



## **Nephrotoxicity of BZP-based herbal party pills: a New Zealand case report**

Mohammed Alansari, David Hamilton

Several serious side effects of the so-called 'party pills' have been documented, including severe agitation, seizures, paranoia, hyperthermia, abdominal pain, and cardiac arrhythmias.

Nephrotoxicity has been reported usually in association with rhabdomyolysis.<sup>1</sup> This paper describes a 17-year-old New Zealand man who developed acute renal failure requiring haemodialysis in the absence of rhabdomyolysis.

### **Case report**

A 17-year-old man who was partying one weekend in Tauranga consumed a small amount of alcohol and five BZP-based herbal party pills (he had never previously taken such pills).

After a few hours he started to have bilateral loin pain, which gradually increased the next day. The pain was radiating to the umbilical and suprapubic area, aggravated by movement. He had mild, short-lived relief with one tablet of 400 mg ibuprofen. He had no other symptoms.

He was admitted to a peripheral hospital after 36 hours because of the severity of the abdominal pain, which required analgesia with morphine. On examination he was euvolaemic and normotensive. Abdominal examination showed mild tenderness in the umbilical area and in both loins. Oral fluids were withheld due to the abdominal pain, and he was given intravenous fluids.

He was found to have renal impairment with a serum creatinine 220  $\mu\text{mol/L}$  on admission, which rose the following day to 320  $\mu\text{mol/L}$ . The patient was then transferred to the Renal Unit at Waikato Hospital, Hamilton with signs of volume overload (jugular venous pressure [JVP] elevated, puffy face, and bilateral leg oedema).

Further investigations revealed serum creatinine 440  $\mu\text{mol/L}$ , urea 10.6 mmol/L, sodium 140 mmol/L, potassium 4.5 mmol/L, corrected calcium 2.29 mmol/L, haemoglobin 150 g/L, and white cell count  $12.0 \times 10^9/\text{L}$ . His liver function tests were normal, creatine kinase 83  $\mu\text{L}$ , C-reactive protein (CRP) 94 mg/L, and erythrocyte sedimentation rate (ESR) 35 mm/hr.

A mid-stream urine (MSU) sample revealed no cells but protein +++ and urinary protein excretion of 1.77 gram/24 hours. Hepatitis B and C serology and HIV tests were negative, as were antineutrophil cytoplasmic antibody and antiglomerular basement membrane antibody levels; serum protein electrophoresis and complement were normal. On ultrasound he had mildly enlarged kidneys with high echogenicity.

His abdominal/renal pain persisted for several days, and his serum creatinine rose to a peak of 778  $\mu\text{mol/L}$ . He was dialysed once. Three weeks from admission his serum creatinine had returned to 92  $\mu\text{mol/L}$ .

## Discussion

The temporal relationship to consumption of 'party pills' and acute renal failure in a previously healthy young man strongly supports a causal association.

Party pills have many names in the market: *Charge, Rupture, Jump, ESP, the GoodStuff, Euphoria, Frenzy, Jax, Exodus, Bolt, Herbal Ecstasy, Pepper Plant, and Nemi*. Most contain benzylpiperazine (BZP).

BZP was first synthesised in 1944 as an antiparasitic, but because of its lack of efficacy and significant side effects it was withdrawn. However, a few studies in the 1970s and 1980s showed that it had a stimulant, amphetamine-like effect. In the 1990s, the drug began to be used recreationally in USA, soon after in Europe, then worldwide. However, in 2002 it was made illegal in USA, and banned in Europe soon afterwards. It was also banned in some states in Australia including Queensland and NSW. It is legal in New Zealand.

BZP is often marketed as a dietary supplement although it has no dietary value. It is included in some weight-reduction pills. BZP has been called natural or herbal because it can be derived from pepper plant but in fact it is entirely synthetic and does not occur naturally in any plant.

The effects of BZP are similar to those created by amphetamine and are a result of stimulation of the central nervous system. Their action is mainly on the serotonergic and noradrenergic systems.<sup>1</sup>

BZP use produces euphoria and keeps the user awake. Therefore it is commonly used in the dancing scene so that the individual can dance all night. BZP usually produce tachycardia and hypertension, which are usually asymptomatic—although in excess they may result in cardiac toxicity, hyperthermia, dehydration, hallucination, and seizure. The effects of long-term use are still unknown.

