From the Chief Medical Officer
Dr Henrietta Campbell CB

Department of
Health, Social Services and Public Safety

An Roinn
Sláinte, Seirbhísí Sóisialta agus Sábháilteachta Poibl

www.dhsspsni.gov.uk

Chief Executives of Acute / Acute & Community Trusts

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Your Ref:
Our Ref:
Date: 4 March 2004

Dear Colleague

PREVENTION AND MANAGEMENT OF HYPONATRAEMIA

In March 2002, guidance on the prevention of hyponatraemia in children was issued to all Trusts. The guidance emphasised that every child receiving intravenous fluids should have a thorough baseline assessment and monitoring to prevent the development of hyponatraemia. An A4 sized black and white copy of the guidance is attached and it may also be accessed on the Departmental website www.dhsspsni.gov.uk . Large laminated posters were distributed to all Trusts which should now be displayed in appropriate clinical areas.

When the guidance was issued, Trusts were encouraged to develop local protocols to complement the guidance and to provide specific direction to junior staff. Emphasis was given to the need to ensure implementation of the guidance in clinical practice. It was also noted that the guidance should be supplemented locally in each Trust with more detailed fluid protocols relevant to specific specialty areas.

Following the development of guidelines for fluid replacement in children the Clinical Resource Efficiency Support Team (CREST) drew up guidance on The Management of Hyponatraemia in Adults. These guidelines focussed on the diagnosis and treatment of hyponatraemia in adults and included infusion guidelines. This was made available in the form of wall charts which were circulated widely last year. [Further copies are available if required from the CREST Secretariat [redacted]] The purpose of this letter is to ask you to assure me that both of these guidelines have been incorporated into clinical practice in your Trust and that their implementation has been monitored. I would welcome this assurance and ask you to respond in writing **before 16 April**.

Yours sincerely

Dr Henrietta Campbell

Copied to:
Medical Directors of Acute Trusts
Directors of Nursing, Acute Trusts
Chief Executives of HSS Boards
Directors of Public Health

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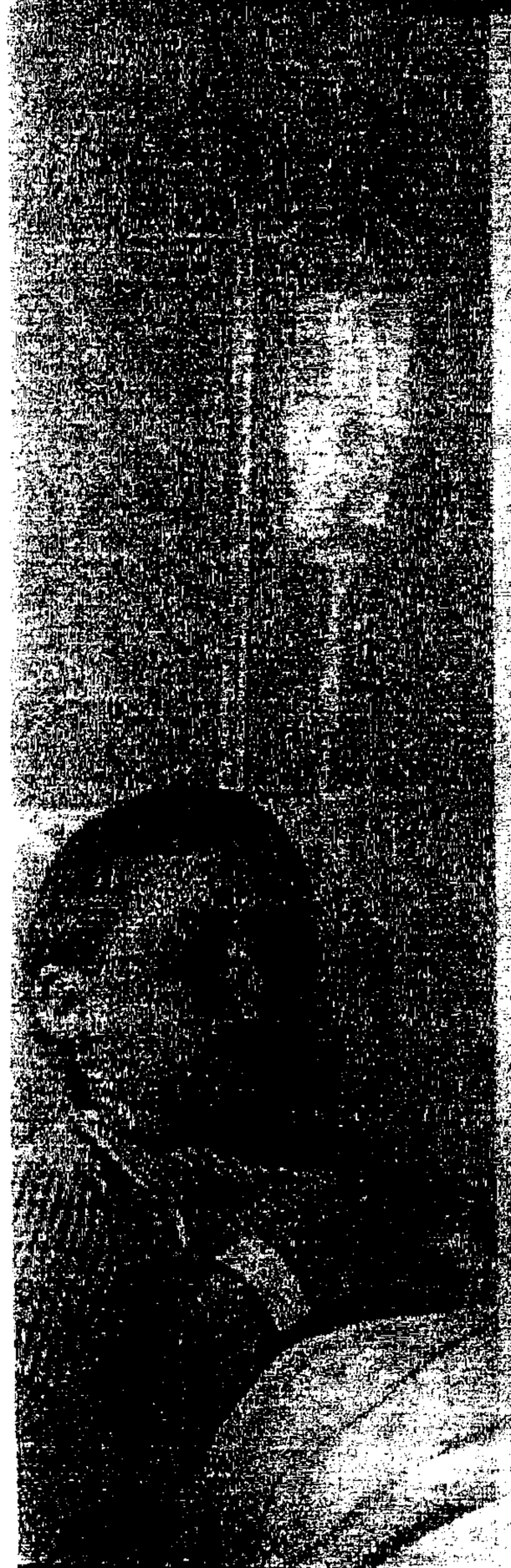
HYPONATRAEMIA



INTRODUCTION

- **Any child on IV fluids or oral rehydration is potentially at risk of hyponatraemia.**
- Hyponatraemia is potentially extremely serious. A rapid fall in sodium leading to cerebral oedema, seizures and death. Warning signs of hyponatraemia may be non-specific and include nausea, malaise and headache.
- 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.
- Complications of hyponatraemia most often occur due to the administration of excess or inappropriate fluid to a sick child, usually intravenously.
- Hyponatraemia may also occur in a child receiving excess or inappropriate oral rehydration fluids.
- Hyponatraemia can occur in a variety of clinical situations, even in a child who is not overtly "sick". Particular risks include:

  - Post-operative patients
  - CNS injuries
  - Bronchiolitis
  - Burns
  - Vomiting

BASELINE ASSESSMENT

Before starting IV fluids, the following must be measured and recorded:

- **Weight:** accurately in kg. [In a bed-bound child use best estimate.] Plot on centile chart or refer to normal range.
- **U&Es:** take serum sodium into consideration.

FLUID REQUIREMENTS

Fluid needs should be assessed by a doctor competent in determining a child's fluid requirements. Accurate calculation is essential and includes:

Maintenance Fluid

- 100ml/kg for first 10kg body wt. plus
- 50ml/kg for the next 10kg, plus
- 20ml/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 in both volume and composition (lab analysis of the sodium content of fluid loss may be helpful).

CHOICE OF FLUIDS

- **Maintenance fluids** must in all instances be dictated by the anticipated sodium and potassium requirements. The glucose requirements, particularly of very young children, must also be met.
- **Replacement fluids** must reflect fluid lost. In most situations this implies a minimum sodium content of 130mmol/l.
- **When resuscitating** a child with clinical signs of shock, if a decision is made to administer a crystalloid, normal (0.9%) saline is an appropriate choice, while awaiting the serum sodium.
- The composition of oral rehydration fluids should also be carefully considered in light of the U&E analysis.

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

MONITOR

- **Clinical state** including hydrational status. Pain, vomiting and general well-being should be documented.
- **Fluid balance:** must be assessed at least every 12 hours 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.

  If a child still needs prescribed fluids after 12 hours of starting, their requirements should be reassessed by a senior member of medical staff.
- **Biochemistry:** Blood sampling for U&E is 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 sodium falls is as important as the plasma level. A sodium 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 samples from the same limb as the IV infusion.

  Capillary samples are adequate if venous sampling is not practical.

  Urine osmolarity/sodium: Very useful in hyponatraemia. Compare to plasma osmolarity and consult a senior Paediatrician or a Chemical Pathologist in interpreting results.

SEEK ADVICE

Advice and clinical input should be obtained from a senior member of medical staff, for example a Consultant Paediatrician, Consultant Anaesthetist or 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.

The Department Of Health, Social Services And Public Safety. Guidance is also available on the Departmental website : www.dhsspsni.gov.uk