Management of gastroenteritis

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Abstract

Childhood gastroenteritis remains a common reason for admission to British paediatric units, although the severity of the disease appears to be diminishing in recent years. We studied 215 infants and children with gastroenteritis admitted consecutively to four paediatric units in South Wales in order to determine the severity of the disease, the organisms isolated, the frequency of complications, and the adequacy of management before admission. Stool pathogens were isolated in 125 (58%) patients (viruses in 65, bacteria in 30, and protozoa in 19, with multiple infection found in 11). There was a low incidence of morbidity and complications, but prolonged diarrhoea (postenteritis syndrome) was present in 24 (11%) cases and 77 (36%) had received inappropriate treatment before admission. Contemporary gastroenteritis is thus a relatively mild disease in the acute phase, but management before admission to hospital is often inadequate, and prolonged diarrhoea may be a feature in a considerable number of cases.

Infectious gastroenteritis is a common cause of morbidity in childhood and remains a major reason for admission to paediatric units in the United Kingdom. Ironside *et al* in 1967 showed that the disease was characterised by a significant incidence of complications, although in only 16% of cases was a pathogenic organism identifiable in the stool.¹ Since then, as a result of increased awareness and improved diagnostic techniques, several new pathogens have been identified and there have been important advances in the management of infant feeding and the use of oral rehydration therapy. A further study in 1984 from the same unit in Manchester suggested that the illness was milder than in the earlier series with a lower incidence of complications, and pathogenic organisms were identifiable in 75% of cases.² However, several deficiencies of care were highlighted in the phase of the illness before admission to hospital with, in particular, poor compliance with the recommended guidelines for fluid and dietary management of acute gastroenteritis.

A study in 1979 describing the experience of one unit in South Wales suggested a similar declining incidence of complications,³ but no recent survey of contemporary gastroenteritis and its management has been reported from this geographical area. We thus undertook a prospective study of children with gastroenteritis

admitted to four paediatric units in South Wales in order to determine the severity of the disease, the organisms involved, the incidence of complications, and also to assess the management of the disease before and during hospital admission.

Patients and methods

All children admitted to four paediatric units in South Wales (three in South Glamorgan and one in Mid Glamorgan) with acute gastroenteritis were entered into a prospective study over 12 months, April 1987 to March 1988. The diagnosis of acute (infectious) gastroenteritis was based on the criteria of an acute diarrhoeal illness (at least five watery stools per day) with or without vomiting and no other evidence of extragastrointestinal infection or disease. Mothers were interviewed using a verbally administered questionnaire, which was completed by a senior clinician (usually one of the authors). Particular attention was paid to the management of the illness before admission and any treatment that had been recommended. Details of clinical examination were recorded and hospital treatment was left to the discretion of the admitting paediatric staff. Assessment of dehydration was based on generally accepted clinical criteria,⁴ and a record was made of all laboratory results. Three separate stool samples were routinely examined and cultured for the presence of pathogenic bacteria, viruses, and parasites including giardia and cryptosporidia. The incidence of complications was noted and the clinical course of the illness recorded for each child, paying particular attention to the duration of diarrhoea and any changes in feeding management that were instituted in hospital before discharge.

Results

SOCIAL PROFILE AND CLINICAL FEATURES

During the study period 215 children (116 boys and 99 girls) had acute gastroenteritis diagnosed. The breakdown of results from the four units (all serving similar populations, both urban and rural) were very similar and results reported are from analysis of all 215 children. There was a male preponderance (54%) and the ethnic origin was white (206, 96%), Afro-Caribbean (seven, 3%), and Asian (two, 1%). The patients' age range was 2 weeks to 9 years with 130 (61%) children being less than 1 year old. A similar acute diarrhoeal illness present in first degree relatives was found in 37 (17%) admissions, and adverse family conditions (poor

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washing or sanitary conditions or overcrowding) as previously defined were found in 24 (11%).² Only 43 (20%) children had been breast fed for more than two weeks, and 170 (79%) patients were in or below social class III (manual), including unemployed (26, 12%) and single parents (15, 7%).

Serious dehydration was uncommon with only 15 (7%) being >5% dehydrated on clinical criteria. Intravenous rehydration, for a maximum of three days, was instituted in 26 (12%) children after assessment by middle grade paediatric staff with two children needing, in addition, prolonged parenteral nutrition. These two children, sisters aged 10 months and 20 months, were from a large, travelling family. Several pathogens were isolated from their stools and both developed severe protracted diarrhoea necessitating intravenous nutrition. All other children were treated with standard oral rehydration solutions and regraded according to recently published guidelines.⁵ Other clinical abnormalities were present in a few patients. Thus fever of >38°C was found in 37 (17%), coryzal symptoms in 54 (25%), febrile convulsions in nine (4%), and rash in 13 (6%). Faecal blood and/or mucus was reported in 19 (9%) cases, with most (n=17) caused by bacterial infection. Fifteen children (7%) had a birth weight <3rd centile, although at the time of admission only nine (4%) were <3rd centile for weight. A previous episode of gastroenteritis was reported in 30 (14%) admissions. The duration of diarrhoea before admission was 1–15 days (median 4) with the total duration of symptoms from the start of the illness 2–29 days (median 7). Length of hospital admission varied from 1–43 days (median 4).

