Acta Neurol. Belg., 2011, **111**, 152-154

Post operative delirium with hyponatriemia after transurethral resection of the prostate: a case of transurethral resection syndrome?

Maurizio CAVALLINI, Maria Gabriella SARACCO and Marco AGUGGIA
Neurological Department, Ospedale Cardinal Massaia, Asti, Italy

Abstract

Postoperative delirium is one of the most spectacular, frightening and misdiagnosed postoperative complications of surgery. We describe the case of a caucasian 77-year-old male patient, who developed a severe postoperative delirium after combined transurethral resection of the prostate and cystolithotripsy. This systemic and unpredictable complication of endoscopic surgery is caused by excessive absorption of electrolyte-free irrigation fluids, leading to brain edema and metabolic encephalopathy. The clinical spectrum ranges from asymptomatic hyponatraemia, to electrocardiographic (ECG) changes, nausea, vomiting, convulsions, coma, pulmonary edema, cardiovascular compromise and death. Because of the heterogeneous clinical presentation diagnosis can be difficult. In a patient who develops alterations of consciousness with evidence of hypervolemia and hyponatremia after endoscopic surgery, transurethral resection syndrome must be considered.

Introduction

Postoperative delirium is one of the most florid, frightening and misdiagnosed postoperative complications of surgery (1). It may affect from 20% to 60% of elderly patients after operation for hip fracture or cardiac surgery. The clinical picture may vary from mild cognitive impairment to an acute confusional state (2).

Transurethral resection (TUR) syndrome is a systemic unpredictable complication of endoscopic surgery caused by excessive absorption of electrolyte-free irrigation fluids containing glycine, mannitol or sorbitol (3). The excessive fluid absorption can impair both cardiovascular and nervous system functions, the latter in the form of a metabolic encephalopathy due to cerebral edema. It may potentially lead to pulmonary edema, cardiovascular compromise, and death (4, 5, 6). The syndrome has been reported after gynecological procedures (transcervical resection of the endometrium) (7) and urological procedures, such as TUR of bladder tumours and transurethral resection of prostate (TURP) (8, 9).

Case report

A caucasian 77-year-old male patient, ASA II class, with benign prostatic hypertrophy was scheduled for combined TURP and cystolithotripsy.

In his past history, he suffered from high blood pressure and dyslipidemia. In 2009 he underwent percutaneous coronary transluminal angioplasty with a drug-eluting stent for coronary heart disease and endoscopic resection of colo-rectal poliposis without any post-operative complications.

The pre-operative general and neurological examinations were normal and there were no abnormalities on standard blood tests.

The current procedure was performed under spinal anesthesia, induced and maintained with intrathecal mepivacaine 0.5% hyperbaric solution and fentanil 6 gamma. During the procedure the patient received an intravenous saline solution (total of 2300 ml), ondansetron 8 mg and antibiotic therapy with ciprofloxacine 200 mg.

Several hours after the end of the procedure, the patients became confused and very agitated, with florid delusions and misperceptions. The clinical examination demonstrated post surgical bladder bleeding, that required blood transfusions, bladder washing and sedation with neuroleptic drugs and benzodiazepines.

Despite improvement in blood tests and haemoglobin level, the patient became more agitated and was admitted to the intensive care unit, where he was intubated and mechanically ventilated.

The patient appeared disoriented, with decreased short-term memory, reduced ability to maintain and shift attention, disorganized thinking, perceptual disturbances, slurred speach, and fluctuating alterations of arousal. Overall, the clinical picture was consistent with the DSM IV TR criteria for Delirium (10).

A brain CT was performed and showed only a moderate and diffuse cortico-subcortical atrophy. Neither infection nor focal neurological signs were detected. The ECG was normal Electrolyte analysis revealed a decrease in serum Na^+ concentration (Na^+ 125 mEq x l(-1)).

For several days the clinical picture got worse despite the continuous administration of sedative drugs, such as propofol, chlorpromazine, olanzapine, benzodiazepines, haloperidol and quetiapine. Meanwhile, the electrolyte imbalance was slowly corrected.

Seven days after admission, when the electrolyte imbalance was corrected, the patient's mental state improved and he was discharged from the intensive care unit.

Discussion

Clinically, the TUR syndrome consists of a spectrum of symptoms ranging from asymptomatic hyponatraemia, to electrocardiographic (ECG) changes, nausea, vomiting, convulsions, coma, and death (11).

