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## Feeding sick babies

The effect of the make-up of feeds on infants' water and electrolyte metabolism has been the subject of recent attention and concern.<sup>1-3</sup> In the first year of life the metabolic rate is high, and energy expenditure is closely related to insensible and obligatory urinary water loss. Though the infant kidney can produce concentrated urine on high intakes of solute,<sup>4</sup> maturation of the ability to excrete a salt load is slower than maturation of glomerular filtration.<sup>5</sup> Disorders of osmolality are thus both common and dangerous in the very young, and hence sick infants must have an adequate water intake and not be subjected to excessive dietary osmolar loads.<sup>6</sup> Fever, hyperventilation, and diarrhoea, and the combination of these three characteristic of infantile gastroenteritis, may all induce hypertonic (hypernatraemic) dehydration<sup>7</sup>; this risk becomes more likely if overconcentrated feeds have been prepared.<sup>8</sup>

There is a second danger from salt overloading. Whereas in negative water balance the problem is hypernatraemia, in a normally hydrated infant salt and water loading would be expected to produce oedema<sup>9</sup> and hypertension. This has been reported in a child given an inaccurately prepared salt/glucose mixture prescribed for diarrhoea.<sup>10</sup>

The dangers of over-concentrated feeds have been emphasised in a recent study<sup>11</sup> which showed that dehydrated infants who developed hypernatraemia had been given feeds of higher concentration than infants who did not. Half-cream milk formulas given to very young infants are particularly apt to produce this effect, and the time has now come for the withdrawal of such feeds from the market. They should never be given to sick babies. Errors may also occur with evaporated milk and may sometimes have devastating consequences, leading to intravascular coagulation and gangrene.<sup>12</sup>

In sick children, then, proper attention to feeding and water intake may be of crucial importance. The need for extra water at these times should be emphasised. Many accidents have occurred as a result of vague instructions being given to mothers on the making up of mixtures containing salt and sugar. This is a dangerous practice. In the absence of a convenient and safe electrolyte mixture it is safer to give water without added salt—but not for longer than 24 hours.

Children under the age of 1 year with any serious degree of diarrhoea should have all solid food and milk taken out of

their diet for the first 24 hours. This eliminates the risk of excessive osmolar loading and reduces the osmotic diarrhoea<sup>13</sup> due to transient lactose intolerance and other intestinal malfunctions that are associated with gastroenteritis. Powders and tablets of electrolyte mixtures all have their disadvantages, particularly the risk that mother might make mistakes in their use. A tablet containing sodium chloride, sodium bicarbonate, potassium chloride, and glucose (Electrosol) is available and is safe provided only enough is prescribed for use over 48 hours and parents are instructed to make up large quantities at a time (8 tablets to 1 litre or 7 tablets to 2 pints). Babies should be encouraged to drink at least 150 ml/kg/day, by frequent feeds if necessary, or more if they demand it. An avidly thirsty baby is nearly always dehydrated but not dangerously so. Infants who are anorexic or vomiting belong in a hospital. There is no advantage in offering a child fluids with glucose alone added.

Within 24 to 36 hours, provided diarrhoea has stopped, a cautious attempt may be made to reintroduce diluted milk and subsequently solids. The initial period of starvation should never be prolonged beyond 36 hours without seeking hospital advice, nor should it be repeated on an outpatient basis. The infant should be back on full diet by the end of the fourth day.

Persistence or recurrence of diarrhoea in spite of withdrawal of milk and solid foods warrants referral to hospital. Prolonged starvation in an infant with gastroenteritis may lead rapidly to severe malnutrition, with irreversible consequences.

<sup>1</sup> Davies, D P, and Saunders, R, *Archives of Disease in Childhood*, 1973, 48, 563.

<sup>2</sup> Davies, D P, *British Medical Journal*, 1973, 2, 340.

<sup>3</sup> Dale, G, et al, *Archives of Disease in Childhood*, 1975, 50, 731.

<sup>4</sup> Edelmann, C M J, and Barnett, H L, *Journal of Pediatrics*, 1960, 56, 154.

<sup>5</sup> Aperia, A, et al, *Acta Paediatrica Scandinavica*, 1975, 64, 393.

<sup>6</sup> Ziegler, E E, and Foman, S J, *Journal of Pediatrics*, 1971, 78, 561.

<sup>7</sup> Harrison, H E, and Finberg, L, *Pediatric Clinics of North America*, 1959, 6, 193.

<sup>8</sup> Taitz, L S, and Byers, H D, *Archives of Disease in Childhood*, 1972, 47, 257.

<sup>9</sup> Taitz, L S, *Proceedings of the Nutrition Society*, 1974, 33, 113.

<sup>10</sup> Whitelaw, A G L, Dillon, M J, and Tripp, J H, *Archives of Disease in Childhood*, 1957, 50, 400.

<sup>11</sup> Chambers, T L, and Steel, A E, *Archives of Disease in Childhood*, 1975, 50, 610.

<sup>12</sup> Abrams, C A L, et al, *Journal of the American Medical Association*, 1975, 232, 1136.

<sup>13</sup> Finberg, L, *Pediatrics*, 1958, 22, 2.