Diarrhoea, dehydration, and drugs

Oral rehydration therapy is effective in treating over four fifths of episodes of diarrhoeal dehydration, and in developing countries which have adopted this form of treatment hospital admission rates and mortality have decreased by about half. Nevertheless, the logistics of getting oral rehydration fluids to children throughout the world to treat the 500 million attacks of diarrhoea that they experience each year pose vast problems. At present probably fewer than 10% of these children have access to oral rehydration fluids, and of these fewer than half actually receive them. Furthermore, the beneficial effects of oral rehydration on diarrhoeal mortality will not be matched by a decreased attack rate unless other public health measures are introduced and breast feeding is encouraged.

Current recommendations for the treatment of diarrhoeal dehydration include intravenous plasma or saline for circulatory failure followed by oral fluids to complete rehydration. In the absence of shock or a contraindication to giving fluids by mouth, such as ileus, oral rehydration may be started. A well proved oral rehydration regimen entails giving a solution of sodium 90 mmol/(l;l) and glucose 111 mmol/(l;1) (20 g/l), with potassium 20-30 mmol/(l;1) and base 20-30 mmol/(l;1) for the first four hours, followed by water for a further two hours. The total volume of fluid administered should be twice the estimated fluid deficit. If hyponatraemia is present oral rehydration solution is given without extra water, and in hypernatraemia the rehydration period is extended to 12 hours.

The addition of glucose or substitution of rice powder for glucose is a useful adjunct to the standard regimen because it may reduce the stool volume and the duration of diarrhoea. The beneficial effect of adding nutrients such as powdered rice may explain the observations of Isolauri and Vesikari, who found that if children resumed their normal diet immediately after oral rehydration the duration of diarrhoea was a third as long as in children whose usual diet was introduced gradually. Other studies of early feeding have shown similar benefits and such an approach should diminish the nutritional deprivation imposed by recurrent attacks of diarrhoea.

Not all diarrhoeal dehydration responds to oral rehydration, and vomiting of rehydration fluid may be a cause of failure. This may be alleviated by giving the fluid in frequent small amounts—for example, by cup and spoon or nasogastric infusion. Carbohydrate malabsorption is another cause, and should be suspected if the patient continues to pass voluminous watery stools. In rotavirus diarrhoea up to a third of the glucose in the oral rehydration fluid may appear in the stools, but an adequate clinical response may still be achieved, the success rates in rotavirus diarrhoea being as high as those in bacterial diarrhoea. Rehydration solutions such as that recommended by the World Health Organisation are less likely to cause malabsorption of carbohydrate because they contain half the concentration of carbohydrate of the commercial rehydration fluids. Treatment by mouth may also fail if stool loss exceeds 10 ml/kg/hour. Treatment of the child with dysenteric diarrhoea may be particularly difficult, because even if rehydration is achieved the child may die from the effects of systemic spread of invasive pathogens such as Shigella, Salmonella, and Campylobacter.

What other forms of treatment may be deployed to tackle the problems? Antibiotics have a limited part to play in treating specific infections such as cholera, severe shigellosis, giardiasis, amoebiasis, and typhoid and when there is diagnostic doubt whether the infant has gastroenteritis or septicaemia. Hill et al used oral gentamicin and cholestyramine to treat children in South Africa with protracted diarrhoea that was presumed to be infective. Nevertheless, bacterial resistance to antibiotics is increasing, and clinical trials of oral rehydration therapy have shown that antibiotics are usually unnecessary.

Of the anti-diarrhoeal drugs, loperamide appears to be the most effective when used to treat chronic diarrhoea of varied aetiology, excess ileostomy output, and faecal incontinence. Sandhu et al have used high doses successfully in selected infants with severe protracted diarrhoea. The effect of loperamide on stool output seems to be exerted by its opiate like action on the motility of the bowel and enhanced absorption of chloride. Though apparently less toxic than its predecessor Lomotil (diphenoxylate and atropine), loperamide may still cause opiate poisoning and ileus.

