

An Unusual Cause for Acute Confusion in Police Custody

Matthew Ralph Peel*

Department of Community Healthcare, Leeds Community Healthcare NHS Trust, England

Abstract

The case study outlines the case of a 57-year-old male who was arrested for drunk-driving after drinking several pints of lager. After several hours detained in police custody he became acutely confused. Clinical examination was unremarkable and there was no obvious cause for confusion. He was sent to the Emergency Department when he remained confused, had a generalised seizure and was found to be severely hyponatraemic. He was admitted to critical care for hypertonic saline and diagnosed with beer potomania.

Keywords: Alcohol; Confusion; Hyponatraemia; Beer potomania; Police custody; Forensic nurse

Case Report

A 57 year-old-male was arrested by police one evening for the offence of driving whilst unfit through alcohol. Officers pulled him over after witnessing him driving erratically, smelling of intoxicants and slurring his speech. He was taken to the local police station, where he was unable to provide an evidential specimen of breath due to a history of Chronic Obstructive Pulmonary Disease (COPD). Because he was unable to provide an evidential sample of breath he was examined by a doctor under Section 4 of the Road Traffic Act 1988 to determine the presence of any condition which may be due to drugs or alcohol. During the examination, he admitted to consuming several pints of lager and some wine. Clinically his examination was unremarkable; he was hypertensive 158/111 mmHg, heart rate 97 bpm, respiratory rate 15 bpm, Oxygen saturations 96%. He was noted to be calm, cooperative and interacted well. Medical history included multiple sclerosis, COPD, depression, asthma and gastro-oesophageal reflux disease. Previous surgery included the release of a Dupuytren's contracture. He lived alone and worked in construction. He denied any illicit drug use and reported drinking alcohol three nights a week. An evidential blood sample was obtained for subsequent analysis at a forensic laboratory.

The following morning, he was referred to the onsite custody nurse after complaining of shortness of breath. He was noted to be well clinically; he had a Glasgow Coma Scale score of 15/15, heart rate 92 bpm, respiratory rate 18, oxygen saturations 98% and temperature 97.52°F (36.4°C). He was calm, polite, alert and orientated. There was no wheeze heard on auscultation. He was provided with his own inhalers (Fluticasone furoate and umeclidinium and vilanterol, and salbutamol) and returned to his cell.

Later that afternoon, he was noted by the police to have become confused, behaving strangely and not making sense when talking with police staff. He was referred to the custody nurse, where he was noted to be alert but disorientated to time, place, person and situation. He was unable to recall the events leading to his arrest and time in custody. He appeared anxious but otherwise looked well. The speech was normal. His chest was clear, heart sounds were dual, there were no palpable heaves or thrills. There was no jugular venous distention. The abdomen was soft, non-tender and bowel sounds were active. He remained hypertensive 181/110 mmHg, tachycardic 104 bpm, respiratory rate 15 bpm, capillary blood glucose 144.14 mg/dl (8 mmol/L), temperature 96.44°F (35.8°C) and Glasgow Coma Scale score of 14/15 (eyes 4; verbal 4; motor 6). On examination, there was no focal neurology. His Abbreviated Mental Test Score (AMTS) was five out of ten. There was a slight tremor and the palms were slightly sweaty.

He was referred to the Emergency Department for acute confusion,

where his AMTS was measured at eight out of ten. While in the department, he started vomiting before having a generalised seizure. Post-ictal he was very agitated and required 3.5 mg of intravenous lorazepam to facilitate a Computed Tomography scan (CT) scan of his head. CT head showed white matter changes consistent with his diagnosis of multiple sclerosis. Blood results revealed he was hyponatraemic with a serum Sodium of 117 mEq/L and a low serum osmolality, see Table 1. He was admitted to critical care where he received hypertonic saline. During the admission he was observed for alcohol withdrawal using the Clinical Institute Withdrawal Assessment of Alcohol revised scale (CIWA-Ar) but required no treatment. His recovery was uneventful, he was discharged home on day three, having been diagnosed with beer potomania Table 1.

Summary of key findings

New confusion is an important sign of acute clinical deterioration requiring urgent further clinical assessments [1]. Acute confusion can be caused by any of the following alone or in combination; sepsis, hypoxia, hypotension or metabolic disturbance [1]. Hypoglycaemia is an easily identifiable and reversible condition which can present as acute confusion and disorientation [2]. As such measuring blood glucose should be a priority for any individual with an altered mental status.

The AMTS is a quick screening tool using ten questions developed by geriatricians in 1972, see Table 2). Scores between 7-8 indicate some

Test	Result	Reference range
Sodium	117 mmol/L	135-145 mmol/L
Potassium	4.0 mmol/L	3.5-5.0 mmol/L
Urea	2.4 mmol/L	2.9-7.1 mmol/L
Creatinine	38 umol/L	50-100 umol/L
Haemoglobin	152 g/L	135-180 g/L
White cell count	16.27 10 ⁹ /L	4.00-11.00 10 ⁹ /L
Platelets	366 10 ⁹ /L	150-400 10 ⁹ /L
Serum osmolality	260 mosmol/kg	275-295 mosmol/kg
Urine specific gravity	1.025	1.015-1.025

Table 1: Relevant biochemistry, haematology and urine results (admission).