LABORATORY INVESTIGATIONS

Organisms were identified in the stools of 125 patients (58%) with virus alone in 65 (30%); of these rotavirus was found in 54. Bacteria alone were found in 30 (14%) (campylobacter (n=11), *Escherichia coli* (n=9), *Salmonella spp* (n=4), shigella (n=4), and aeromonas (n=2)) and parasites in 19 (9%) (cryptosporidia (n=13) and giardia (n=6)). Multiple infection with two or more organisms was present in 11 (5%) patients including two sisters with seven organisms each isolated from their faeces. These were the two children from a large family of travellers who required prolonged parenteral nutrition. Blood was taken for electrolytes and acid-base analysis in 76 patients (35% of total) on admission. The decision to perform these investigations was taken on clinical grounds by the paediatric registrars involved with the cases. Serum sodium concentration was <135 mmol/l (range 128–134) in 17 children and hypernatraemia (sodium concentration >145 mmol/l) was found in only two children (sodium 149 and 151 mmol/l). Urea concentration >6 mmol/l was present in 17 children (highest value 11) and bicarbonate <15 mmol/l in 13 children (lowest value 9).

MANAGEMENT BEFORE ADMISSION

A total of 204 children (95%) had previously

been seen and treated by a general practitioner and 11 (5%) had been treated with a variety of remedies suggested by members of the family. Guidelines for the management of acute gastroenteritis have been published⁵ and in only one of the group treated by the family and 137 of the group treated by the general practitioner could the treatment be termed appropriate. Appropriate treatment, for the infant and young child at least, consists of the cessation of milk and normal diet and the use of oral rehydration solution for a temporary period until the diarrhoea is resolving. In developed countries this is often only necessary for 24 hours and, indeed, there is current debate as to whether cessation of feeds is appropriate at all in many cases, particularly in the developing world where malnutrition is so prevalent. It is clear that drug treatment is not appropriate as a first line treatment, however, and antibiotics are indicated only in systemic illness after bacterial gut infection. Despite this, 49 (23%) patients in our study had received medication with a variety of drugs (see table) and 43 (20%) were not following the recommended guidelines for feeding during acute gastroenteritis.

COMPLICATIONS

Twenty six children (12%) required intravenous treatment with crystalloid solutions, usually because of continued vomiting, and two children (1%) required a prolonged period of intravenous nutrition because of protracted diarrhoea. In 24 (11%) cases overall a diagnosis of postenteritis syndrome was made, defined as continuing watery diarrhoea for more than seven days and three failed regrades. The method of regrading varied between the hospitals involved but generally consisted of a regime of increases in the strength of milk feeds offered to the child (quarter, half, three quarters, and full strength every 12 hours), and a failed regrade was defined as an increase in diarrhoea. The management decisions regarding feed changes were taken by the individual clinicians concerned. All but one of the children with postenteritis syndrome were <12 months old and there were no obvious factors before or after admission that distinguished them from the other study patients. Indeed, only the two children requiring parenteral nutrition were unwell and losing weight. After the institution of a cows' milk protein and lactose free diet using a specialised feed (8% soya milk, 2% protein hydrolysate, 1% comminuted chicken) the diarrhoea resolved. In all these children the

Treatment before hospital admission

	No (%) children
Treatment by general practitioner	204 (95)
Family remedy	11 (5)
'Inappropriate' management (total):*	77 (36)
Antibiotics	19 (9)
Kaolin and morphine	17 (8)
Antimotility agents	4 (2)
Metoclopramide	9 (4)
Continued milk feeds	39 (18)
Sugar and water	4 (2)

*Several children received more than one type of incorrect treatment.

exclusion diet was temporary (one to four months) and all are now on a normal diet.

Discussion

Our study of contemporary gastroenteritis in a South Wales population confirms that the illness is now relatively mild and free of complications. Hypernatraemic dehydration was previously a major complication of acute gastroenteritis in infancy and was linked to the administration of incorrectly reconstituted artificial milk feeds and the early introduction of mixed feeding.^{1 2} Improved feeding practices contributed to the very low incidence of hypernatraemia found in the 1979 survey of gastroenteritis in South Wales.³ It is gratifying to find in our study that hypernatraemia and severe dehydration are now rarities in children requiring admission to hospital. This is, in part, a tribute to the improved primary care in the community and the early use of appropriate oral rehydration solutions. Our study also highlights the fact, however, that the management of children before admission with acute diarrhoeal illness is often suboptimal and a significant number of patients had received inappropriate treatment before admission. This is particularly surprising as clear guidelines for the optimal management of childhood gastroenteritis have been published,⁵ which recommended that drugs are rarely necessary, and may indeed be dangerous, in the early management of the uncomplicated case. Furthermore, it is disappointing that many of the children in our study were being fed inappropriately, and clearer guidelines need to be given to parents. Whatever the reason for the inappropriate management, it is obvious that treatment before admission of many of the children was inadequate and there is considerable scope for improvement both in terms of education and communication.

We were also surprised to discover that 11% of patients were changed to a specialised feed before discharge because of continuing

diarrhoea and no weight gain over a period of seven days. All these children improved with the substitution of an appropriate exclusion diet. It is not possible to define accurately what proportion of these children suffered from dietary protein intolerance and how many suffered from lactose intolerance, as further investigations with jejunal biopsy and analysis of stool for reducing substances were not undertaken. Indeed, it may be that an exclusion diet was not, in fact, necessary in all these patients, but our study did not specifically address this point. Halliday *et al* have reported a similar high incidence (19%) of the postenteritis syndrome in an Australian population.⁶ It is reassuring that the need for a specialised feed was temporary in all our patients and it is important that these children are followed up and challenged with cows' milk at an early stage (one to three months).

In summary, this study, which is the first comprehensive hospital based study of acute gastroenteritis in South Wales, has shown that the illness is relatively mild and the complication rate low when compared with previous studies. However, deficiencies in management before admission to hospital still exist and attention should be directed to improving education and, especially important, the communication between hospital and community care givers.

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