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Letters

Children are another group at risk of hyponatraemia perioperatively

EDITOR—Our poor understanding and practice of giving fluid and electrolytes perioperatively spans all age groups. The editorial by Lane and Allen highlighted elderly postmenopausal women as being particularly at risk of **hyponatraemia** postoperatively,[1] as has been emphasised in several case series, [2 3] and the electronic responses to the editorial also concentrated on this age group (www.bmj.com/cgi/content/full/318/7195/1363#responses).

The use of hypotonic saline is standard practice for the paediatric age group. This practice is based on calculations of normal physiological requirements for salt and water homoeostasis. These principles were laid down over 40 years ago and have never been challenged, although every year otherwise healthy children suffer brain damage associated with acute perioperative **hyponatraemia**.[4] Isotonic solutions are not used in children because it is assumed that their kidneys cannot handle a salt load.

The basic flaw that prevents us understanding the cause of these catastrophes is our assumption that normal physiological rules apply. They don't, and we are frequently undone by the subtleties of secretion of antidiuretic hormone. Practically everything that happens to a patient in the perioperative period is guaranteed to turn on secretion of antidiuretic hormone and inhibit the excretion of electrolyte free water when the situation demands.

Even when an isotonic or near isotonic solution is given surgical patients can become hyponatraemic. In a study by Steele et al 21 out of 22 patients who received only these types of fluid showed a fall in serum sodium concentration from a mean of 140 to 136 mmol/l.[5] The explanation became evident from the urine sodium measurements, which showed that most patients were excreting a hypertonic urine (sodium concentration 150 mmol/l) and were in positive water balance. This implied that antidiuretic hormone was acting, a combination of events referred to by the authors as "desalination."

In a case series of 23 children with acute **hyponatraemia** presenting with convulsions that I have collected seven of them were excreting a hypertonic urine at presentation despite having a serum sodium concentration of <125 mmol/l (data submitted for publication). Much can be learnt from measuring urine sodium concentrations and calculating not only fluid but tonicity balances (sodium plus potassium).

Acute **hyponatraemia** leading to brain damage is largely preventable but only if we learn to understand that normal physiology is frequently perturbed perioperatively. We need to recognise the prodromal symptoms and be aware that any postoperative patient is potentially at risk. Finally,

[redacted]

the use of hypotonic saline should be prohibited perioperatively and reserved only for situations in which the administration of electrolyte free water is genuinely needed.

Desmond Bohn, *paediatric intensive care specialist* .
Department of Critical Care Medicine, Hospital for Sick Children, 555 University Avenue, Toronto, Ontario M5G 1X8, Canada dbohn@sickkids.on.ca

1. Lane N, Allen K. **Hyponatraemia** after orthopaedic surgery. *BMJ* 1999; 318: 1363-1364 [Full Text]. (22 May.)
2. Ayus JC, Wheeler JM, Arieff AI. Postoperative hyponatremic encephalopathy in menstruant women. *Ann Intern Med* 1992; 117: 891-897[Medline].
3. Ayus JC, Arieff AI. Chronic hyponatremic encephalopathy in postmenopausal women: association of therapies with morbidity and mortality. *JAMA* 1999; 281: 2299-2304 [Medline].
4. Arieff AI, Ayus JC, Fraser CL. **Hyponatraemia** and death or permanent brain damage in healthy children. *BMJ* 1992; 304: 1218-1222[Medline].
5. Steele A, Gowrishankar M, Abrahamson S, Mazer CD, Feldman RD, Halperin ML. Postoperative hyponatremia despite near-isotonic saline infusion: a phenomenon of desalination. *Ann Intern Med* 1997; 126: 20-25[Medline].

Related editorials in BMJ:

Hyponatraemia after orthopaedic surgery.
Nick Lane and Kathryn Allen
BMJ 1999 318: 1363-1364. [Full text]

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