oral rehydration fluids

Sir,

Tripp and Candy have reviewed the present state of oral rehydration clearly and concisely.1 I would like to make a few comments.

In most places where the World Health Organisation (WHO) oral rehydration solution is used a large proportion of patients will have varying degrees of malnutrition. Thus, experience of treatment in developing countries is not necessarily applicable to developed countries where intravenous fluids are available. In developing countries most children who die from dehydration die because they have not received intravenous fluids appropriately, or at all. The purpose of oral rehydration solution is to prevent them getting to this stage. Although WHO oral rehydration solution can be used successfully, even in severely dehydrated children if carefully managed, it does not negate the necessity to have facilities for intravenous treatment. About 10 to 15% of children in hospital treated with oral rehydration solution will need the addition of intravenous fluids to achieve rehydration.2 Unfortunately many children with moderate to severe dehydration die when given oral rehydration solution because it is given unsupervised resulting in progression of dehydration, and intravenous fluids are not given or are given too late.

In developed countries most children with diarrhoea who are not dehydrated or only mildly so are adequately treated with a low osmolar solution, and those more severely dehydrated with intravenous fluids. A 100% cure rate is the aim. I do not see why, unless the health facilities deteriorate in these countries, the practice should be changed. In fact rehydrating a moderately dehydrated child with oral rehydration solution is much more time consuming for nursing staff than administration of intravenous fluids with the aid of an infusion pump.

Oedema in children given oral rehydration solution may be a symptom of malnutrition rather than of overhydration. Many malnourished children develop oedema for the first time after rehydration with the WHO oral rehydration solution. This does not necessarily mean that they are adequately rehydrated but more that the sodium load of oral rehydration solution is too much for their already compromised state, which includes a reduced plasma oncotic pressure and impaired renal tubular function.

It is suggested that the potassium concentration of the WHO oral rehydration solution is too low to replace the total body potassium deficit that is commonly found in malnourished children with diarrhoea. What is more important than increasing the potassium concentration of the present solution, which ideally is only used for rehydration and not maintenance, is to give potassium supplements for some days or weeks after rehydration in the form of potassium salts, bananas, coconut water, or citrus fluids. In the case of the occasional child who presents with symptoms of hypokalaemia such as hypotonia, abdominal distention, and ileus only high doses of intravenous potassium followed by an oral potassium for two to three weeks will suffice.

Regarding appropriate technology, it is important to separate the children with nil to mild dehydration who can be adequately treated with a variety of fluids from the moderate to severely dehydrated child who in the absence of intravenous treatment can only be rehydrated by a carefully managed high osmolar solution. The osmolality of ‘home based solutions’ can vary enormously. A low osmolar solution will not be adequate for the treatment of these children.

Lastly, it has been stated that neonates can be successfully rehydrated by the WHO oral rehydration solution. The physiology of the neonate in developing countries is no different to that in developed countries where solutions containing 0·18 N saline are used for rehydrating neonates. At present, in view of the neonates’ limited ability to excrete sodium, it would seem unwise to advocate the universal use of WHO oral rehydration solution for management of dehydration in neonates until it has been shown that it is safe when given unsupervised. Unfortunately, with the number of dehydrated infants presenting to health centres in developing countries, supervision of rehydration is the exception rather than the rule.

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Sir,

Drinks will not help a child in circulatory collapse from diarrhoea; liquid by vein will.

Unless enthusiasts for oral rehydration make this clear children may die and an old and valued remedy for moderate or early enteritis will be blamed. Drs Tripp and Candy in their annotation1 should surely have reminded us that in the paper by Santosham et al.,3 on which they rely heavily, all children with severe diarrhoea (shock or 10% dehydration) received intravenous treatment before entering the trial.

