CASE REPORT

Demerits of using glycine 1.5% as irrigation fluid for transurethral resection of prostate in patients with severe renal insufficiency

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Abstract

Transurethral Resection of Prostate (TURP) syndrome is a rare but serious complication characterized by fluid absorption, leading to life-threatening complications. Although renal insufficiency is frequently associated with the patients posted for TURP, there are no studies on the choice of irrigation fluid in patients with severe renal insufficiency. The safety of glycine has been demonstrated in mild to moderate renal insufficiency patients, but not in severe renal insufficiency patients requiring hemodialysis. We report a case of 68 year old male with severe renal insufficiency, who developed TURP syndrome with 1.5% glycine as irrigation fluid and discuss the role of various irrigation fluids in patients with severe renal insufficiency.

Keywords: TURP, Severe Renal Insufficiency, Glycine, Hemodialysis, Irrigation Fluid

Introduction

Transurethral Resection of Prostate (TURP) syndrome occurs due to fluid absorption during TURP, causing visual disturbance, headache, nausea, vomiting, and in severe cases, hyponatraemia, pulmonary oedema, seizures, and coma. Incidence of TURP syndrome has decreased over the years due to identification of risk factors, strict monitoring and availability of bipolar electrical system. Benign Prostatic Hypertrophy (BPH) is often associated with renal impairment presenting as Acute Kidney Injury (AKI), Chronic Kidney Disease (CKD) or AKI with CKD [1]. AKI can be due coexistence of obstructive uropathy or older age. Around 15-30% of patients with BPH present with renal insufficiency and more than 50% of them require hemodialysis [2]. The risk of TURP syndrome is more in such patients, hence choosing an ideal irrigation fluid is challenging. There is limited information on severity of renal insufficiency in TURP syndrome, with only one reported case about TURP syndrome in CKD patient, using sorbitol as an irrigating fluid [3]. We report a case of 68-year old male, with severe renal insufficiency, who underwent TURP with 1.5% glycine as irrigating fluid and developed TURP syndrome.

Case Report

A 68-year old male with acute urinary retention was catheterized for one month and required hemodialysis twice a week for two weeks due to severe renal dysfunction. Patient was a chronic smoker for 30 years, stopped one month back and had no other co-morbidities. Computed tomography of the abdomen revealed bilateral hydroureteronephrosis, pelvic ureteric junction calculus and a 90 g prostate. He was posted for bilateral Ureteroscopic Lithotripsy (URSL) with TURP in same sitting to alleviate obstructive uropathy at the earliest. His renal parameters are shown in Table 1.

Table 1: Renal parameters of the patient

Day since admission	Urea (mg/dl)	Creatinine (mg/dl)	Sodium (mEq/L)	Potassium (mEq/L)
Day 1	72	7.1	134.9	4.78
Day 3	78	7.6	136	5.2
Day 4 pre-dialysis	84	7.6	140	4.9
Day 4 post-dialysis	38	2.7	138.7	3.58
Day 5	52	5.8	136	3.3
Day 7 post-dialysis	44	4.8	128	3.36
Day 11	36	3.1	134.7	3.34
Day 13 post-dialysis (day of surgery)	25	1.8	135.5	3.17

All other investigations were within normal limits. Cardiac assessments (electrocardiogram and 2D ECHO) were normal. One day prior to surgery, urea was 25 mg/dl, creatinine 1.8 mg/dl, serum sodium was 135.5 mEq/L, and potassium 3.17 mEq/L. Preoperative vitals were stable.

Under strict aseptic precautions, 18G epidural catheter was threaded at L3-L4 level and tip fixed at T12-L1 interspace. Spinal anesthesia was performed with 1.5 ml of heavy bupivacaine with 25 µg of fentanyl. Right internal jugular vein was cannulated with 7F triple lumen catheter and CVP was 8 mm Hg. After a 1-hour URSL procedure, TURP was performed using 1.5% glycine as irrigation fluid. After 30 mins of prostatic resection, patient became restless and complained of visual disturbances. His heart rate dropped to 28/min which responded to injection Atropine. Nine-thousand ml of irrigation fluid and 300 ml of intra-venous fluid were used. The surgeon was informed to terminate the procedure due to suspicion of TURP syndrome. Electrolyte analysis confirmed decreased serum sodium concentration (118 mEq/L), and increased potassium (from 3.1 to 3.9 mEq/L). Total blood loss was approximately 300 ml and total duration of both the procedures was three hours. Arterial blood gas analysis showed pH of 7.23, PCO_2 – 42.9 mmHg, PO_2 -213 mmHg, lactates-0.72, and bicarbonate -17.9 meq/L. CVP was 14 mm Hg. Furosemide 20 mg IV was given and 3% NaCl was started at 15 ml/hr and was continued for next 18 hours. Serum Na+ reached 123 mEq/l after 6 h, 126 mEq/l after 12 h and 132 mEq/L after 24 h. Patient's symptoms improved after 3 hours of infusion and fully recovered 6 hours later. CVP gradually returned to normal and 24 hours later, serum urea was 42 mg% and creatinine was 1.8 mg/dl. Patient was observed in intensive care unit, later shifted to the postoperative ward.

Discussion

TURP syndrome is a rare but serious complication. Commonly used electrolyte free irrigation fluids like glycine, sorbitol and mannitol allows the use of monopolar electrical system but carry risk of fluid overload due to their hypotonicity. Glycine 1.5% is the most commonly used irrigating fluid with monopolar electrical system but associated with a higher incidence of TURP syndrome [4-5]. It has a higher incidence of hypervolemia, TURP syndrome, and cardiac toxicity when compared to 0.9% NS and 5% glucose and can also induce degenerative and toxic hepatorenal changes [5-6]. Systemically absorbed glycine gets metabolised in liver to ammonia which can cause neurological symptoms and myocardial depression. Around 5-10% of glycine is excreted unchanged in urine but in patients with severe renal insufficiency, this excretion is reduced, leading to glycine toxicity [6]. In our case, patient experienced blurred vision, bradycardia and restlessness due to systemic effects of glycine. Gupta *et al*., (2010) found that bradycardia, restlessness along with hyponatremia and hyperkalemia occurred in 8% of the patients who underwent TURP with 1.5% glycine [7].

In patients with mild to moderate renal insufficiency, glycine has been used safely without increase in incidence of TURP syndrome and dilutional hyponatremia [8]. However, there is no previous report or studies on the use of glycine for TURP in severe renal insufficiency. Therefore, we believe avoiding glycine in patients with renal insufficiency would be appropriate. An alternative to glycine in monopolar electrical system is 5% glucose which is reported to be safer but still carries the risk of fluid overload. Hence, it is better to use bipolar electrical system or laser techniques for resection with saline as irrigation fluid in renal failure patients [9]. Balanced electrolyte solutions like Ringer's lactate and Plasma-Lyte can be considered to overcome the drawbacks of normal saline but further studies are needed. The reporting of this case is as per CARE (CAse REports) guidelines [10].

Conclusion

The choice of irrigation fluid for TURP in patients with severe renal insufficiency is challenging. The use of bipolar electrical system or laser system with normal saline or balanced electrolyte solution, can be considered with strict monitoring.

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