Carbamazepine-Induced Acute Renal Failure

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Dear Sir,

Carbamazepine is mostly used in partial seizures with complex symptoms. The most frequent adverse reactions are dizziness, drowsiness, unsteadiness, nausea and vomiting. We may also observe aplastic anemia, leukopenia, agranulocytosis, abnormal liver function tests and dermatological signs of hypersensitivity.

The kidney is rarely involved, water retention due to inappropriate secretion of anti-diuretic hormone being the most frequent adverse reaction. It has also been reported to induce tubulointerstitial nephritis in the context of an allergic reaction [1-5]. Tubular necrosis caused by carbamazepine has been reported [6]. We observed a new case of tubular necrosis as a toxic reaction secondary to over-dosage.

A 48-year-old man was admitted to hospital because of dizziness and unsteadiness. Five years before he had started carbamazepine (200[^]100 mg) therapy because of complex partial epilepsy. He had had no seizures for the last 2 years. He had no past history of renal disease. Routine blood examination and renal function tests were normal.

Two weeks before admission he complained of unsteadiness which was thought to be peripheral dizziness. He returned to the hospital complaining of dizziness, nausea and vomiting. Physical examination on admission revealed a conscious man, well hydrated, temperature 36.5°C, pulse 84, and blood pressure 140/80. He had horizontal nystagmus with no other findings. On admission hemoglobin was 11.9 g/100 ml, white cell count 8,600/mm³ with no eosinophilia; blood urea was 110 mg/dl (39.3 mmol/l) and serum creatinine 8.1 mg/dl (715 µmol/l); Na⁺ 134 mEq/l, K⁺ 3.9 mEq/l, HCO₃ 29 mEq/l. Urine showed 6-8 red cells, abundant granular casts, no white cells; protein 0.79 g/l, and Na⁺ < 10 mmol/l. The urinary output was 1,200 c³. The carbamazepine level was 14.7 µg/ml (reference values 8-12 µg/ml).

After withdrawal of carbamazepine the patient improved rapidly on conservative management of the renal failure. The dizziness and nystagmus disappeared within 24 h. During the next week urea fell to 74 mg/dl (26.3 mmol/l) and creatinine to 1.4 mg/dl (124 µmol/l).

Confirmative analysis by renal biopsy was not done because of the fast recovery of the patient. Twenty-one days later he had normal renal function, creatinine was 1 mg/dl (89

μmol/l) and urea 35 mg/dl (12.5 mmol/l). There was no proteinuria and urine analysis was normal.

Fortunately this patient came to the hospital showing symptoms of central nervous system involvement. This enabled us to detect urinary abnormalities at an early stage, leading to the early suppression of carbamazepine and thus allowing the kidneys to make a quick recovery. Acute renal failure has been related as an adverse reaction to carbamazepine, mostly as a tubulointerstitial nephritis in relation with hypersensitivity and formation of immune complexes. In this case the absence of fever, erythematous skin rash, eosinophilia, etc., suggests that it could be acute renal failure due to overdosage in the context of an acute tubular necrosis. A low fractional excretion of sodium is not opposed to this concept. In fact, we find several reports of the nonoliguric type of acute tubular necrosis with a low fractional excretion of sodium [7, 8]. To our knowledge this is the second case described in the literature referring to acute tubular necrosis resulting from treatment with carbamazepine.

References

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