MINISTERIAL SUBMISSION

From: Dr M McCarthy

cc: Dr I Carson
Mr P Simpson
Mr J Hamilton
Mr K Mulhern

Date: February 2003

1. CMO ✓ 20.2.03
2. Des Browne

INQUEST VERDICT ON RAYCHEL FERGUSON

Issue: **The recent inquest on Raychel Ferguson, a 9 year old who died following surgery in Altnagelvin Hospital on 10 June 2001.**

Timing: **Urgent.**

Presentational: **Minister may be asked to comment on the case when he visits Altnagelvin Hospital on Thursday 20th February.**

Recommendation: **That Minister notes information relating to the case and agrees lines to take.**

Background

1. Raychel Ferguson, a 9 year old girl died on 10 June 2001 following an appendicectomy in Altnagelvin Hospital. The inquest on her death was held on 5th February 2003 and the findings concluded that she died from cerebral oedema caused by hyponatraemia (depleted sodium levels).

2. Raychel was admitted to Altnagelvin Hospital on 7 June 2001, complaining of abdominal pain. Appendicitis was diagnosed and she underwent appendicectomy the same day. Initially post-operative recovery proceeded normally. However the following day she vomited and complained of a headache. On the 9th June she suffered a series of seizures and was transferred to the Paediatric Intensive Care Unit at RBHSC where she died on the 10th June.

3. The post-mortem examination established that she died from cerebral oedema caused by hyponatraemia. The verdict at the inquest concluded that the hyponatraemia was caused by inadequate electrolyte (salt) replacement in the face of vomiting and water retention.

4. Hyponatraemia is rare but potentially extremely serious, a rapid fall in sodium leading to seizures and death. Warning signs are often non-specific and include nausea, headaches and malaise.

5. Hyponatraemia often reflects water retention and is a particular risk in patients who have just had surgery or who are vomiting, when a hormone may be released that causes the body to retain water.

Summary of Issues

6. Issues likely to arise focus on:

- **The Case**: Now that the inquest has concluded, Rachael's family may pursue legal proceedings.

- **The implications for disseminating information to health professions:** Following Raychel's death, the Chief Medicial Officer established a group to draw up guidance for hospital medical and nursing staff working with children. The guidance aims to raise the awareness of hyponatraemia and provide clear and practical advice on steps required to prevent hyponatraemia. Guidance was completed in February 2002 and disseminated to Trusts. A copy of the guidance is attached (Annex A).

- **Quality of Care:** A statutory duty of Quality will soon apply across the HPPS. New arrangements including the establishment of a Health and Social Services Regulation and Improvement Authority will be put in place to monitor practice against agreed Standards.

Handling and Timing Issues

7. There has been a considerable amount of media interest in this case. The Belfast Telegraph reported on the inquest proceedings. UTV is currently recording, material including an interview with the Chief Medical Officer, for an *Insight* programme due to be televised within the next few weeks. It is possible that Minister will be asked to comment on the case and its implications when he visits Altnagelvin Hospital on Thursday 20 February. Lines to take are attached (Annex B).

Recommendation

8. I recommend that you agree the lines to take.

M. McCarthy

DR MIRIAM McCARTHY

Senior Medical Officer

DHSSPS

075-065-207

CHILD AT RISK OF 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&E:** take serum sodium into consideration.

FLUID REQUIREMENTS

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

Maintenance Fluid

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

CHOICE OF FLUID

- **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 status** including fluid/dietary intake, 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

ANNEX A

ANNEX B

LINES TO TAKE

My sympathy goes to the parents and family of Raychel following the death of their daughter.

I am concerned about this incident and want to make sure that the lessons we learn from this unfortunate event will prevent a similar case occurring in the future.

Guidance has already been issued to doctors and nurses involved in treating children in hospitals. This guidance raises awareness of hyponatraemia, a rare but potentially serious problem, and provides clear and practical advice on how to prevent it.

We must ensure the very highest quality standards in our Health Services. New arrangements to support the Duty of Quality will soon be in place. These will include the establishment of a Standards and Guidelines Unit within the DHSS&PS, and an independent HSS Regulation and Improvement Authority.