Atypical presentation of acute hyponatremia in transurethral resection of prostate surgery: A case report

Sameer Sethi, Sonia Kapil

Department of Anesthesia, Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India

Address for correspondence:
Dr. Sameer Sethi,
Department of Anesthesia and Intensive Care, Post Graduate Institute of Medical Education and Research (PGIMER), Sector 12, Chandigarh, India.
E-mail: sethi.sameer@rediffmail.com

ABSTRACT

We report a case of unusual presentation of transurethral resection of prostate (TURP) syndrome. A 58-year-old male patient with grade III benign hypertrophic hyperplasia was scheduled for TURP under spinal anesthesia. At 120 min of surgery, the patient presented with atypical symptoms of tightness in the chest with difficulty in breathing. The electrolyte analysis revealed an acute hyponatremia (serum Na^+ 95 mEq/l). Patient was successfully treated with rapid infusion of 3% hypertonic saline along with furosemide.

Key words: *Acute hyponatremia, glycine, hypertonic saline, transurethral resection, TURP syndrome*

INTRODUCTION

The transurethral resection of prostate (TURP) syndrome is characterized by a spectrum of symptoms ranging from asymptomatic hyponatremia to electrocardiographic (ECG) changes, dizziness, headache, nausea, vomiting, convulsions, coma, and death.[1,2] Asymptomatic hyponatremia can occur in over 50% of TURPs, while clinically detectable TURP syndrome may become obvious in 2% of resections.[3,4] As the consequences of this syndrome can be serious, prompt recognition and appropriate management are important. We report a case of atypical presentation of acute hyponatremia in TURP surgery, which was managed rapidly and successfully.

CASE REPORT

A 58-year-old male patient (weight 70 kg, height 175 cm) with grade III benign hypertrophic hyperplasia was posted for TURP surgery. His general, systemic, and airway examinations were normal and he is a non-smoker.

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The laboratory investigations were within normal limits except for the ECG which showed left bundle branch block (LBBB). Echocardiography (ECHO) showed LBBB and left ventricular diastolic dysfunction (LVDD) grade I with ejection fraction (EF) = 51%. Stress thallium revealed mild reversible perfusion defect in apical and anteroseptal areas. Pre-operative electrolyte levels were: serum Na^+ = 138 mEq/l, K^+ = 4.78 mEq/l, and Cl^- = 103 mEq/l. His average pre-operative blood pressure was 116/70 mmHg and heart rate was 78 beats/min. Since the patient was asymptomatic with good effort tolerance and no other co-morbidities, spinal anesthesia was administered with 2 ml of hyperbaric bupivaciane (0.5%) with 25 μg fentanyl at L3-4 level. Routine monitoring with ECG (leads II and V), non-invasive blood pressure (NIBP), pulse oximetry, and temperature was done. Inj. Midazolam 0.5 mg was given IV for sedation. T8 level was achieved before the surgery started.

At 120 min of surgery, the surgeon told that there was accidental opening of the prostatic venous sinus and patient started complaining of tightness in the chest with difficulty in breathing. He developed no other neurological or cardiovascular symptoms and his hemodynamic parameters were normal. SPO_2 dropped to 86-88% within minutes. Bilateral basal crepts were present on auscultation of chest. We immediately informed the surgeon to terminate the surgery quickly and stopped the irrigation. We increased the fraction of inspired oxygen concentration and the patient was conscious and oriented. The chest examination revealed fine crepts in the basal areas. There was tachycardia, but no

other ECG changes, and his BP was maintained. Right radial artery was cannulated for invasive blood pressure monitoring and arterial blood gas (ABG) sample was sent. Right central venous line was inserted. Central venous pressure (CVP) was 15 mmHg. A total of 20 l of 1.5% glycine was used during the procedure. The patient was given 1.5 l of crystalloid. There was no significant blood loss. We monitored blood gases which showed serum Na^+ = 95 mEq/l, K^+ = 3.56 mEq/l, Cl^- = 72 mEq/l, pH = 7.266, PO_2 = 51.3, PCO_2 = 46.7, HCO_3 = 21.8, base excess (BE)= −5.6, and oxygen saturation (SPO_2) = 80.1. A diagnosis of TURP syndrome was made.

