

Correspondence

Inappropriate perioperative fluid management in children: time for an isotonic solution?!

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SIR—In his editorial ‘Inappropriate perioperative fluid management in children: time for a solution?!’ Lönnqvist (1) recommended a solution containing 0.9% glucose and 120 mmol·l⁻¹ of sodium (2) as an almost ‘fool-proof’ and ‘golden compromise’. We agree that such a solution should contain firstly a glucose concentration (i.e., 1–2%) high enough to avoid hypoglycemia and low enough not to cause significant hyperglycemia and secondly an electrolyte pattern and osmolarity very close to normal physiological extracellular levels. But is the proposed solution really ‘golden’ when it comes to overcoming iatrogenic hyponatremia and acid–base disorders? First, the *in vitro* osmolarity (the sum of cations and anions including glucose: 307 mosmol·l⁻¹) of the proposed solution is nearly identical to that of ‘normal’ saline (308 mosmol·l⁻¹). What counts, however, is the osmolarity that is effective *in vivo* rather than that measured *in vitro* (3). Glucose enters very rapidly into the intracellular space to be metabolized there and, therefore, *in vivo* the solution becomes clearly hypotonic (256 mosmol·l⁻¹). Second, the lactate concentration of the solution (20.7 mmol·l⁻¹) is below the physiological bicarbonate concentration (24 mmol·l⁻¹). *In vivo*, lactate metabolism leads to the release of equimolar amounts of bicarbonate and, therefore, theoretically a high volume infusion of this solution may produce dilutional acidosis. Third, for stabilization of the acid–base status, acetate may be preferable to lactate because it is metabolized significantly faster, more independently of hepatic function, with a lower increase in oxygen consumption and no interference with the diagnostic use of lactate as a marker of low tissue perfusion. From our point of view an almost ‘fool-proof’ solution should be really isotonic with a physiological electrolyte pattern and acetate as a bicarbonate precursor in order to prevent acid–base imbalances. Would it not be more rational to use perioperatively such an isotonic electrolyte solution with 1% glucose added (6 ml glucose 40% in 250 ml isotonic solution)? Indeed, this has proved to be an almost ‘fool-proof’ solution in many of our children’s hospitals for several years and we, in fact, recommended it in our recent guidelines (4). Unfortunately, it has not been possible to find a pharmaceutical company that would be willing to take up this idea because in this case, the cost of clinical studies necessary for approval will be greater than the potential return on investment. Therefore, we filed an

application for standard approval with the German regulatory agency, ‘Bundesinstitut für Arzneimittel und Medizinprodukte’, Bonn, Germany, and this application is currently under regulatory review!

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Those who ignore the past

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SIR — I have read the recent correspondence by Jimi and Shin (1) in which they recommend superficial temporal arterial cannulation in infants. As someone who was a pediatric trainee in the 1970s and who had significant experience with this technique, I must agree that it is quite readily performed, either percutaneously or by cut down. However, I also distinctly and to this day remember the CT scans published by Prian *et al.* (2), which the authors reference, and also the particularly impressive CT scan of a massive infarction in the distribution of the middle cerebral artery published by Simmons *et al.* (3), which Jimi and Shin did not reference. The use of this technique decreased markedly and abruptly with the publication of these two reports. I note that the three patients reported by Simmons *et al.* did not develop manifestations of neurologic injury until >4 months after hospital discharge, far beyond the time of routine anesthesia follow-up.