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Drs Tripp and Candy comment:
One of the reasons for writing our annotation1 was to review the controversies and stimulate discussion on the subject of oral rehydration treatment for acute diarrhoea. We were therefore grateful to receive letters from Drs Hughes-Davies and Coulter for this opportunity to comment. Both correspondents have highlighted the need

References
for intravenous fluids for shocked patients and for the small proportion of patients in whom oral rehydration treatment fails. We would, of course, concur but would emphasise that oral rehydration treatment will decrease the need for intravenous fluids, especially when there are suggestions that oral rehydration may in fact be safer. For example, when Santosham et al. 3 compared intravenous with oral rehydration, morbidity was confined to the intravenous treatment group. Pizarro et al. 4 reported that repair of fluid and electrolyte disturbances was more rapid in orally than intravenously rehydrated patients and the convulsion rate due to hypernatraemic dehydration was less with oral treatment. The incidence of convulsions has been further decreased by extending the rehydration phase in hypernatraemia to 12 hours, rather than six (M. M. Levine, personal communication). We share the aim of Dr Coulter of '100% cure rate' but would suggest that these data, obtained from well nourished infants and children, call for similar trials in developed countries.

A further attraction of oral rehydration is that it can be administered by the patient's family under supervision, thus actually releasing nurses for other tasks. We accept that families are all too often not involved in the inpatient care of their children but have found that children's nurses prefer to rehydrate children orally than attend to an infusion pump. When a suitable rehydrating solution is used, rehydration is correspondingly shortened 6 and inpatient stay is further curtailed when regraded according to the regimen in our annotation.

Dr Coulter draws attention to the problem of oedema occurring during rehydration of malnourished children; this complication has been reported regardless of route or the sodium concentration of the rehydrating fluid. 1 4 Dr Coulter's helpful comments on potassium depletion were well received. We also share his anxieties about the accuracy of 'home based solutions', but he would accept that a balanced, physiological solution will never be available for treatment of the 500 million episodes of acute diarrhoea occurring in children throughout the world each year, and other strategies are required. Part of this strategy must be the training of personnel to provide the supervision of treatment of diarrhoeal illness, without which any treatment regimen will fail.

Like any powerful, effective therapeutic tool, WHO oral rehydration solution must be used with respect.

Dr Coulter's concern about the use of the WHO solution in neonates prompts us to emphasise that a 90 mM sodium solution is specifically for rehydration and to continue to administer it after rehydration is achieved will provide an excessive sodium intake for any age group. This is why we were careful to specify the details of the Pizarro rehydration regimen in our annotation, and emphasise a return to nutritious fluids after six to eight hours. A dehydrated child of any age is suffering from depletion, in the main, of extracellular fluid which requires replacement by a fluid resembling it in composition. 5 We can only return to the limited published report on rehydration of diarrhoeic neonates 6 which shows that provided free water was administered with WHO oral rehydration solution, 122 of 127 neonates were successfully treated, with recourse to intravenous fluid in only five who had ileus, profuse diarrhoea, or vomiting.

In conclusion, pioneers in the field of treatment of diarrhoeal dehydration in Asia, Africa, and South America have provided many important messages for the optimum treatment of this condition which challenge many established dogmas.

References

Impact of improved perinatal care on the causes of death

Sir,

We would like to reply to the points made in Dr Addy's commentary on our paper. 1 The word 'impact' was perhaps unfortunately chosen since it implies a sudden event followed by a static situation. However, both obstetrics and neonatology are in a progressive evolution whose rate of change has become more rapid since the availability of techniques for fetal monitoring and ventilatory care of the newborn. Continuous change in perinatal care inevitably provokes continuing change in clinical consequences.

Lessons are therefore more clearly perceived when viewed against the passage of time. The year 1976 was a logical time to begin the survey but any choice was bound in some degree to be arbitrary. Emergency caesarean sections and resuscitation of the newborn were practised long before that date. Knowledge of the statistics before 1976 would supplement the conclusions of our paper but would be unlikely to alter them materially. Since perinatal mortality cannot exceed 100% the fall in mortality of low birthweight infants can hardly have been more dramatic before 1976 than it has been afterwards. Nevertheless, our colleagues in St Mary's Hospital are currently reviewing the statistics from 1970 onwards and we look forward to their findings.

Dr Addy is naturally concerned with the severity of respiratory distress syndrome and asphyxia in all live births and some of the questions he asks are beyond the scope of the paper. Our study was quite deliberately confined to...