Regular Review

Dietary management of gastroenteritis in Britain

B A WHARTON, R E PUGH, L S TAITZ, J A WALKER-SMITH, I W BOOTH

Gastroenteritis is becoming less of a problem in Britain, but still 4.6 of every 1000 children under 5 were admitted to hospital for gastroenteritis in 1983,¹ a rate only slightly lower than the 5.8 admitted in 1978.² Mortality has fallen substantially. In 1978 142 infants and 22 toddlers (1-4 year olds) died from gastroenteritis in England and Wales,³ while in 1983 deaths numbered 38 and 10 respectively.⁴ In the 1970s the mortality from gastroenteritis in Britain was higher than that in many other countries in Europe.⁵ The infant mortality from gastroenteritis in Britain (6 for every 100 000 in 1983) is now much lower than that in some countries—for example, Greece (18) and Portugal (113); on a par with that in countries such as Belgium (5) and France (6); but still above that seen in West Germany (3) and the Netherlands (Nil).⁶

Where should gastroenteritis be managed?

Most children with uncomplicated gastroenteritis can be treated at home with oral rehydration preparations, but infants under 6 months and all infants living in poor social conditions are particularly vulnerable. Many are admitted to hospital.

Persistent vomiting, abdominal distension, hypothermia, alteration of conscious level, and reduced urine output (wet nappies may be caused by urine or watery diarrhoea) are all indications for hospital admission. Care must be taken not to rely on measured weight loss alone, and clinical judgments of dehydration may be unreliable. Other abdominal conditions such as intussusception and intra-abdominal sepsis may be confused with gastroenteritis.

Dehydration

The widespread adoption of oral rehydration treatment by many developing countries has dramatically reduced childhood mortality and morbidity from acute diarrhoea.^{7,8} In Britain the use of oral rehydration solutions has been slow to develop but is increasing.⁹⁻¹¹ The table shows the oral rehydration solutions available in Britain. Most of them are available as a powder which is reconstituted with water; others are ready to feed. Home made salt and sugar solutions, for example, "a tablespoonful of sugar and a pinch of salt in 4 oz of water" have a notoriously inaccurate composition. Soft drinks are usually hyperosmolar and low in electrolytes. Neither should be used.^{12,13} Those oral rehydration solutions in which the sodium concentration is modest (35-50 mmol/l), are good for prophylaxis or correcting mild dehydration and

Recommendations on the dietary management of gastroenteritis

- (1) Home made salt and sugar solutions and soft drinks should not be used in managing gastroenteritis.
- (2) Bottle fed infants over 6 months who have only mild diarrhoea should return immediately to full strength feed after 24 hours of oral rehydration solution.
- (3) Bottle fed infants below 6 months should be regraded in the conventional way after 24 hours of oral rehydration solution—that is, increasing from quarter strength (one part of made up formula to three parts of oral rehydration solution) through half strength and three quarter strength to full strength.
- (4) Special infant formula or food need not be used when routinely managing gastroenteritis.
- (5) In those cases in which a special formula is needed use a nutritionally complete formula based on oligopeptides or amino acids.
- (6) Whole protein sources such as unmodified goats' milk or ewes' milk should not be used for either normal or ill babies.³²

are suitable for use at home. There is no evidence that any one formulation is superior to another. Patients who are more than mildly dehydrated may require a solution with a higher sodium concentration.^{14,15} In Britain these children should be referred to hospital. In developing countries, where easy access to medical care may be difficult, continued management at home with the World Health Organisation solution has been successful. Severe dehydration and shock require parenteral fluids.

Oral rehydration solution is used to replace feeds while vomiting and diarrhoea are at their height, which usually lasts under 24 hours. About 200 ml/kg body weight in the first 24 hours should be offered, more if the baby remains thirsty. The child who is vomiting should first be given frequent small volumes, from a spoon if necessary. The persistence of vomiting or oliguria strongly suggests that the diagnosis, and the need for parenteral fluids, should be reviewed.

Drugs

There is no convincing evidence that any of the drugs used for symptomatic relief are useful in childhood gastroenteritis. Their use is associated with unwanted effects, adds unnecessary expense, and tends to divert attention away from the central importance of oral rehydration.¹⁶ Antibiotics will

Final concentration of oral rehydration solutions, where necessary reconstituted with water according to the manufacturers' instructions

Product	Concentration of solution mmol/l					
	Sodium	Chloride	Potassium	Base*	Glucose	Sucrose
<i>Prescribable on FP10 or available over the counter</i>						
Powders to be dissolved in water (volume of water per sachet):						
Sodium chloride and glucose oral powder, compound <i>BNF</i> (200 ml)	35	37	20	18	200	
Dioralyte (200 ml)	35	37	20	18	200	
Glucolyte (200 ml)	35	37	20	18	200	
Electrolade (200 ml)	50	40	20	30	111	
Rehidrat (250 ml)	50	50	20	20	91	94
				+ 8 citrate		
Solution, ready to feed:						
Pedialyte MS (maintenance)	45	35	20	10 citrate	153	
<i>Solutions, ready to feed and available only in hospital</i>						
Dextrolyte	35	30	13	18 lactate	200	
Pedialyte RS (Rehydration)	75	65	20	10 citrate	153	
WHO solution	90	80	20	20 citrate	110	
				+ 10 citrate		

*Bicarbonate unless stated otherwise.

be needed rarely and only for specific indications that can be identified by stool microscopy and culture—for example, giardiasis and shigellosis. Persistent or bloody diarrhoea, high fever, a history of foreign travel, or a nursery outbreak are indications for further microbiological investigations.

