

# PostScript

## LETTER

### Adverse effects of rapid isotonic saline infusion

Neville *et al* reported on a randomised controlled trial of hypotonic versus isotonic saline for rehydration of children with gastroenteritis. They found that isotonic saline was superior with regards to correction of hyponatraemia.<sup>1</sup> The majority of patients in the study received a "rapid replacement protocol" which entailed the infusion of 40 ml/kg of isotonic saline over 4 hours in the isotonic saline arm of the study. The authors did not report on important known adverse effects associated with rapid infusion of isotonic saline which have been reported in previous randomised controlled trials of volume support with isotonic saline versus other fluids.

Rapid isotonic saline infusion predictably results in hyperchloraemic acidosis.<sup>2</sup> The acidosis is due to a reduction in the strong anion gap by an excessive rise in plasma chloride as well as excessive renal bicarbonate elimination.<sup>3</sup> In a randomised controlled trial with a mixed group of patients undergoing major surgery, isotonic saline infusion was compared to Hartmann's solution with 6% hetastarch and a balanced electrolyte and glucose solution. Two thirds of patients in the saline group but none in the balanced fluid group developed postoperative hyperchloraemic metabolic acidosis.<sup>3</sup> The hyperchloraemic acidosis was associated with reduced gastric mucosal perfusion on gastric tonometry.

Another double blind randomised controlled trial of isotonic saline versus lactated Ringer's in patients undergoing aortic reconstructive surgery confirmed this result; the acidosis required interventions like bicarbonate infusion and was associated with the application of more blood products.<sup>4</sup> Hyperchloraemia was found to have profound effects on eicosanoid release in renal tissue, leading to vasoconstriction and a reduction of the glomerular filtration rate.<sup>5</sup> The increased eicosanoid release may also explain the findings of reduced gastric perfusion in hyperchloraemia mentioned above.<sup>3</sup>

The main adverse effect of saline induced hyperchloraemic acidosis, however, may be the action which is taken to correct the abnormality. Acidosis is often seen as a reflection of poor organ perfusion and poor myocardial function, and a negative base excess may prompt the application of boluses of more saline containing fluids exacerbating the acidosis, the use of blood products, escalation of inotropic support and initiation of ventilatory support.<sup>6</sup>

The safety of hyperchloraemic acidosis has not been established in prospective studies and in patients with different types of critical illness. Particularly in critically ill patients with co-morbidities like renal disease, more physiological electrolyte solutions (e.g. Ringer's lactate solution) may be preferable to isotonic saline, and a slow replacement protocol safer than rapid infusions.

M Eisenhut

Consultant Paediatrician, Luton & Dunstable Hospital,  
Lewsey Road, Luton LU4 0DZ, UK;  
michael\_eisenhut@yahoo.com

doi: 10.1136/adc.2006.100123

Competing interests: none declared

### References

- 1 Neville KA, Verge CF, Rosenberg AR, *et al*. Isotonic is better than hypotonic saline for intravenous rehydration of children with gastroenteritis: a prospective randomised study. *Arch Dis Child* 2006;**91**:226–32.
- 2 Prough DS, Bidani A. Hyperchloraemic metabolic acidosis is a predictable consequence of intraoperative infusion of 0.9% saline. *Anesthesiology* 1999;**90**:1247–9.
- 3 Wilkes NJ, Woolf R, Mutch M, *et al*. The effects of balanced versus saline-based hetastarch and crystalloid solutions on acid-base and electrolyte status and gastric mucosal perfusion in elderly surgical patients. *Anesth Analg* 2001;**93**:811–16.
- 4 Waters JH, Gottlieb A, Schoenwald P, *et al*. Normal saline versus lactated Ringer's solution for intraoperative fluid management in patients undergoing abdominal aortic aneurysm repair: an outcome study. *Anesth Analg* 2001;**93**:817–22.
- 5 Bullivant EMA, Wilcox CS, Welch WJ. Intrarenal vasoconstriction during hyperchloraemia: role of thromboxane. *Am J Physiol* 1989;**256**:152–7.
- 6 Brill SA, Stewart TR, Brundage SL, *et al*. Base deficit does not predict mortality when secondary to hyperchloraemic acidosis. *Shock* 2002;**17**:459–62.

## BOOK REVIEW

### Weight matters for children

Edited by Rachel Pryke. Oxon: Radcliffe Medical Press Ltd, 2006, £14.95 (US\$28 (approx.); €22 (approx.)), paperback, pp 215, ISBN 1857757718



It seems impossible to open a newspaper or turn on the television without the issue of childhood obesity being raised. The government has set targets to reduce the incidence of childhood obesity and school based programmes have been established, and yet the number of children who are obese continues to rise. What seems to be lacking and what this book sets out to provide is specific practical guidance for parents to follow as to what families need to be doing on a day to day basis to ensure children remain healthy and avoid becoming obese.

The primary focus is on parents and carers, and the author, who is a GP, frequently draws on her own experience as a mother to give examples of her own family life, which helps give credence to the messages which run throughout the book. The issue of choice is dealt with very well and discusses how important it is to give children choice and how parents can influence children to make the right choice. Parents are also encouraged to examine their own parenting styles to see how this influences the behaviour and eating habits of their children.

There are separate sections on preschool children and junior children, covering topics ranging from breast feeding and weaning to explanations about what constitutes a healthy diet. The advice about managing behavioural difficulties around mealtimes is particularly helpful, with sections such as "Tips to avoid becoming wound up at meal times" providing plenty of practical suggestions for families to try. There are also practical suggestions on encouraging physical activity in children and reducing television watching. The issue of dealing with a child who is already overweight is addressed, emphasising the need to take action early, placing this responsibility within the family context. There is also helpful information about understanding children's psychological wellbeing, examining the issue of low self esteem, bullying, and depression.

The final section covers nutrition and health problems. Basic nutritional information is provided to help make sense of the contents of our food and details what should constitute a healthy well balanced diet. There is a well written section on a wide variety of medical problems encountered which may affect a child's growth, ranging from cows' milk allergy to cystic fibrosis, and sources of further information are well referenced.

Overall I felt that this was a well written book, packed full with helpful practical suggestions. As a paediatrician, the advice contained within the chapters covered many of the food related problems seen in clinic. As a parent I also recognised many of the scenarios and remembered many meal times with young toddlers which were far from enjoyable! My one criticism of the book would be the general layout as I felt this was more in keeping with a medical textbook rather than a manual for parents. I'm not sure whether first impressions of the book would encourage parents to pick it up. However, this certainly won't deter me from recommending this book. I do feel this will be of benefit to all paediatricians to read as well as GPs, health visitors, school nurses, and of course also parents, especially those dealing with truculent toddlers!

C Grayson

## CORRECTIONS

doi: 10.1136/adc.2003.045401corr1

Principi N, Esposito S, Gasparini R, Marchisio P, Crovari P, for the Flu-Flu Study Group. Burden of influenza in healthy children and their households. *Arch Dis Child* 2004;**89**:1002–7.

This article has been retracted by the publisher because of significant overlap with Principi N, Esposito S, Marchisio P, Gasparini R, Crovari P. Socioeconomic impact of influenza on healthy children and their families. *Pediatr Infect Dis J* 2003;**22**(Suppl 10):S207–10.

doi: 10.1136/adc.2005.77065corr1

D M B Hall and M J Renfrew. Tongue tie (*Arch Dis Child* 2005;**90**:1211–5).

Photographs 1, 2, 4, and 5 in this article are reproduced by kind permission of Kay Hoover, MED, IBCLC.