



feature of some cases of exertional heatstroke – without any evidence that it is the exclusive cause.

We have argued that exercise-induced heatstroke is most probably the result of some genetic predisposition to the development of a state of explosive endogenous thermogenesis in susceptible individuals.⁸ This is the only explanation for the relative rarity of heatstroke. For example, 5 cases of heatstroke developed in the 2002 Argus Pick 'n Pay Cycle Tour in Cape Town, held in unusually warm conditions.⁸ If environment alone were the cause of heatstroke, then the vast majority of the 28 753 entrants should have been affected. That they were not, must indicate that only certain individual athletes are at risk of heatstroke because of an individual susceptibility that is currently poorly understood – and not simply because those affected were the only cyclists who became 'dehydrated'.

Similarly, lobbyists for the sports drink industry⁹ continue to propose that a sodium deficit induced by exercise contributes to exercise-associated hyponatraemia (EAH) and muscle cramping, despite clear evidence to the contrary.¹⁰⁻¹³

Step 2: Encourage scientists to undertake research (funded at your expense) that promotes the incorrect science developed in Step 1. Reward those scientists with admission to a core clique of lobbyists and contrarians.¹⁴ It is helpful if those scientists are encouraged to believe that these rewards depend on them sustaining the pseudoscience.

Step 3: Assist these 'contrarian' scientists in their efforts to become influential members of the editorial boards of the major scientific journals in which authors, foolish enough to dare challenge the pseudoscience of Step 1, may wish to publish their work. In this way, the pseudoscience can never be exposed.

Step 4: Establish yourself as a key funder of influential organisations that produce statements that can be used to promote your product. When these organisations produce position stands, try to ensure that the drafting committee includes enough of your favoured scientists that the pseudoscience of Step 1 underpins those guidelines. At the same time, it helps to ensure that your favoured scientists can become influential members of those organisations, preferably the President or Vice-President.

Step 5: Ensure that top athletes are paid to use only your product.¹⁵ This gives the impression that their superior athletic ability is purely due to their use of your product.

I should imagine that the same model has been embraced by the sports supplement industry¹⁶ and probably certain pharmaceutical companies.¹⁷

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Near-fatal TURP syndrome associated with similarities in irrigant fluid packaging appearance

To the Editor: We describe a case of severe iatrogenic transurethral resection of the prostate (TURP) syndrome associated with confusing irrigant fluid packaging. TURP syndrome is described, as well as steps taken to request industry to alter the packaging.

Case report

A 67-year-old man presented to Groote Schuur Hospital with acute-on-chronic urinary retention. Following catheterisation, benign prostatic hyperplasia (BPH) was diagnosed and elective transurethral resection of the prostate (TURP) was planned.

The TURP was completed in 40 minutes with 30 g tissue resected. At the end of the procedure TURP syndrome was suspected when the patient became confused, bradycardic and hypotensive. It was discovered that sterile water (15 l) had inadvertently been used as irrigant instead of mannitol.

The patient developed massive intravascular haemolysis, progressive disseminated intravascular coagulopathy (DIC) and cardiovascular collapse. Of interest is the fact that severe hyponatraemia and fluid overload were notably absent – features that distinguish this from mannitol-induced TURP syndrome. He required intubation, ventilation and inotropic support in the intensive care unit. He was transfused continuously with packed cells, fresh-frozen plasma and



platelets for approximately 12 hours before the haemolysis and DIC abated. Despite his critical condition, he recovered well, was discharged home on day 7 without any permanent sequelae and is voiding satisfactorily.

Preventable TURP syndrome

The iatrogenic confusion with the irrigant solution relates to the fact that the product packaging of water and mannitol is nearly identical (Fig. 1).



Fig. 1. Water (left) and mannitol (right) have almost indistinguishable packaging.

TURP still represents the gold standard for surgically managing benign prostatic hyperplasia. TURP syndrome is a major life-threatening complication of prostate surgery, caused by the intraoperative absorption of irrigant fluid from the prostatic bed. The prevalence of TURP syndrome is about 10% and the reported mortality rate 0.2 - 0.8%.¹

Clinically the typical isotonic mannitol-induced TURP syndrome presents with neurological disturbances (92%) and/or cardiovascular instability (54%).¹ Dilutional hyponatraemia is a common biochemical manifestation. Hypotonic fluids (as erroneously used in this case) may lead to life-threatening haemolysis.

Treatment of TURP syndrome relies on early recognition followed by coagulating any bleeding and stopping surgery

thereafter. Intravenous fluids are discontinued. Arterial blood gas, serum sodium and haemoglobin are checked. Cardiorespiratory support is administered as required.

Typically furosemide 40 mg is administered intravenously in an attempt to clear absorbed fluid. Concern about this measure have been raised by the drug's apparent exacerbation of renal sodium loss.²

Symptomatic hyponatremia resulting in seizures or coma should be treated with 3% hypertonic saline. It is given at a rate of 1 ml/kg/h up to 200 ml.¹

A variety of measures have experimentally been recommended to reduce the incidence of TURP syndrome (e.g. ethanol breath test, intraprostatic vasopressin, etc.). Some alternatives to standard TURP are commercially available locally and eliminate the danger of TURP syndrome such as laser prostatectomy or bipolar TURP in saline.

Industry response

The manufacturer of the fluid was approached to request a change in irrigant fluid packaging identification. They have given us a written undertaking that the colour of their water, saline and mannitol packaging will be altered.

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Erratum

In the 'Guidelines for CPD accreditation of the South African Society of Medical Oncology' by Abratt *et al.*, which appeared on p. 729 of the October 2003 *SAMJ*, the second author's name should have been R W Eek and not R Eele.