The safety of rapid rehydration in dehydrating diarrhoea in a busy rehydration unit

To the Editor: Dehydration due to diarrhoeal disease is one of the major contributors to mortality in early childhood.[1] In South Africa it contributes significantly to in-hospital mortality, often within the first 24 hours of admission.[2] Rehydrating a dehydrated child over 4 - 6 hours (rapid rehydration (RR)) is widely recommended, as it has resulted in earlier discharge and is considered safe.[3] Where oral rehydration cannot be used, nasogastric (NG) rehydration has been shown to be at least as effective as intravenous (IV) rehydration and is probably safer.[4]

The 20-bed Rehydration Unit (RU) at Red Cross War Memorial Children's Hospital in Cape Town admits over 2 000 children annually from community-level services. Children are admitted to the RU if they have failed an oral rehydration trial at primary health care level or in the hospital's Emergency Unit. Shocked children are stabilised in the Emergency Unit before admission to the RU. The RU is staffed by interns and senior house officers, supervised by a paediatric registrar. For many years rehydration over 24 hours has been the norm, mainly owing to fears of over-hydrating children with early malnutrition. In February 2007, new protocols emphasising NG rehydration and incorporating RR (at between 15 and 30 ml/kg/h for 4 hours, depending on the degree of dehydration) with certain contraindications (age less than 3 months, neurological or cardiorespiratory signs, suspected hypernatraemia, severe malnutrition) were introduced. *Pro forma* medical records encouraged adherence to the protocol and good record keeping by medical staff. Serum electrolytes were not routinely measured, this being restricted to children with severe dehydration or in whom complications were suspected clinically.

An audit of the implementation, efficacy and safety of the RR protocol in the RU at the peak of the annual diarrhoea season in Cape Town was undertaken. This letter reports on the safety aspects from a retrospective folder review of children admitted to the RU during March 2007. To ensure that the care of the children most at risk from RR was reviewed, the following cases were chosen: (*i*) all children younger than 2 years (based on a list from the hospital records system); and (*ii*) all children with proven hypernatraemia (as identified by laboratory records). Data included age at admission, degree of dehydration, fluid volume and rate calculated by the doctor and its appropriateness (i.e. presence or absence of a contraindication), method of rehydration (oral, NG, IV), whether the child was re-assessed at 4 hours as indicated in the protocol, and the occurrence of complications (respiratory, neurological, fluid overload, e.g. development of oedema, other potential complication). Simple descriptive statistics were used to analyse the data, and the chi-square test was used for comparison of proportions. Ethical approval for the study was obtained from the Research and Ethics Committee of the University of Cape Town.

Fig. 1 shows the breakdown of the cases, their eligibility for RR and their fluid therapy. The patients' mean age was 10.6 months. Forty-three patients had hypernatraemia and 55 were under 3 months of age. Ten per cent of the children were HIV infected. The reasons that RR was contraindicated in 177 of children (52%) were 'underweight' (66), cardiopulmonary (47), suspected hypernatraemia (9), and age under 3 months (55); in 7 cases there was more than one contraindication.

In 82.5% of the 97 cases in which RR was prescribed appropriately, NG rehydration was prescribed. Seventeen children received IV RR. 'Some dehydration' (Integrated Management of Childhood Illness

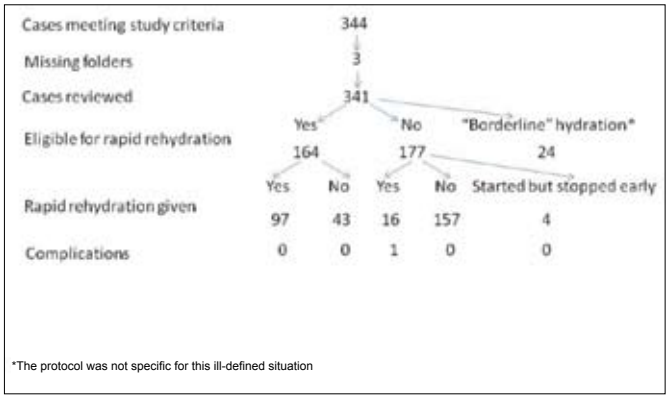

Fig. 1. Breakdown of the cases reviewed.

(IMCI)) was present in 73% of the 97 cases, and 'severe dehydration' (IMCI) in 13%; the remainder were 'borderline' (2 cases) or not recorded. Of the 113 (97 + 16) children who were rehydrated over 4 hours, 48 (42.5%) were re-assessed at the protocol time of 4 hours, 44 (38.9%) were reviewed more than 5 hours after commencement of fluids, in 20 cases the data were missing, and 1 child was re-assessed at 2 hours and the infusion was stopped. The only complication occurred in one child who was given RR inappropriately (over-hydrated but no sequelae). No child subsequently found to be hypernatraemic suffered a complication from RR (*N*=10). There was no difference in complication rate between the group who were prescribed RR when it was indicated and those who did not receive it when it was indicated (0/97 v. 0/43).

RR for dehydrated children with diarrhoea in this context appears to have been safe, supporting international guidelines. Despite less than optimal management in many cases, there were no complications from the excessive fluid administration. That most children received their fluid by NG infusion rather than IV may explain this lack of adverse outcomes. NG rehydration was associated with fewer complications than IV fluids in a study of RR in an emergency department.[4]

Contraindications to RR in the RU were based on risks of fluid overload: they were largely adhered to, but even among the 16 patients who erroneously received a full 4 hours of RR, only one mild complication arose. The large number of apparent contraindications to RR in this study was inflated by the number of very young babies and by the use of 'underweight' as a category. Severe malnutrition, the true contraindication, was impossible to ascertain retrospectively as few length measurements were done.

In uncomplicated cases of dehydration due to diarrhoea in small children where oral fluids cannot be given, RR, usually via the NG route, is effective and safe.

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Possible drug reaction, eosinophilia and systemic symptoms (DRESS) syndrome in an infant

To the Editor: It was with interest I read the article on the DRESS syndrome in the December issue of SAJCH.[1] The toxicology of *Spirostachys africana* is well recognised. Commonly known as tamboti, it produces copious milky latex which was apparently used in the treatment of the patient.

This latex is reported in Palgrave's *Trees of Southern Africa* to be extremely toxic, and was used as a fish poison and to tip arrow heads.[2] Applied topically it can cause severe skin irritation and even eye damage. It is amazing that the patient reported did not die. Also interesting is that African children of the area known as the 'Old Transvaal' are generally warned about its poisonous nature.

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