after surgery has started and as late as several hours after surgery has been completed [6]. Nausea, vomiting and confusion are the most common neurologic symptoms. Hypervolemia and electrolyte imbalance have been implicated as one of the causes of TURP syndrome. Large scale fluid absorption is rare but leads to symptoms severe enough to require intensive care. Normal serum osmolality is 290 mOsm/L and serum sodium level for our study was of reference range 130-145 mmol/l. The change in serum sodium level is obvious as dilutional hyponatremia results secondary to the absorption of at least 3000 ml of irrigating fluid [7-9]. Others have also used 100mls of mannitol 20% into 5 liters of water during irrigation. Due to the high cost of glycine which has been suggested as a suitable irrigating fluid considering its many advantages we have been using sterile water for our patients. As compared to glycine (1.5 %), sterile water was found to be safe and inexpensive irrigation fluid for TURP, also in relation to the safety profile there was no difference between sterile water and glycine [10]. Identification of early symptoms of TURP syndrome and prevention is essential to retard the onset of severe and fatal manifestation in patients undergoing endoscopic surgeries. Pre-existing hyponatremia should be identified and corrected, especially in patients on diuretics and low salt diet [4,11].

## CONCLUSION

This study opens a forum of discussion and provides an initial review and changes observed during TURP procedures. Sterile water is cheap and readily available in developing Africa, however adequate measures should be taken to prevent serious and fatal complications.

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