Furosemide 20 mg IV was given. Rapid correction of hyponatremia was started with 3% hypertonic NaCl at 150 ml/h and the patient was shifted to postoperative ICU for further monitoring and optimization.

Serum electrolytes improved to Na^+ = 104 mEq/l, K^+ = 3.69 mEq/l, Cl^- = 80 mEq/l, pH = 7.285, PO_2 = 54.9, PCO_2 = 44.7, HCO_3 = 20.8, BE = −5.8, and SPO_2 = 88.1. Symptoms of tightness in the chest wall and breathlessness improved.

About 150 ml more of 3% NaCl was infused over 1 h. ABG showed Na^+ = 112 mEq/ q/ l, K^+ = 3.87 mEq/l, Cl^- = 86 mEq/l, pH = 7.311, PO_2 = 61.7, PC q/ O_2 = 44.4, HCO_3 = 21.9, BE = −4.3, and SPO_2 = 91.3%.

Patient was dehydrated as the urine output was 1.5 l over 2 h. Patient was rapidly infused with 500 ml of 0.9% NaCl. In the postoperative ICU, further infusion of 0.9% NaCl at 100 ml/h was maintained and blood gases were monitored when the serum Na^+ reached 118 mEq/l after 6 h and 122 mEq/l after 12 h. The oxygen saturation and electrolytes continued to improve overnight and the serum sodium level increased to 132 mEq/l with potassium level of 3.35 mEq/l by the next evening.

Cardiac troponin levels measured 6 h after the event and on the next day were 0.2 and 0.15 ng/ml, respectively. Postoperative ECG and ECHO findings were similar to those seen in the pre-operative evaluation.

DISCUSSION

TURP is the second most common surgical procedure done in men. It requires the use of irrigating fluid to gently dilate the mucosal spaces, remove blood, cut tissue, and remove debris from the operating field and enable better vision. Various irrigating fluids have been used for TURP[1] and we have used 1.5% glycine as the irrigating fluid.

The potential complication of such procedure is systemic absorption of hypotonic irrigating fluid. The various clinical manifestations produced due to the absorption of large volume of irrigating fluid during TURP are together known as TURP syndrome.[1,2] Early signs of TURP syndrome are dizziness, headache, nausea, dyspnea, arrhythmias, hypertension, and bradycardia, followed by restlessness and confusion. If not treated promptly, a patient becomes cyanotic, hypotensive, and ultimately sustains cardiac arrest. Occasionally, it starts with neurological signs.[1,2,5]

Glycine solution the is most commonly used irrigant solution in traditional therapeutic endoscopic urologic procedures.[6]

Symptoms of hyponatremia usually do not develop until the serum sodium concentration decreases below 120 mEq/l. The osmolality of 1.5% glycine is 230 mOsm/l (hypotonic) as compared to serum osmolality of 290 mOsm/l. This marked hypotonicity in plasma may also result in intravascular hemolysis which leads to elevation of serum potassium level. Clinical manifestations and ECG changes (peaked T waves, prolongation of QRS complex and PR interval, and ventricular fibrillation) of hyperkalemia occur when the plasma level of potassium rises above 6 mEq/l. Hyperkalemic cardiotoxicity is increased by hyponatremia and acidosis.[7] Our patient had normal serum potassium level throughout.

Despite improvements in the current surgical and anesthetic management, 2.5-20% of patients undergoing TURP show one or more manifestations of TURP syndrome and 0.5-5% die peri-operatively.[5]

The major risk factors for TURP syndrome include the size of the opened venous sinuses, the amount of the irrigation fluid used, using excess amounts of hypotonic IV fluids, and most importantly, the duration of the resection. Procedure lasting more than 60 min and volume of prostate gland being more than 60 ml could be associated with more complications.[5]

Hahn[8] reported that shortness of breath, uneasiness, chest pain, and pulmonary edema may develop on the operating table, particularly during operations associated with small blood loss.

