DILUTIONAL HYPONATRAEMIA FOLLOWING TRANSURETHRAL OPERATION FOR CLOT RETENTION

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SUMMARY

Dilutional hyponatraemia with symptoms (TUR syndrome) may occur not only in association with transurethral prostatic resection, but also in other operations in which electrolyte-free irrigating fluid is used. This case report describes a patient who developed the TUR syndrome after blood clots had been removed from the bladder with the aid of a transurethral resectoscope.

KEY WORDS


CASE REPORT

An 82-yr-old man, who had previously undergone open prostatectomy, presented with voiding difficulties. His only medication was warfarin, which had been prescribed because of transient episodes of cerebral ischaemia. Cystoscopy revealed an urethral stricture and some remaining adenomatous prostatic tissue. On two occasions, the stricture was dilated under local anaesthesia. Four days after the second dilatation, the patient developed acute urinary retention and suprapubic drainage was performed. There appeared to be a large amount of blood clot in the bladder, and it was decided to perform a transurethral blood clot evacuation procedure.

Atropine 0.25 mg i.v. was given and general anaesthesia was induced with diazepam 5 mg. Anaesthesia was maintained using a Bain circuit with a fresh gas flow of 67% nitrous oxide in oxygen at 7.5 litre min⁻¹ and 0.75% isoflurane. Isotonic crystalloid solution 1 litre and 5% glucose solution 500 ml with sodium 80 mmol were given during the operation. The urologist evacuated blood clots and coagulated bleeding vessels via a resectoscope. Glycine 2.2% in water was used to irrigate the bladder.

During the last 25 min of the procedure, which lasted for 75 min, the systolic arterial pressure increased from 110 to 150 mm Hg; heart rate was unchanged. After operation, the systolic pressure increased further to 200 mm Hg. The patient became confused and drowsy, and it was difficult to maintain an airway. Ninety minutes after operation, blood-gas analysis (whilst oxygen 4 litre min⁻¹ was given via a nasal catheter) showed $P_{a,o}$ 14.5 kPa, $P_{a,c,o}$ 5.5 kPa, pH 7.26, standard bicarbonate 18 mmol litre⁻¹ and base excess —8 mmol litre⁻¹. The serum concentration of sodium had decreased from 141 to 116 mmol litre⁻¹ during the operation. The diagnosis of transurethral prostatic resection syndrome (TUR syndrome) was made.

The patient was treated with i.v. infusion of 2% saline solution 500 ml, 200 ml of bicarbonate 0.6 mol litre⁻¹, and frusemide 40 mg. His mental functions improved slowly. However, repeated volumetric fluid balance calculations suggested that no diuresis had been induced. From immediately before the operation to 6 h after, serum creatinine concentration increased from 148 to 208 μmol litre⁻¹, and urea concentration from 10.4 to 21.2 mmol litre⁻¹. Serum concentration of sodium was still reduced (119 mmol litre⁻¹). However, a second dose of frusemide (80 mg), administered 12 h after operation, induced diuresis and during that night the patient passed urine 2 litre in excess of his fluid intake. By the next morning, serum concentration of sodium had returned to normal (135 mmol litre⁻¹), but the serum concentrations of creatinine and urea remained increased for 5 days after operation (maximum 201 μmol litre⁻¹ and 21.9 mmol litre⁻¹, respectively). The patient made a full recovery.

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Massive absorption of irrigating fluid may be prevented by placing the irrigating fluid bags no higher than 60 cm above the patient, and by limiting the duration of operation to no more than 1 h [1]. The volumes of irrigating fluid used and recovered should be compared if there is any suspicion of fluid absorption. Blood loss, serum concentration of sodium and osmolality should also be measured frequently. Hyponatraemia is a specific sign of fluid absorption, while a decrease in serum osmolality indicates that severe symptoms are likely to ensue [2]. Furthermore, at this hospital we often use an irrigating fluid containing both glycine and ethanol, which allows absorption to be monitored by means of expired breath analysis [3]. Unfortunately, none of these precautions was used during the operation described here. We were not aware of the possibility of dilutional hyponatraemia in association with evacuation of blood clot.

For many years, dilutional hyponatraemia resulting in circulatory and neurological symptoms (TUR syndrome) was thought to be a complication arising exclusively in connection with transurethral resection of the prostate. However, during the 1980s it has been apparent that the TUR syndrome may occur also after several other surgical procedures, such as percutaneous ultrasonic lithotripsy [4, 5], vesical ultrasonic lithotripsy [6] and intrauterine endoscopic laser surgery [7]. The present report is the first to describe dilutional hyponatraemia after operation for clot retention.

The signs and symptoms of TUR syndrome in this case were consistent with those known to occur in association with transurethral prostatic resection [1, 2]. The patient developed hypertensive and encephalopathy, which remained unexplained until we received the results of serum sodium analysis. Blood-gas analysis showed metabolic acidosis, which is a common finding in TUR syndrome. In spite of treatment with hypertonic saline and bicarbonate, the patient suffered renal damage. The urinary excretion of water was low or absent during the first 8 h after operation, and the serum concentrations of urea and creatinine were increased.

In some washout procedures, normal saline may be used to irrigate the bladder. However, coagulation of bleeding vessels is often carried out, and a non-electrolyte irrigating fluid should be used. In transurethral prostatic resection, TUR syndrome results from absorption of electrolyte-free irrigating fluid through prostatic veins severed by the resectoscope. Another possibility is that the fluid is absorbed via open perforations in the prostatic capsule (extravasation). In our patient, the irrigating fluid was absorbed probably through the bleeding blood vessels responsible for clot retention. This case, together with other reports [4–7], draws attention to the possibility of TUR syndrome whenever electrolyte-free irrigating fluids are in contact with body surfaces damaged by surgery or injury.

REFERENCES