LETTERS TO THE EDITOR

Mechanisms of carbamazepine-induced antidiuresis

Carbamazepine may cause water retention and hyponatraemia. Gilad’s Textbook of Medicine, Harrison’s Principles of Internal Medicine, The Textbook of Internal Medicine and the Oxford Textbook of Medicine attribute the mechanism to an excessive release of arginine vasopressin (AVP) from the neurohypophyseal system. The Oxford Textbook of Medicine states that carbamazepine does not augment AVP at renal tubular level. In Brain’s Diseases of the Nervous System, the precise mechanism is noted to remain unclear. In contrast, Goodman and Gilman’s The Pharmacological Basis of Therapeutics notes that carbamazepine has an antidiuretic effect that is sometimes associated with a reduced AVP level and indicates that the mechanisms of water retention are not clearly understood. However, the Martindale Extra Pharmacopoeia notes that alcohol and dehydration support both central and renal mechanisms, clearly noting that carbamazepine sensitises the kidney to the effects of vasopressin.

The exact mode of action of carbamazepine is controversial. There is evidence that the drug may stimulate the central release of AVP either directly or by altering the threshold of the hypothalamic osmoreceptors, while others claim that it increases the sensitivity of the AVP receptor to its agonist in both the kidney and the corticoster in the anterior pituitary gland.

The standard textbooks should be modified to encompass the diversity of the individual response to carbamazepine evident in the literature.

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Acute transient hydrocephalus in carbamazepine poisoning: a case report

The pathological changes most commonly seen in carbamazepine poisoning are in the region of the globus pallidus bilaterally, and less commonly in the thalamic temporal lobes and the cerebral white matter.1,2 Yet they acknowledged that the mechanism for the production of carbamazepine-related hyponatraemia was unclear.

While studying carbamazepine effects in normal subjects, Stephens et al3 found that there was no direct stimulation of AVP secretion but in contrast to Thomas et al4 they found that there was an increased renal sensitivity to AVP. The AVP values found at peak diuresis when taking the drug were similar to controls despite an impaired water handling. They also suggested that there was osmoreceptor resetting so that AVP secretion was in excess in dehydration but in relative excess during water loading. AVP basal values were again lowered by the drug. When a patient with carbamazepine-induced hyponatraemia was treated with demeclocycline, free water clearance rose despite an increase in plasma AVP, providing further support for a direct renal action of carbamazepine.5 Demeclocycline has been successfully used in a similar patient following the failure of phenytoin, water restriction and carbamazepine dose reduction to correct the hyponatraemia.4 Further recent evidence suggests that plasma AVP may be decreased by carbamazepine even though AVP is secreted and hypotonic saline plasma cortisol is increased. This may indicate that carbamazepine has an AVP-like action or that it increases the sensitivity of the AVP receptor to its agonist in both the kidney and the pituitary gland.

The pathological changes in the brain in this patient are similar to those seen in cases of carbamazepine poisoning and suggest the possibility of AVP release being a factor in this case. The patient had a history of chronic alcohol misuse and was taking carbamazepine for a long period of time. It is possible that the increased sensitivity to AVP was due to chronic alcohol misuse.

The patient was admitted to hospital on May 11, 1999 with a history of ingesting 120 mg of carbamazepine on May 6, 1999. He presented with drowsiness, vomiting, ataxia and a diplopia. He was treated with intravenous fluids and diuretics and transferred to the neurosurgical unit. He was admitted to the intensive care unit on May 12, 1999. MRI scans of the brain showed no evidence of intracranial mass effect. CT scans of the head were normal. He was treated with intravenous fluids and diuretics and discharged home on May 14, 1999.

The patient was readmitted to hospital on May 27, 1999 with a history of ingesting 120 mg of carbamazepine on May 12, 1999. He presented with drowsiness, vomiting, ataxia and a diplopia. He was treated with intravenous fluids and diuretics and discharged home on May 14, 1999.

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is expedited by breathing oxygen, preferably under pressure.

The classical structural damage caused by carbon monoxide poisoning is a diffuse hypoxic cerebral injury leading to infarction. The most common lesions are of the pallidum bilaterally and are predominantly in the anterior two thirds, and probably result from the sensitivity of this functional end arterial area to hypoxaemia and hypotension. A unilateral pallidal lesion and marked asymmetrical white matter involvement has been described. The unique feature of our case is acute obstructive hydrocephalus associated with bilateral cerebellar swelling and compression of the fourth ventricle. No involvement of the globus pallidus and medial temporal lobes was seen. The precise cause of this cerebellar oedema is unknown, but could have been due to acidosis and hypoxaemia which are a common cause of widespread white matter oedema in CO poisoning. The hydrocephalus was of a transient nature since it subsided on medical therapy. Bilateral cerebellar oedema in acute carbon monoxide poisoning, presenting with acute hydrocephalus, has not been previously reported. It is important to be aware of this complication in the initial stages, as a CSF diversion procedure might be required if it does not respond to steroids.

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