

SP 04

DO WE STILL "TREAT" CHILDREN WITH HYPOTONIC INTRAVENOUS FLUIDS?

Neil Caldwell,¹ Lauren Williams,¹ Oliver Rackham,² Charles Morecroft³. ¹Wirral University Teaching Hospital; Liverpool John Moores University; ²Wirral University Teaching Hospital; ³Liverpool John Moores University

10.1136/archdischild-2015-308634.4

Aim The National Patient Safety Agency (NPSA) alert, "Reducing the risk of hyponatraemia when administering intravenous infusions to children," gives clear guidance on fluid management¹. The following study reviewed intravenous fluid management in children to identify:

- ▶ Which fluids are given to children
- ▶ If hospitals had removed sodium chloride 0.18% in glucose 4% from stock
- ▶ The extent of hyponatraemia
- ▶ If hospitals have clinical guidelines for fluid management in children.

Method A national multi-sectional study was conducted for paediatric patients (both medical and surgical), providing they met the inclusion criteria:

- ▶ aged 0–18 years and
- ▶ receiving intravenous fluids or fluids had been stopped in previous 24 hours.

Children receiving intensive care were excluded. A data collection tool was completed by pharmacists for one to four days in each hospital, noting age, weight, clinical background, indication, fluids administered, including rate and electrolyte monitoring. Respondents were asked for their local clinical guideline for fluid management in children.

Results 216 patients were recruited from 28 hospitals. 200 children received maintenance fluids and 44 received replacement fluid for volume expansion. Hypotonic maintenance fluids (sodium chloride <0.9%) were given to 118 children (59%). No-one received 0.18% sodium chloride in 4% glucose. All hospitals reported that this product was no longer available as ward stock in accordance with NPSA recommendations. Isotonic maintenance fluids were given to 63 children (32%). Hypertonic maintenance fluids were given to 19 patients (10%). Hypotonic replacement fluids were given to five children (11%). Isotonic solutions for volume expansion were used in 39 cases (89%).

Hyponatraemia was noted in 20 patients (nine received hypotonic solutions, nine isotonic and two patients hypertonic fluids). Forty-seven patients (22%) had no electrolyte monitoring following fluid initiation. Forty-one patients received greater than 100% of the maintenance volume calculated using the Holliday and Segar calculation.² Of these two patients experienced hyponatraemia. Twenty-five hospitals (89%) had intravenous fluid guidelines in place. This represents a 60% increase in guideline availability since the evaluation conducted by Armon *et al* in 2004, before the NPSA publication.³

Conclusion Practice following the NPSA publication is changing. No child received 0.18% sodium chloride in 4% glucose. Most children receive volume expansion with an isotonic solution but maintenance fluids still tend to be hypotonic. Most, but not all hospitals, have intravenous fluid guidelines in place for children.

Despite changes in practice, we have not yet found the perfect intravenous fluid (20 patients had hyponatraemia), hence further changes are necessary. There is now a licensed isotonic solution

available which is used at the author's institution. More care needs to be taken with regard to regular electrolyte monitoring and the volume of fluid administered.

REFERENCES

- 1 NPSA alert (2007). Reducing the risk of hyponatraemia when administering intravenous fluids in children (publication reference 0409). <http://www.nrls.npsa.nhs.uk/resources/?EntryId45=59809> (accessed 1 Jul 2014).
- 2 Zaoutis LB, Chiang VW. Comprehensive pediatric hospital medicine. 2007 Philadelphia: Mosby/Elsevier.
- 3 Armon K, Riordan A, Playfor S, *et al*. Hyponatraemia and hypokalaemia during intravenous fluid administration. *Arch Dis Child* 2008;93:285–87.