*Corresponding author: Matthew Ralph Peel, Advanced Clinical Practitioner, Leeds Community Healthcare NHS Trust, DipHE, BSc (Hons), Hunsworth, West Yorkshire, England, Tel: +44 7834518390; E-mail: mattpeel@nhs.net

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Age?	Correct – 1 point Incorrect – 0 points
Time? (to nearest hour)	Correct – 1 point Incorrect – 0 points
Address for recall at the end of the test 42 West Street	
Year?	Correct – 1 point Incorrect – 0 points
Name of this place?	Correct – 1 point Incorrect – 0 points
Identification of two persons (doctor, nurse, etc.)?	Correct – 1 point Incorrect – 0 points
Date of birth?	Correct – 1 point Incorrect – 0 points
Year of First World War?	Correct – 1 point Incorrect – 0 points
Name of present Monarch?	Correct – 1 point Incorrect – 0 points
Count backwards 20 - 1	Correct – 1 point Incorrect – 0 points
Above address recall correct?	Correct – 1 point Incorrect – 0 points

Table 2: Abbreviated Mental Test Score.

cognitive impairment with scores below 7 suggestive of acute delirium [3,4]. In the case outline above the initial AMTS was five initially suggesting an acute delirium and eight when seen in the Emergency Department, suggesting cognitive impairment. This suggests there was some fluctuation in the degree of confusion Table 2.

The normal range for serum Sodium is between 135 – 145 mEq/L [5]. Hyponatraemia is biochemically defined as a serum Sodium below 135 mEq/L, symptoms of nausea and malaise typically present below 130 mEq/L, progressing to headache, lethargy, restlessness and disorientation when below 120 mEq/L [6]. Equally important as the sodium level is the rate at which the plasma serum Sodium level falls [6]. Serum Sodium levels below 120 mEq/L can lead to seizures, coma, respiratory arrest, brainstem herniation and carries a 25% mortality rate [7]. Hyponatraemia is a common water imbalance disorder with several causes; Syndrome of inappropriate antidiuretic hormone secretion (SIADH), diuretics, polydipsia, adrenal insufficiency, hypovolemia, heart failure and liver cirrhosis [8]. The cause and treatment depends on the fluid state of the individual, whether they are hypovolemic, euvolemic or hypervolemic [9]. Examination revealed the individual was euvolemic, hyponatraemia in euvolemia occurs where there is an excessive intake of water which the body’s kidneys are unable to excrete leading to a dilutional hyponatraemia, the body’s sodium content remains the same but plasma osmolality is low (see Table 3) [9].

Beer potomania was first described in 1972 [10] and remains an unusual cause of hyponatremia [11]. The diagnostic criteria for includes [11]:

- Severe hyponatraemia
- Low serum osmolality
- Long-standing protein malnutrition
- Large (usually over 5L) of beer over a relatively short time.

Beer is hyperosmolar, it contains no protein, minimal solutes and only a very low sodium content (approximately 2 mEq/L). The pathophysiology of beer potomania involves the excessive consumption of the low solute content beer, with the alcohol effecting proteolysis, resulting in reduced solute delivery in the kidneys [10]. As a result of the reduced solute being delivered to the kidneys there is impaired free water clearance, which leads to a dilutional hyponatremia. It is typically

Abnormal antidiuretic hormone release	Vagal neuropathy Deficiency of adrenocorticotrophic hormone (ACTH) or glucocorticoids (Addison’s disease Hypothyroidism Severe potassium depletion
Syndrome of inappropriate antidiuretic hormone secretion	Tumours Pulmonary lesions Central nervous system causes Metabolic causes Drugs
Psychiatric illness	‘Psychogenic polydipsia’ Non-osmotic ADH release Antidepressant therapy
Increased sensitivity to ADH	Chlorpropamide Tolbutamide
ADH-like substances	Oxytocin Desmopressin
Unmeasured osmotically active substances stimulating osmotic ADH release	Glucose Chronic alcohol misuse Mannitol Sick-cell syndrome

Table 3: Causes of euvolemic hyponatraemia.

seen in those who are alcohol dependent [10,11], because of their concurrent protein malnutrition. But cases have been reported in non-alcohol dependent individuals [12].

Treatment

Symptomatic hyponatremia as outlined in the case above, requires immediate and aggressive management in a critical care setting, using hypertonic (3%) saline. Care can only be safely managed in a hospital setting and not a custodial one. Care must be taken to avoid rapid correction, which may lead to osmotic demyelination syndrome. Osmotic demyelination syndrome is a condition where there is damage to the Myelin sheath, the membrane layer covering an axon [13]. Osmotic demyelination syndrome may present with dysarthria, quadriparesis, movement disorder, encephalopathy or locked in syndrome [14].

Discussion and Conclusion

Acute confusion in custodial settings is a red flag requiring further investigations. Because of the wide range of differentials conditions which may cause an acutely confused state, individuals will often require assessment in the Emergency Department.

There is a well-established association between alcohol and criminal behaviour, leading to an increased proportion of individuals in custody having potentially consumed a significant amount of alcohol, in particular beer [15]. Which may present individuals at greater risk of developing beer potomania and should be considered as a differential when ever asked to see an acutely confused individual.

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