

McCarthy, Miriam

To: gnesbitt [REDACTED]
Cc: Campbell, Dr Henrietta
Subject: Hyponatraemia

Geoff,



hypo13dec.doc

I attach the latest draft of the Hyponatraemia guidelines for your information. I know that within your Trust there are concerns that the guidelines do not go far enough in specifying fluids for particular conditions etc. In your role as a member of the Hyponatraemia group I would appreciate your comments on the document and ways in which we can strengthen the content. I want to ensure that the final guidelines meet the needs of clinicians and provide the necessary advice for junior staff to ensure that further cases of serious hyponatraemia can be avoided in children receiving IVs.

My telephone number is [REDACTED]

Many thanks

am McCarthy

HYPONATRAEMIA IS A RISK IN

PREVENTION OF HYPONATRAEMIA IN CHILDREN RECEIVING INTRAVENOUS FLUIDS

INTRODUCTION

- Hyponatraemia most often reflects failure to excrete water. Stress, pain and nausea are all potent stimulators of anti-diuretic hormone (ADH), which inhibits water excretion.
- Hyponatraemia is potentially extremely serious, a rapid fall in sodium leading to cerebral oedema, seizures and death.
- Complications of hyponatraemia most often occur due to the administration of excess or inappropriate fluid to sick children, usually intravenously.
- Hyponatraemia may also occur in children receiving excess or inappropriate oral rehydration fluids.
- Hyponatraemia can occur in a variety of clinical situations, even in children who are not overtly "sick". Particular risks include:
 - Post-operative patients.
 - CNS injuries
 - Bronchiolitis
 - Burns
 - Vomiting

BASELINE ASSESSMENT

 Before starting IV fluids:

- **Weight:** accurately in kg. [In a bed-bound child use best estimate.] Plot on centile chart or refer to normal range.
- **U&E:** take serum sodium into consideration.
- **Fluid needs:** should be assessed by a doctor competent in determining children's fluid requirement. Accurate calculation is essential and includes:

Maintenance Fluid 100mls/kg for first 10kg body weight plus
50mls/kg for the next 10kg body weight plus
20mls/kg for each kg thereafter, up to max of 70kg
[This provides the total 24 hr calculation, divide by 24
to get the mls/hr].

Replacement Fluid Must always be considered and prescribed separately.
Must reflect fluid loss.
Must replace loss with most appropriate fluid.

DHSSPS

CHOICE OF FLUID

Hyponat risk = 0.18% →

Fluid and electrolyte requirements vary as a function of metabolic activity.

- In the immediate resuscitation of a child with clinical signs of shock, if a decision is made to administer a crystalloid, normal (0.9%) saline would be an appropriate choice, while awaiting the serum sodium.
- The choice of maintenance fluids will be influenced by anticipated sodium, potassium and glucose requirements. 0.45% NaCl in dextrose is often a satisfactory solution to use unless an alternative is indicated.
- Replacement fluids should ideally have a sodium content similar to plasma, for example Hartmann's solution or normal (0.9%) saline.
- The composition of oral rehydration fluids should be carefully considered.

Hyponatraemia may occur in children receiving **any** IV fluid or oral rehydration. Vigilance is needed for all children receiving fluids.

MONITOR

- **Clinical state:** including hydrational status. Pain, vomiting, general well-being should be documented.
- **Fluid balance:** must be assessed at least daily by an experienced member of clinical staff.

Intake: All oral fluids (including medicines) must be recorded and IV intake reduced by equivalent amount.

Output: Measure and record all losses (urine, vomiting, diarrhoea, etc.) as accurately as possible

- **Biochemistry:** Regular blood sampling for U&E may be difficult but remains **essential** at least once a day - more often if there are significant fluid losses or if clinical course is not as expected

The rate at which Na⁺ falls is as important as the actual plasma level. A Na⁺ that falls quickly may be accompanied by rapid fluid shifts with major clinical consequences.

Consider using an indwelling heparinised cannula to facilitate repeat U&Es.

Do not take sample from the same limb as the IV infusion.

Capillary samples are adequate if venous sampling is not practical.

- **Urine osmolarity/Na:** Very useful in hyponatraemia. Compare to plasma osmolarity and consult a senior paediatrician or a chemical pathologist in interpreting results.

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SEEK ADVICE

Advice and clinical input may be obtained readily from a senior member of medical staff including:

Consultant Paediatrician
Consultant Anaesthetist
Consultant Chemical Pathologist

- In the event of problems that cannot be resolved locally, help should be sought from consultant paediatricians/anaesthetists at the PICU, RBHSC.

DHSSPS

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