

Legally, several strategies were available for AB. He was advised not to enter a plea of automatism, as the case of Sullivan confirmed that epileptic automatism is to be treated as insane automatism, which would result in a special verdict of not guilty by reason of insanity. The special verdict would result in his detention in hospital for an indeterminate period, although a mental health review tribunal might discharge him from hospital (Hamilton, 1984). The prosecution argued that he had a "psychopathic disorder" (within the meaning of the Mental Health Act). They pressed for admission to a secure hospital under a hospital order. They argued that the organic damage had made him unreliable in abstaining from alcohol and in following treatment. This view was supported by both a forensic psychiatrist and a prison doctor.

At trial, the defendant pleaded guilty, and submitted medical reports that stated that he was mentally disordered at the time of the offence, but that he was now no longer mentally disordered and was fit to be further assessed out of a secure setting. A bed in a local hospital was offered for this further assessment. The judge accepted that the defendant had substantially recovered and discharged him, unconditionally. Surprisingly, he did not make a probation order, with medical treatment a condition

of probation, but the defendant proved to be a pleasant and co-operative man who was keen to end his personal nightmare and to start to rebuild his life.

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## Altered State of Consciousness in a Compulsive Water Drinker

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A relatively normal 16-year-old Chinese woman with a six-month history of compulsive water drinking resulting in a comatose state is reported. The drinking was perpetuated by an enjoyable altered state of consciousness after ingestion of an average of 20 litres of water per day. Treatment by fluid restriction and, later, simple education was successful. The subjective dimension of an altered state of consciousness may provide an important explanation for the obscure aetiology.

Although the physical mechanisms underlying water intoxication have been described (Goldman *et al*, 1988), the associated psychopathology in compulsive water drinkers remains less well understood. Vieweg

*et al* (1985a) listed ten non-specific terms for the phenomenon, and emphasised its aetiological obscurity. We report an adolescent woman whose water drinking, which led to a coma, was

related to her seeking an altered state of consciousness (ASC).

### Case report

A 16-year-old Chinese woman with good past health was admitted for a sudden loss of consciousness. The second of three children in a relatively normal, working-class family, she had had an uneventful childhood and was described as a 'lovely-looking' child. Six months previously she had left school as an average student, and went to work as an office clerk. She found the job boring, felt lonely at times, especially after the marriage and departure of her eldest sister, and kept most feelings to herself. She became sensitive about her mild amount of facial acne and frequently urged her mother to cook her more 'cold' food to balance her excessive 'hot' energy that was believed to cause the acne and occasional moodiness. Six months previous to the coma, she started drinking increasing amounts of water (usually cooled distilled water) to 'cool' herself. The average intake was estimated to be 20 litres a day. A large proportion of this was taken in a short time, so as to achieve a more 'forceful' effect. Despite the discomfort of the resulting abdominal bloating, diarrhoea, nausea and sometimes vomiting, she experienced enjoyable feelings of being "a little dizzy, funny and high, like after a beer", which enabled her to fall asleep easily. The water drinking persisted as a habit, despite the complete disappearance of the acne. There was no history of substance abuse.

On the day of admission, she had consulted a general practitioner for vomiting but was said to have no special problem. She returned from work as usual at 6 p.m., and drank more water in order to sleep well, but at 6.30 p.m. she was found to be unarousable and was taken to the hospital. The patient was in an afebrile coma with no abnormal signs. Urgent laboratory investigations gave the following results: plasma Na 117 (normal range 134–145) mmol/l, K 3.2 (3.5–5.1) mmol/l, urea 2 (3.4–8.9) mmol/l, creatinine 57 (44–107)  $\mu$ mol/l, plasma osmolality 242 (275–295) mosm/kg with simultaneous urine osmolality 236 mosm/kg, and spot urine Na 53 mmol/l and K 23 mmol/l. She passed copious amounts of dilute urine of specific gravity persistently < 1.008. All other blood tests, as well as computerised tomography of the brain, were normal. On fluid restriction alone, she regained consciousness when the plasma Na and osmolality returned to normal, a few days later. Psychiatric assessment showed her to be essentially normal. She readily admitted to the 'addictive' water drinking and expressed ignorance of the risks involved. Over the next six months she managed to drink in moderation (< 1.5 litres a day), and plasma Na and K levels kept within normal limits. She had also started to chew gum, and coped well both at work and socially.