Hypervolemia and hyponatremia (12, 13) are the most relevant features to define this syndrome, the latter being reported after up to 41% of TURP procedures. Asymptomatic hyponatraemia can occur in over 50% of TURPs (11), while mild to moderately severe TUR syndrome occurs in between 1 and 8% of TURPs performed (14).

Pathophysiological mechanisms comprise possible pharmacological effects of the irrigant solutes, volume effect of the irrigant water, dilution hyponatremia and brain oedema (3).

As in our case, it is usually possible to establish a causal relationship between the post operative electrolyte imbalance and the patient's clinical picture: the appearance of clinical symptoms coincides with the detection of hyponatremia, and their resolution follows the correction of the electrolyte imbalance. Nevertheless, other confounding factors may be present as in our patient. In particular, post-operative anaemia might trigger post operative delirium especially in old patients.

Conclusions

If a patient who undergoes endoscopic surgery, such as transurethral resection of the prostate, suddenly develops alteration of consciousness with evidence of hypervolemia and hyponatremia, a transurethral resection syndrome must be suspected.

It must be pointed out, however, that in a patient with post-operative delirium after endoscopic surgery, other etiological factors such as drug withdrawal or side effects, respiratory dysfunction, infection, anaemia, hypocalcemia, hyponatremia, renal failure or liver dysfunction, have to ruled out before TUR syndrome can be considered.

TUR syndrome lacks a stereotyped clinical presentation and the diagnosis can therefore be difficult. However, because its consequences can be serious, it has to be promptly recognized and managed (15).

REFERENCES

1. Shi CM, Wang DX, Chen KS, Gu XE. Incidence and risk factors of delirium in critically ill patients after non-cardiac surgery. Chin Med J (Engl). 2010 Apr 20;123(8):993-9.
2. Amador LF, Goodwin JS. Postoperative delirium in the older patient. J Am Coll Surg. 2005;200(5):767-773.
3. Ghanem AN, Ward JP. Osmotic and metabolic sequelae of volumetric overload in relation to the TUR syndrome. Br J Urol. 1990;66:71-8.
4. Jensen V. The TURP syndrome. Can J Anaesth. 1991;38:90-6.
5. Hughes PD, McNicol D, Mutton PM. *et al*. Postoperative hyponatraemic encephalopathy: water intoxication. Aust NZ J Surg. 1998;68:165-8.
6. Hahn RG. Fluid absorption in endoscopic surgery. Br J Anaesth. 2006 Jan;96(1):8-20. Epub 2005 Nov 29. Review.
7. Chui PT, Short T, Leung AKL, Tan PE, Oh TE. Systemic absorption of glycine irrigation solution during endometrial ablation by transcervical endometrial resection. Med J Aust. 1992;157:667-9.
8. Dorotta I, Basali A, Ritchey M, O'Hara JF, Sprung J. Transurethral resection syndrome after bladder perforation. Anesth. Analg. 2003;97:1536-8.
9. Hultén JO, Sundström GS. Extravascular absorption of irrigating fluid during TURP. The role of transmural bladder pressure as the driving pressure gradient. Br J Urol. 1990;65:39-42.
10. Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text Revision. Washington, DC, American Psychiatric Association, 2000.
11. Kluger MT, Szekely SM, Singleton RJ, Helps SC. Crisis management during anaesthesia: water intoxication. Qual Saf Health Care. 2005 Jun;14(3): e23.
12. Kuroda Y, Kamitani K, Yoshida H, Miyoshi H, Kishi R, Sato M, Mutsuura K, Asahi T. TURP syndrome with severe hyponatremia (98 mEq x l(-1)): a report of a case Masui. 2010 Apr;59(4):464-6.

13. Rhymer JC, Bell TJ, Perry KC, Ward JP. Hyponatraemia following transurethral resection of the prostate. Br J Urol. 1985;57:450-2.
14. Hahn RG. Early detection of the TUR syndrome by marking the irrigating fluid with 1% ethanol. Acta Anaesthesiol Scand. 1989;33:146-5.
15. Gravenstein D. Transurethral resection of the prostate (TURP) syndrome: a review of the pathophysiology and management. Anesth Analg. 1997 Feb;84(2):438-46.

Cavallini Maurizio, M.D.,
Neurological Department,
Ospedale Cardinal Massaia,
Via Conte Verde 125,
14100 Asti (Italy).
E-mail: mcavallini@asl.at.it