The results of a multicentre trial of loperamide as an adjunct to oral rehydration in the treatment of acute diarrhoea are reported in this issue (p 1263). The duration of the diarrhoea was reduced significantly, but the effect of loperamide on stool output was not recorded. Other anti-diarrhoeal drugs that have been similarly investigated
include chlorpromazine, whose effect was limited by drowsiness, and bismuth subsalicylate, where the large volumes required precluded trials in children. The success of oral rehydration in treating acute diarrhoea presents a formidable challenge to pharmacologists. They are being called on to improve on a treatment which is effective, cheap (treatment of diarrhoeal dehydration with the WHO solutions costs about 5p), physiological, and appropriate for diarrhoea of various causes. Furthermore, oral rehydration is virtually free from side effects. The fact that the WHO is interested in the development of anti-diarrhoeal drugs is an indication that further research and development are worthwhile. Through the pharmaceutical industry has the opportunity to make a major impact on world health. Meanwhile, oral rehydration represents the spearhead of primary health care in countries where the mortality from diarrhoea is high. Its broad acceptance may lead to the more ready acceptance of other interventions, such as immunisation and measures to improve nutrition and hygiene.

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Requirements for thoracic medicine

Like other specialists, proponents of thoracic medicine are convinced of the need for their specialty and are jealous of its standards. The wish to improve care in thoracic medicine has spurred the committee on thoracic medicine of the Royal College of Physicians to issue a report identifying requirements for thoracic medicine in district general hospitals. Most of the recent recommendations are a mixture of sensible advice and a desire to ensure that a minimum standard of practice is achieved throughout Britain, and few would argue with them. The document has at least one contentious recommendation, however: that referring to the minimum requirements for consultant staffing. The committee states clearly that at least one consultant specially trained in thoracic medicine should be available in each district general hospital. It also proposes an average of one consultant per 150,000 population, and, though this has already been achieved in numerical terms, many of the consultants are bunched in districts with teaching hospitals or regional centres. Hence some districts are still left without a consultant trained in thoracic medicine.

Thoracic medicine is not alien to those wishing to be represented in every district, but the number of medical subspecialties is growing and few district hospitals could accommodate a consultant in every claimant specialty. This is a particular problem in subspecialties such as thoracic medicine, as most chest consultants also practise general internal medicine, and too many subspecialists may reduce the volume of general acute medical work handled by individual physicians below what some fear is the threshold necessary to maintain skills. Part of this objection depends on the attitude of physicians to the amount of work that they can and should handle as well as their historic view of the nature of consultant work. In turn this depends on our existing staffing structure, with its heavy dependence on junior doctors. The central thrust of the Short report was that consultants should undertake relatively more care and an expansion of their number might fortuitously increase the range of subspecialties available to every district. Although future consultant expansion may help to absorb some of the competing pressures by medical subspecialties for district representation, the problem is with us now. Representatives of each subspecialty argue fiercely that they require a consultant in every district hospital and the college committee on thoracic medicine is no exception.

A substantial proportion of the workload of general internal medicine falls within the remit of thoracic medicine. This is not surprising as about a quarter of all deaths in men are attributable to respiratory diseases, which also account for nearly a third of absences from work in Britain. Parallel to this is the fact that nearly a quarter of consultations in general practice are for respiratory disease, a much higher rate than for any other disorder. Though some of this work is suitably managed by general physicians, specialist knowledge meets an important need which might be expected to occur in any district hospital given this burden of respiratory disease.

Specialist training also has a practical benefit as many respiratory diseases respond to treatment once adequate diagnosis and assessment have been carried out. In particular this applies to asthma, which has a prevalence of between 2% and 5%, though if wheezing is taken as a symptom then 1% of children have it and up to about a third of any population may have complained of it at any one time. Nevertheless, deaths from asthma are still occurring, many of them probably preventable. Specialists in thoracic medicine also have important skills in the assessment of lung function and advice about allergic disease and intensive care. A service for fibro-optic bronchoscopy under local anaesthesia is a great advantage in a district general hospital, particularly when thoracic surgery may not be available locally. For these practical reasons there is a need for well trained clinicians dispersed to every district rather than concentrated in high technology centres.

Hence thoracic medicine should have a secure future and would be a powerful competitor for consultant representation at a district general hospital. The combination of a high