The drug was first reported in New Zealand in 2004 in Dunedin, when five students presented to Dunedin Hospital's Emergency Department with toxic effects.<sup>2</sup> Soon after, Waikato Hospital's Emergency Department (as well as other New Zealand hospitals) started to receive patients with toxic effects.<sup>3,4</sup>

In April 2004, the New Zealand Expert Advisory Committee on Drugs assessed the party pills under the Misuse of Drugs Act and concluded that there was insufficient objective evidence showing that BZP was harmful; thus they recommended that party pills should remain legal in New Zealand. Thereafter, Social Tonics Association New Zealand (STANZ) issued a code of practice which advised that sale be limited to those over 18 year of age with adherence purely on a voluntary basis.<sup>6</sup>

For stimulants in general, the aetiology of acute renal failure is believed to be either due to circulatory collapse or rhabdomyolysis rather than due to a direct toxic effect. Circulatory collapse can be secondary to hyperthermia (secondary to hypothalamic dysfunction), excessive sweating, and consequent dehydration, with or without tachyarrhythmia.

Rhabdomyolysis can be due to hyperthermia, severe agitation, and excessive muscular activity. Accelerated hypertension has been implicated in one case of acute renal failure secondary to amphetamine,<sup>7</sup> and angitis in another.<sup>8</sup>

Whilst nonsteroidal anti-inflammatory drugs (NSAIDs) have been implicated in acute renal failure, our case's symptoms preceded the ingestion of one tablet of the NSAID ibuprofen. Moreover, he had no comorbidity which may be associated with NSAID use—induced acute renal failure, notably use of high doses, prolonged courses, diabetes, heart failure, hypertension and concomitant use of diuretics, and calcium channel blockers.<sup>9</sup>

We postulate that the acute renal failure observed here may be related to a direct toxic effect of the party pills on the kidneys, in the absence of rhabdomyolysis or circulatory disturbance. His vasculitis screen was negative and apart from the one dose of ibuprofen 1 day before admission, there was no other medication or herbal medicine intake before or after the party pills ingestion.

Spontaneous resolution of acute renal failure ensued.

**Author information:** Mohammed Alansari, Medical Registrar, Waikato Hospital, Hamilton; David V Hamilton, Locum Consultant Nephrologist, Waikato Hospital, Hamilton (currently Consultant Nephrologist, Norfolk and Norwich University Hospital, Norwich, UK).

**Correspondence:** Mohammed Alansari, Waikato Hospital, Private Bag 3200, Hamilton. Email: [mohalansari@yahoo.com](mailto:mohalansari@yahoo.com)

#### References:

1. TOXINZ. Official information source for toxicology. Dunedin: New Zealand National Poisons Centre. Available online. URL: <http://www.toxinz.com> (insert BZP into Search box) Accessed May 2006.
2. Stewart L. Police urge party pills ban (2004, March 3). Otago Daily Times.
3. Nicholson T. Prevalence of use, epidemiology and toxicity of 'herbal party pills' among those presenting to the emergency department. *Emergency Medicine Australasia*. 2006;18:180–4. Available online. URL: <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1742-6723.2006.00826.x;jsessionid=bQyWwZcjqh-he58R7R?journalCode=emm> Accessed May 2006.
4. Gee P, Richardson S, Woltersdorf W. Toxic effects of BZP-based herbal party pills in humans: a prospective study in Christchurch, New Zealand. *N Z Med J*. 2005;118(1227). URL: <http://www.nzma.org.nz/journal/118-1227/1784/>
5. National Drug Policy; the Expert Advisory Committee on Drugs (EACD) advice to the Minister of Health in April 2004.
6. STANZ official website. Code of practice. Available online. URL: <http://www.stanz.org.nz> Accessed May 2006.
7. Woodrow G, Harnden P, Turney JH. Acute renal failure due to accelerated hypertension following ingestion of 3,4 methylenedioxymethamphetamine (ecstasy). *Nephrol Dial Transplant*. 1995;10:399–400.
8. Rifkin SI. Amphetamine-induced angitis leading to renal failure. *South Med J*. 1977;70:108–9.
9. Huerta C, Castellsague J, Varas-Lorenzo C, Garcia Rodriguez LA. Nonsteroidal anti-inflammatory drugs and risk of ARF in the general population. *Am J Kid Dis*. 2005;45:531–9.