In our case, patient presented with symptoms of tightness in the chest wall with difficulty in breathing. This might be due to absorption of hypotonic irrigating fluid in the lungs, resulting in bilateral basal crepts and drop in oxygen saturation. He had no dizziness, headache, nausea, arrhythmias, hypertension and bradycardia, restlessness, confusion, or visual disturbances. Serum potassium remained normal throughout.

To best of our knowledge, this type of presentation in a case of acute hyponatremia has not been described in literature.

The most critical intervention in the treatment of TURP syndrome is early diagnosis and treatment. Firstly, the absorbed water must be eliminated with loop diuretics such as furosemide.[9]

Our patient's serum sodium level was 98 mEq/l which improved dramatically with rapid infusion of 3% NaCl along with furosemide to eliminate excess absorbed water. The hyponatremia is treated aggressively to avoid intravascular hemolytic, particularly if the serum sodium is below 100 mEq/l.[10] Our patient was administered 150 ml of 3% hypertonic NaCl for 2 h.

Glycine absorption has been shown to cause ECG changes associated with subacute effects on the myocardium, such as T-wave depression or inversion for up to 24 h after surgery or increased troponin.[11]

Our patient developed no ECG changes or showed any increase in cardiac troponin.

CONCLUSION

Acute hyponatremia during TURP should be diagnosed early and corrected rapidly with hypertonic saline because it can cause neurological and other complications if not corrected early.

REFERENCES

1 Jensen V. The TURP syndrome. Can J Anaesth1991;38:90-6.
2 Reich O, Gratzke C, Bachmann A, Seitz M,Schlenker B, Hermanek P, *et al*. Morbdity, mortality and early outcome of transurethral resection of the prostate: A prospective multicenter evaluation of 10,654 patients. J Urol2008; 180:246-9.
3 Okeke AA, Lodge R, Hinchliffe A, Walker A, Dickerson D, Gillatt DA. Ethanol-glycine irrigating fluid for transurethral resection of the prostate in practice. BJU Int2000;86:43-6.
4 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 cases. AktuelleUrol 2008;39:369-72.
5 Gupta K, Rastogi B, Jain M, Gupta PK, Sharma D. Electrolyte changes: An indirect method to assess irrigation fluid absorption complications during transurethral resection of prostate: A prospective study. Saudi J Anaesth2010;4:142-6.
6 Yousef AA, Suliman GA, Elashry OM, Elsharaby MD, ElgamasyAel-N. A randomized comparison between three types of irrigating fluids during transurethral resection in benign prostatic hyperplasia. BMC Anesthesiol 2010;10:7.
7 Scheingraber S, Heitmann L, Weber W, Finsterer U. Are there acid-base changes during transuretheral resection of the prostate (TURP)? AnesthAnalg2000;90:946-50.
8 Hahn RG. Fluid absorption in endoscopic surgery.Br J Anaesth1997;96:8-20.
9 Gravenstein D. Transurethral resection of the prostate (TURP) syndrome: A review of the pathophysiology and management. AnesthAnalg1997;84:438-46.
10 Monk TG, Weldon BC. The renal system and anesthesia for urologic surgery. In: Barash PG, Cullen BF, Stoelting RK. editors. Clinical anesthesia. 4th ed. Philadelphia: Lippincott Williams & Wilkins, 2000. p.100533.
11 Collins JW, Macdermott S, Bradbrook RA, Drake B, Keely FX, Timoney AG. The effects of the choice of irrigating fluid on cardiac stress during transurethral resection of the prostate: A comparison between 1.5% glycine and 5% glucose. J Urol2007;177:1369-73.

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