EDITORIAL

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Hypotonic or isotonic maintenance fluids for paediatric patients: the never-ending story

Thomas Langer[1,2], Manu L. Malbrain[3], Niels Van Regenmortel[4,5]

[1]Department of Medicine and Surgery, University of Milano-Bicocca, Monza, Italy
[2]Department of Anaesthesia and Intensive Care Medicine, Niguarda Ca' Granda Hospital, Milan, Italy
[3]Faculty of Engineering, Department of Electronics and Informatics (ETRO), Vrije Universiteit Brussel (VUB), Brussels, Belgium
[4]Department of Intensive Care Medicine, Antwerp University Hospital, Edegem (Antwerp), Belgium
[5]Department of Intensive Care Medicine, Ziekenhuis Netwerk Antwerpen Campus Stuivenberg, Antwerp, Belgium

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Lehtiranta *et al*. [1] recently published an influential study in *JAMA Pediatrics*, in which they compared the use of a balanced isotonic with a moderately hypotonic fluid in acutely, mainly non-critically ill children. It contributes significantly to the understanding of paediatric maintenance fluid therapy, of which the optimal electrolyte composition is still under debate. Strikingly, it is the first trial on the tonicity of paediatric maintenance fluids that does not focus solely on hyponatraemia, but also evaluates other electrolyte disorders and fluid retention. We agree that the observed sodium-induced weight gain might be of little relevance, given the short duration of the therapy, but are convinced that it could lead to clinical problems in children who are critically ill or require more prolonged treatment [2].

One aspect that might require further discussion is that, after the initial resuscitation, only one type of fluid was used in each study arm. Although we understand this in view of study design simplicity, there are three distinct indications for fluid therapy, each calling for a different type of fluid: resuscitation, maintenance fluid therapy, and the replacement of ongoing fluid losses, e.g. diarrhoea. The focus of this study was largely maintenance fluid therapy, which makes the conclusion that "isotonic fluids are not optimal for fluid therapy" somewhat misleading. Isotonic solutions remain the first choice for resuscitation and the replacement of most fluid losses, to avoid the risk of vasopressin-induced hyponatraemia. Maintenance fluids, nicely demonstrated to better be hypotonic, aim to provide water and electrolytes in patients who are not able/allowed to eat and drink. They are rarely required when these needs are delivered with (par) enteral feeds. Probably, they should even be adapted to the phenomenon of *fluid creep* provides, the enormous unintentionally administered amounts of water and electrolytes [3, 4]. Fluid creep could be the reason why there was still some body weight gain.

Finally, the higher incidence of metabolic acidosis in the hypotonic arm could be explained by the lower strong ion difference (SID) of the hypotonic solution [5]. Although the chloride content was comparable in both solutions (± 100 mmoL L^{-1}), the infusional SID of the isotonic fluid was 50 mmol L^{-1}, compared to the zero-SID hypotonic fluid (80 mmoL L^{-1} NaCl and 20 mmoL L^{-1} KCl). The hypotonic group probably experienced iatrogenic, hyperchloraemic metabolic acidosis, a problem that could easily be avoided by substituting some chloride with organic anions and therefore the use of a balanced hypotonic solution [5].

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CORRESPONDING AUTHOR:

Dr. Thomas Langer, Department of Medicine and Surgery, University of Milano-Bicocca, Piazza dell'Ospedale Maggiore 3, 20162, Milano, Italy, phone: +39(0)264448580, e-mail: thomas.langer@unimib.it

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