### Discussion

Compulsive water drinking is believed to occur almost exclusively in psychiatric patients (Chinn, 1974; Jose & Perez-Cruet, 1979) and over 85% of cases of water intoxication are related to

schizophrenia or affective psychosis (Zubenko, 1987). A group of idiopathic uncomplicated compulsive water drinkers will usually comprise about 80% female neurotics, and some subjects with no psychopathology (Barlow & De Wardener, 1959; Chinn, 1974). Some cases are triggered in mentally normal individuals because of toothache (Pickering & Hogan, 1971), medical advice to treat nephrolithiasis (Berry *et al*, 1977), and an unsatisfied urge to defecate (Swanson & Iseri, 1958). Our patient did not have psychiatric disorder. This is supported by her satisfactory termination of this potentially fatal habit (Vieweg *et al*, 1985b) after simple explanation, because compulsive water drinking is usually described as "extremely difficult to treat" (Noonah & Ananth, 1977).

Rowntree (1923) wrote that "Nature has provided adequately against water intoxication. . . . the sensation of satiation following the ingestion of small or moderate quantities of water renders the subsequent ingestion of large amounts increasingly difficult." Apparently, physical discomforts did not reduce our patient's endurance in water drinking.

In the traditional Chinese health system, all foods are classified into gradients of possessing 'hot' (*yang*) or 'cold' (*yin*) energy, and health is achieved by balancing these energies (Koo, 1984). Water is believed to be mildly 'cooling', and therefore much less deleterious to health than a 'very cold' food such as water melon. If taken in large amounts, water is believed to be a good remedy for diseases due to an excess of 'hot' energy. The patient's wish to rid herself of the acne (a symptom of excess 'hot' energy) apparently initiated the drinking process. The symptoms of intoxication (bloating, nausea, vomiting and diarrhoea) coincided with symptoms typically attributed to cold-excess (Koo, 1984) and encouraged the patient that it was the right therapy for her acne. Over time, however, she became 'addicted' to the 'high', which also helped to calm her mood and frustrations before she went to sleep. Her wish to 'cool' herself is culturally understandable and very different from frequently reported cases where polydipsia is based on a delusional need for cleansing (Smith & Clark, 1980; Singh *et al*, 1985).

The choice of distilled water is especially risky in terms of the development of hyponatraemia. It appears that she was seeking an ASC, which has been defined as:

"any mental state(s), induced by various physiological, psychological, or pharmacological manoeuvres or agents, which can be recognised subjectively by the individual himself as representing a sufficient deviation in subjective experience or psychological functioning from certain general

norms of that individual during alert, waking consciousness." (Ludwig, 1966)

To our knowledge, the use of water to induce an ASC has not been reported before. Classic descriptions of water intoxication have not mentioned dizziness or ASC as possible symptoms (Rowntree, 1923), although Barlow & De Wardener (1959) recorded "a feeling of unreality" and the development of "a hysterical fugue" in their Patient 2. According to Ludwig's (1966) scheme, water as an agent to induce an ASC would fall under 'somato-psychological factors' (narcotics, psychedelics and dehydration but not overhydration were quoted as examples) which alter body chemistry and frequently bring about an ASC in a maladaptive way to "resolve emotional conflicts" or "defend against anxiety over an ugly look". Vieweg *et al* (1985a) noted that compulsive water drinking could be a response to increased levels of transmitter substances accumulating in the limbic system in periods of frustration, and raised the interesting possibility that compulsive drinkers seek to enhance opiate receptor effect by decreasing surrounding sodium concentration. (Interestingly, Patient 4 reported by Barlow & De Wardener (1959) was addicted to morphia.) The patient's new habit of chewing gum seems to be not only a substitute activity but also fits in with the hypothesis that compulsive water drinkers seek to satisfy an oral need (Singh *et al*, 1985).

Water intoxication is said to occur only in those individuals with impaired ability to excrete a maximally dilute urine, as water homeostasis is robust in normal individuals, who can handle up to 30 litres of water intake per day (Zubenko, 1987). The simultaneous urine and plasma Na and osmolality of the patient also suggested a degree of SIADH (syndrome of inappropriate ADH secretion). Reported cases of intoxication may represent the tip of an iceberg of compulsive drinkers, some of whom are mentally normal individuals whose prognosis is likely to be much better than the 50% recurrence rate quoted for psychiatric patients (Smith & Clark, 1980).

Singh *et al* (1985) indicated without elaboration that water must presumably fulfil some psychological need if dependence on it occurs. Barlow & De

Wardener (1959) wrote: "If fluid was not accessible most patients became agitated, except during the fluid deprivation test". This seems to imply a primarily psychological rather than physical dependence. Water is generally regarded as a harmless natural substance that is more readily available than any substance of abuse. The seeking of an ASC could provide the missing aetiological link in a proportion of compulsive drinkers who may or may not be psychiatrically disturbed. Further investigation is suggested.

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