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Annotations

Management of infantile gastroenteritis

There has been a dramatic fall in the mortality from acute gastroenteritis in childhood in developed countries. In western Europe mortality statistics from acute diarrhoea have fallen to zero for some countries such as the Netherlands in 1984. In the United Kingdom the mortality was zero in Northern Ireland in 1983, 1984, and 1985 (World Health Organisation regional statistics). For England and Wales there has been a dramatic fall in annual mortality in recent years from about 300 in the late 1970s, to about 25 in the late 1980s. Nevertheless, there are still too many children dying each year. Furthermore, as the study of Conway *et al* in Leeds makes clear, gastroenteritis continues to be a significant cause of paediatric morbidity in Britain especially in infants from socially disadvantaged families.[1]

This recent fall in mortality is related to the dramatic reduction in the incidence of hypernatraemic dehydration and consequent death from this cause.[2] The earlier much more significant fall in mortality from the appalling mortality levels at the beginning of this century, when about 30–50 000 children died in England and Wales each year, relate to the improvement in public health and personal hygiene. These dramatic falls in mortality in Western countries occurred well before the widespread use of modern oral rehydration therapy, which has done so much to reduce mortality in the developing world in recent years.

Nevertheless, the most important part of modern management of infantile gastroenteritis centres upon appropriate oral rehydration therapy. This is generally agreed in principle, although the details—that is, the most appropriate sodium concentrations and carbohydrate content—remain matters for discussion at least in the developed countries.[3–5] It is depressing to find out, however, that only 30·8% of infants had been given oral rehydration therapy in the study of Conway *et al* particularly as over 60% had visited their general practitioner.[1] Clearly more education is required in this country for doctors as well as parents of children.

A policy for refeeding babies after gastroenteritis and the need for special formula feeding after gastroenteritis in infancy, remain more controversial issues. There is less general agreement in this area.

It has been the practice in the United Kingdom for some years for children with acute gastroenteritis after 24 hours of oral glucose electrolyte solution to reintroduce gradually the infant's usual feeds by a system known as regarding. In recent years the need for this approach for infants over the age of 6 months has been questioned and the practice of regrading in this age group has largely been abandoned. More caution has been used for infants less than 6 months of age.[6] There are now studies to indicate that even in this age group, however, immediate return to the infant's formula feed is to be recommended as routine practice.[7 8]

This is a more important issue in developing countries where malnutrition is common and any prolonged reduction of energy intake after gastroenteritis must be avoided. Certainly the continuation of breast feeding throughout the episode of diarrhoea supplemented by oral rehydration therapy is recommended for breast fed babies whether they be in developed or developing communities.[9]

Why was regrading so popular for so long? This may relate to the high incidence of lactose intolerance as a complication of acute gastroenteritis in the past, whereas lactose intolerance now appears to be declining as an important problem according to most reports.[10] Fox *et al*, however, did not find any difference in lactose intolerance between a regraded group and a non-regraded group of infants with gastroenteritis, yet their overall incidence of lactose intolerance was high.[8] Their series was rather atypical, however, as the incidence of rotavirus was so low and the finding of other pathogens so high. Were they describing cases of cows' milk protein intolerance, complicated by gastroenteritis presenting as lactose intolerance?

When considering a policy for refeeding after gastroenteritis for bottle fed infants, the relative importance of cows' milk intolerance either as lactose intolerance or cows' milk allergy, as a complication of acute gastroenteritis must be assessed in each individual community concerned. Its relative frequency, and so importance, varies widely from centre to centre and currently apart from the report of Fox *et al* appears to be in decline in the United Kingdom, Northern Europe, and North America.[10]

Cows' milk intolerance may be due to cows' milk allergy or lactose intolerance, or both, as occurs in some cases of cows' milk sensitive enteropathy. Indeed cows' milk allergy can present as lactose intolerance.

In these northern communities, because of improvement in modern adapted milks making formulas less sensitising, cows' milk allergy as a complication of gastroenteritis, appears to be a declining problem. As a result, the traditional approach of regrading for patients with gastroenteritis no longer seems necessary. Furthermore, as cows' milk intolerance—whether it be lactose intolerance or cows' milk allergy—is no longer such an important problem as a complication of gastroenteritis as it was formerly, therefore a

prophylactic lactose free formula is not routinely indicated. Indeed although lactose free soy formulas have been recommended for routine use after gastroenteritis,[8] there is a risk of developing soy sensitive enteropathy.[11 12] There are indeed a number of foods that may damage the small intestinal mucosa when fed in early infancy especially to infants who already have cows' milk sensitive enteropathy.[13] It thus does seem unwise to feed new foods at this time of small intestinal mucosal vulnerability.

The diagnosis of lactose intolerance in these circumstances is usually based upon the presence of 1% or more stool reducing substances; Fox *et al* make the diagnosis when 0·5% or more reducing substances are found.[8] This could explain their higher incidence than that reported in recent years, although patient selection is certainly possible. No child in their series had recurrence of diarrhoea seven days after refeeding, which shows that lactose intolerance occurred only during the time of the acute infection. Fox *et al* recommended an immediate change of feed to a lactose free feed (for example, Wysoy (Wyeth)) when lactose intolerance was diagnosed. An alternative strategy is to return for 24 hours to an oral rehydration solution and then regrade back onto cows' milk formula.[14] In this way the need for a special formula is avoided. Lactose intolerance in this circumstance is likely to be very brief in duration as it merely reflects the presence of gastrointestinal infection causing temporary change to the small intestinal mucosa.

When diarrhoea on cows' milk feeding persists for more than two weeks after the onset of diarrhoea, then the cause of this chronic diarrhoea should be sought. Investigation should include stool microbiology to detect nosocomial infection or persistent stool pathogens such as enteropathogenic *Escherichia coli, Giardia lamblia,* or cryptosporidia. Small intestinal biopsy should be considered in these circumstances to diagnose the presence of enteropathy. When specific pathogens are excluded the most likely cause is a temporary cows' milk sensitive enteropathy. Then a cows' milk free formula should be prescribed. A protein hydrolysate is recommended.

Conclusions

While breast feeding is ideal for infants, in those who are bottle fed the morbidity from acute gastroenteritis should be reduced by continuing to feed babies with a modern milk formula of low sensitising capacity after a relatively brief period of an oral rehydration solution. This both ensures adequate energy intake and reduces the risks of developing postenteritis milk intolerance.

Cows' milk protein intolerance is a relatively uncommon complication occurring in only 2·9% of the large series of 1148 children reported by Conway *et al*.[1] Interestingly Conway *et al* do not mention lactose intolerance per se in their report.[1] They probably include it within the term cows' milk protein intolerance as they define it. Clearly there is a real need to describe accurately the relative importance of milk intolerance either as cows' milk allergy or lactose intolerance in bottle fed infants who develop gastroenteritis in individual communities.

See related articles on p 936 and p 939.

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