Diet

It has been traditional to continue breast feeding during an episode of gastroenteritis. We endorse this approach, although there is only one trial (from Burma) which has investigated the question: it showed an advantage in not omitting breast milk for one day.¹⁷ Most infants who develop gastroenteritis in Britain are bottle fed. For these it has been conventional management to prescribe 24 hours of an oral rehydration solution and then to reintroduce gradually the usual infant formula or cows' milk over three to five days (a process known as regrading). This approach has been questioned,^{18,19} and for those infants aged over 6-9 months and those with mild gastroenteritis there appears to be no advantage in regrading.²⁰ Therefore we recommend that infants aged over 6 months who have only mild diarrhoea after 24 hours of oral rehydration may return immediately to their normal full strength feed. Should important symptoms return when the feed is introduced, however, the child should be managed by a conventional regrading.

A definitive controlled trial of regrading against continued feeding in infants under 6 months old with gastroenteritis is still awaited. Regrading results in a low energy intake for a few days, which is clearly a problem for malnourished children but less important in previously healthy ones. Therefore we advise that infants below 6 months should be regraded in the conventional way as they have a greater risk of relapse.²⁰

Recurrent or persistent diarrhoea after an initial episode of gastroenteritis now occurs less often.²¹ This may be because of the diminished sensitising capacity of modern infant formulas and so a lower prevalence of cows' milk sensitive enteropathy and secondary lactase deficiency.^{22,23} In view of this we do not advise a special infant formula or food in the routine management of gastroenteritis.

The conventional way to regrade is to dilute the child's usual infant formula with oral rehydration solution, firstly, as a quarter strength (three parts of solution to one part of made up formula), secondly, as half strength, thirdly, as three quarter strength, and, finally, as full strength. The intervals between the change in strength may be 12 or 24 hours depending on whether a "fast" or a "slow" regrade is considered right.

Recurrent or persistent diarrhoea

A return of important symptoms—that is, vomiting and diarrhoea—leading to reintroduction of oral rehydration alone or intravenous fluids is regarded as a failed regrade. The failure may be caused by excess stool reducing substances resulting from lactose intolerance. Since the intolerance is usually a brief episode associated with the infection a further regrade using the normal infant formula may be attempted. Failed regrading may also be caused by persistent infection, reinfection with a new pathogen, or an infection outside the gastrointestinal system—for example, of the urinary tract—as well as food intolerance. If the diarrhoea persists for over two weeks and the child is not thriving other causes of protracted diarrhoea should be considered—for example, coeliac disease or immunodeficiency.²⁴ If after this review no other specific treatment is suggested then a special formula should be used. A special formula should be virtually lactose free, low in allergenicity, and have a composition that makes it suitable for continued use in early infancy—for example, in its content of minerals, vitamins, etc. Whether the special formula contains medium chain triglyceride does not seem critical, and most infants with intolerance of cows' milk protein tolerate sucrose and starch hydrolysates.

The lactose free formulas available are based on a soya protein isolate, whole casein, or an oligopeptide-amino acid mixture that has been prepared by hydrolysing milk protein. Formulas based on whole casein are not nutritionally suitable for young infants over prolonged periods without modification or supplementation. Furthermore, it is not clear to what extent the treatment of the casein during manufacture of the formula renders it hypoallergenic and so there must be

doubts about its use during recovery from acute gastroenteritis. Soya formulas have similarly been recommended because of their possible hypoallergenicity.²⁵ It has become apparent, however, that not only does gastrointestinal hypersensitivity to soya protein exist and coexist with intolerance to cows' milk protein but also it is particularly likely to occur in babies with intolerance to milk protein.²⁶⁻³⁰

Therefore if a special formula is needed we recommend that a nutritionally complete formula based on oligopeptides or amino acids should be used. Formulas available in Britain are Nutramigen, Pregestimil, and Peptide 0-2, and others are expected. The only serious objection to oligopeptide and amino acid formulas is cost, but the availability of new preparations should eventually result in price reductions. If the use of one of these formulas fails then more detailed investigation and management are necessary. Management will usually mean using modular diets including individually prescribed food substances such as comminuted chicken, individual whole proteins or oligopeptide and amino acid mixtures, triglycerides, oligosaccharides, and other sugars. Skilled dietetic supervision is essential. Often during the gradual introduction of these diets parenteral feeding will be necessary.

Whole protein sources such as unmodified goats' milk or ewes' milk are unsuitable feeds for normal babies and should not be given to ill ones.³¹

Once an infant has been placed on a special feed it should be continued until the expected weight is approached. A challenge with a regular formula may then be attempted and if it is successful gradual reintroduction instituted. If there is any unexplained recurrence of symptoms then cows' milk and its products should be withheld until the child reaches about 2 years of age.

Taking children abroad

There is particular concern about the risks for children aged under 2 years who are born in Britain of immigrant

parents and taken to their parents' homeland for a holiday—often to areas where poverty and gastrointestinal infection are common. There they run an increased risk of developing acute gastroenteritis, which may often become protracted so that when they return to Britain they are seriously ill with chronic diarrhoea and malnutrition.³² Whether antibiotics should be used prophylactically or therapeutically for such infants is controversial. It is essential that parents are warned of the serious potential health hazards of such visits, particularly the dangers from contaminated drinking water and poor food hygiene. The risk of washing food such as salads with contaminated water and the value of boiling all drinking water and of eating properly cooked food should be emphasised.

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B A WHARTON

Consultant Paediatrician, Birmingham

R E PUGH

Consultant Paediatrician, Crewe

L S TAITZ

Senior Lecturer in Child Health, Sheffield

Nutrition Committee,
British Paediatric Association

J A WALKER-SMITH

Professor of Paediatric Gastroenterology, London

I W BOOTH

Lecturer in Child Health, London

British Society of Paediatric Gastroenterology

Correspondence to: Dr B A Wharton, Sorrento Maternity Hospital, Birmingham B13 9HE.

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