Reviewer's report

Title: Intravenous postoperative fluid prescriptions for children: A survey of practice

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Reviewer: Stephen Playfor

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Referee's report

Intravenous postoperative fluid prescriptions for children: A survey of practice

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The paper reports a very modest postal questionnaire

Major Compulsory Revisions

1. The paper must be rewritten in the context of the recent NPSA alert regarding hypotonic fluids; strangely this alert is mentioned in passing only in the abstract section. We need to know if data was collected before or after 27 March 2007 in order to interpret the findings.

Comments such as in the 1st para of the Discussion section on p7; â”This is putting large numbers of children at risk of hyponatraemia and its devastating consequencesâ” is no longer true as Trusts should by now have removed bags of sodium chloride 0.18% with glucose 4% from general ward areas.

Another example is the final sentence of the Discussion section on p9; â”In particular, the rate of standard maintenance infusions, and the use of 4% dextrose with 0.18% saline, should be reviewed.â” There is no need for further â”reviewâ”; following the NPSA alert, sodium chloride 0.18% with glucose 4% must not be used in any paediatric patient a routine maintenance fluid. Furthermore the issue of volumes of maintenance infusion were addressed by the NPSA Working Group.

2. Confusion regarding basic science and terminology are a key part of the problem of iatrogenic hyponatraemia.

The accepted format for describing IV fluids is as followsâ’

â”Sodium chloride 0.18% with glucose 4%â” not â”4% dextrose with 0.18% salineâ”. The format should be changed throughout the paper.

Background section, 1st para, p3; â”These solutions are hypertonic in vitro but essentially hypotonic in vivo as glucose is metabolised to water.â” This needs
to be completely rewrittenâ#; Sodium chloride 0.18% with glucose 4% in vitro is iso-osmolar compared to plasma
Sodium chloride 0.45% with glucose 5% in vitro is hyperosmolar compared to plasma
Both solutions are hypotonic; tonicity is a property of a solution which must be defined with reference to a semipermeable membrane, typically human cell membranes. â##Tonicity in vitroâ## is a meaningless concept.

The reason that glucose does not contribute to the tonicity of these fluids is because in normal physiological circumstances glucose is an osmotically ineffective solute which is rapidly transported by the Glucose Transport Proteins down a simple concentration gradient into cells; the typical intracellular glucose concentration being ~0.11mmol/L. It is not because â##glucose is metabolised to waterâ##.

3. Background section, 3rd para, p3; The November 2003 Royal College of Anaesthetists Bulletin referred to was issued as part of a surge in awareness following the death of a child with gastroenteritis rather than a postoperative death. Details of this childâ##s case were published inâ#; Playfor S. Fatal iatrogenic hyponatraemia. Arch Dis Child 2003;88:646-647.

4. Conclusions section, 1st para, p10; â##Based on current evidence we feel that 4% dextrose with 0.18% saline should be abandoned as a maintenance fluid for children in the post operative periodâ##: Based on what evidence? The NPSA alert has provided us with clear guidance.

5. Conclusions section, 1st para, p10; â##Our current fluid guidelines for children are shown in table 3.â## Why? They are irrelevant.

6. Conclusions section, 2nd para, p10; â##All fluid boluses should be 20 ml/kg of isotonic fluid.â## Current APLS guidelines recommend boluses of 10ml/kg in the setting of hypovolaemia in trauma or in the post-operative setting.

7. Conclusions section, 3rd para, p10; â##A large multi-centred randomised trial is warranted to compare 5% dextrose with 0.45% saline, with isotonic solutions at different maintenance rates.â## Why? to look at what? mortality? hyponatraemia? The authors need to recognise what a massive and difficult proposition this would be.

Minor Essential Revisions
1. Abstract, Results, p2; â##although ne quarterâ##.
2. Abstract, Conclusions, p2; â##traditional, outdated maintenance ratesâ##. In what sense are traditional maintenance rates outdated? There is no evidence upon which to recommend any other formula for calculating maintenance rates.
Maintenance rates and recommended restrictions are covered in the NPSA alert.

3. Background, para 2, p3; ‘Hyponatraemia occurs as the hypotonic saline is a source of free water, which cannot be excreted because Anti Diuretic Hormone (ADH) levels are elevated due to the surgical stress response. The mechanism of action of ADH is to prevent free water excretion. ADH impairs the excretion of free water it does not prevent it.

4. Background, para 3, p3; ‘postoperative’ and ‘post operative’ both used; be consistent in the format used.

I am unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

At best this paper would constitute an article of limited interest

**What next?:** Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

**Level of interest:** An article of limited interest