

BIF hyponatraemia 10/4

**McCarthy, Miriam**

**From:** BOB TAYLOR [drbobtaylor [REDACTED]]  
**Sent:** 03 October 2001 14:36  
**To:** Miriam McCarthy  
**Subject:** hyponatraemia



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s.doc

Hi M,

Here are some comments from Anaesthetic SAC and from Alder Hey and Toronto Sick Kids.

It appears that the common factor is the use of Balanced Salt (Hartmanns or N Saline) intraoperative and 0.45% NaCl, with either 2.5% or 5% glucose.

"s all getting rather confused and I am determined to keep it as simple as possible. There will always be people with their own favorites (me included) but our guideline should allow some leeway.

Alder Hey as you can see do not stock 0.18 NaCl/4% glucose at all. There is a concensus that for infants < 1year old this fluid should continue to be used, but not in those > 1year old.

Peter is still keen to keep surgical patients separate from general patients. I would like a minimal standard for all (as outlined) with some clinical freedom about exact solutions to use.

BOB

Here is the email from Alder Hey;

"Tony Nunn the chief pharmacist at Alder Hey on this  
ie.

Alder Hey do not stock no. 18 solution and use 5% glucose with 0.45% sodium chloride as they do not believe that 2.5% glucose is sufficient to prevent hypoglycaemia. In infants (not sure of exact age) they use glucose 10% with 0.45% sodium chloride."

And Toronto (anaesthetists)

Bob.

Greetings. I am unclear whether your query is for kids postop Alone or intraop and preop as well. We use lactated ringers exclusively except for infants and chronically ill kids. Perioperatively, we run balanced salt solutions but I am sure that the solutions are changed to glucose and hyponatremic solutions on the floor. Of course, surgeries such as scoliosis where SIADH can occur are marks for hyponatremia if hypotonic solutions are used. I know Des Bohn organized a lecture to educate the paediatricians. Don't know how well he was received. IT is a pandemic, chronic problem, particularly in infants.

DHSSPS

best wishes  
jerry

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## Recommendations to prevent Acute Hyponatraemia in Children

To prevent the uncommon but serious problem of dilutional hyponatraemia the free water component of intravenous fluids must be limited. Acute hyponatraemia is often unheralded, therefore care must be taken in the prescription and administration of intravenous fluids. Finally surveillance of the patient receiving intravenous fluids is vital.

1. **Body weight** must be accurately measured or estimated by a professional with substantial paediatric experience. The estimation of body weight can be made using the child's age; **Body weight = (AGE+4) x 2**

This weight should be plotted on a Centile Chart as a cross check. If the weight is beyond the 3<sup>rd</sup> or 97<sup>th</sup> Centile range then the weight must be re-examined.

2. **Fluid Calculation.** Maintenance fluids should be calculated carefully.

An accepted guide to maintenance fluid administration is;

For the first 10 kgs body wt give 4 mls / kg / hour (*40 mls/hr for a 10 kg infant*)

For the second 10 kgs body wt give 40 + 2 mls / kg / hour (*60 mls/hr for a 20 kg child*)

For each subsequent 1 kg body wt give 60 + 1 ml / kg / hour (*70 mls/hr for a 30 kg child*)

3. **Maintenance fluid** for > 1 year old children should contain **not less than 0.45%NaCl in 2.5% Glucose**. Infants < 1 year (0.18%NaCl in 4% Glucose) with careful monitoring.

4. **Chemistry.** A baseline blood sample must be sent for Na<sup>+</sup>, Urea and blood sugar. Regular Na<sup>+</sup> and blood sugar estimation is required and must be documented. This will mean at least once and often twice daily samples. An indwelling heparinised cannula or capillary sample will avoid sampling difficulties in the anxious child or those with poor veins. Do not take samples for the same limb as the intravenous infusion.

5. **Other Fluids.** Avoid GLUCOSE containing iv fluids for fluid resuscitation or replacement fluids. Give 5 mls/kg 10% GLUCOSE bolus if there is hypoglycaemia (< 4 mmol/L). Care must be exercised when additional fluids are administered. Intravenous antibiotics, oral fluids or contrast media are commonly forgotten additional fluids.

6. **Fluid balance.** Measurement of urine output or body weight is mandatory. Daily body weight measurement will accurately assess free fluid but is not feasible in the surgical bed bound child with acute pain. Urine output must be measured and clearly documented. An experienced doctor must assess fluid balance at least twice daily and take appropriate action to correct fluid loss or retention. If measurement of urine output is problematic a urinary sodium, potassium and urea should be measured.

7. **Correction of hyponatraemia.** A Child with a serum Na<sup>+</sup> < 130 mmol/l needs urgent referral to a hospital with a Paediatric ICU (Asymptomatic hyponatraemia). Correction of hyponatraemia is potentially dangerous and requires experience

## Intravenous Fluid Prescription

### **Infants less than 1 year of age.**

Dilutional Hyponatraemia does not appear to be a common problem in this age group. Blood chemistry and monitoring of fluid balance is as described above.

For normal serum sodium ( $\text{Na}^+$  135-145 mmol/l)  
Give 0.18% NaCl in 4% Glucose at a rate of 4 mls per kg body weight per hour. *Eg For a 5 kg infant this is 20 mls per hour.*

For low or high sodium expert advice should be sought.

### **Children greater than 1 year of age.**

Dilutional Hyponatraemia is well documented in this age group. Blood chemistry and monitoring of fluid balance is as described above.

For normal serum sodium ( $\text{Na}^+$  135-145 mmol/l)  
Give 0.45% NaCl in 2.5% Glucose or Hartmanns solution at a rate as above.

For low or high sodium expert advice should be sought.

### **REFERENCES**

Arieff AI. Postoperative hyponatraemic encephalopathy following elective surgery in children. Paediatric Anaesthesia 1998;8:1-4

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