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Use of milk in infants with diarrhea

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The purpose of this review is to analyze the present knowledge and recommendations regarding the use of milk during acute diarrhea of infancy.

BREAST-MILK "PROPHYLACTIC" AND "THERAPEUTIC" EFFECTS.

Brast-milk has a protective effect on infants as demostrated by a decreased morbility and mortality associated with diarrhea (1, 2). Controlled studies in which acute diarrhea continued to be breast-fed during the rehydration phase showed an improvement in stool consistency, a reduction in the number ot stools, and a tendency towards lower fecal output and improved rehydration compared to those in whom breast-feeding was discontinued (3,4,5). An additional study has demonstrated that breast-fed infants who developed rotavirus diarrhea had a milder course of disease than those who had been formula-fed (6). Multiple factors can be responsible for the benefits of breast-milk and these include better sanitation, immunological factors, osmolality, type of fecal flora developed, and frecuency of feeding.

USE OF MILK OTHER THAN BREAST

The majority of the studies performed in infants with diarrhea using lactose-containing formulas have been performed in eutrophic infants and except for some instances of intolerance, the majority of infants can be successfully fed during an episode of diarrhea with an undilute cow milk formula. The severity of the diarrhea and the nutritional status of the infant will play a role in conditioning complications and determining outcome.

The effects of unrestricted diet on mild infantile diarrhea was studied prospectively by Margolis et al. (7). In this study, the authors enrolled 176 healthy infants who were less than 1 year of age to determine the effects of diet on the course of mild diarrhea. When diarrhea occurred (56 episodes), infants were randomly assigned to a treatment diet which consisted of 24 hrs of electrolyte solution followed by dilute soy formula, dilute cow milk formula or undilute soy formula, or their usual formula. Parents recorded daily weights, stool losses, and oral intake. There were minor and non-significant differences among the different treatment diets. The patients who were on an unrestricted diet had 0.7 fewer days of diarrhea, and 1% less of weight loss compared with those who received the treatment diet. Treatment failures were similar in both groups.

To determine if elimination of lactose was necessary in infants with mild gastroenteritis Groothuis et al. (8) studied 85 infants who at the time that they developed diarrhea were randomly assingned to a formula containing one of 4 carbohydrates: lactose, sucrose polycose, or combined sucrose polycose. Daily diaries kept by parents indicated that symptoms resolved in most patients within 7 days and that stool frecuency, weight gain, and need for hospitalization did not differ significantly among the groups. The authors found comparable recovery from mild acute gastroenteritis within 2 weeks irrespective of carbohydrate ingestion. This information is of relevance in view of studies that demostrate lactose malabsorption in acute diarrhea. Using the breath hydrogen test incomplete lactose absorption was demostrated in breast-fed infants (9) and in children who were fed a lactose load (10).

Davidson et al. (11) determined the incidence and duration of lactose malabsorption in children hospitalized with acute enteritis. They performed 178 breath hydrogen test in 104 children whose age range was 2 week to 5 years. They determined that the overall incidence of lactose

malabsorption was 50%, while that of lactose intolerance was 32%. The average recovery rate was 4 to 8 weeks in children 6-18 months old while the majority of children over 18 months of age recovered in less than two weeks.

Isolauri et al (12) studied 65 infants who were hospitalized for acute gastoenteritis. Following oral rehydration they had rapid reintroduction of feeding appropiate for age: in one group (27 infants) cow milk and milk products were eliminated from diet while the remaining 38 continued to receive their usual milk and milk products as part of the mixed diet. No differences were observed between the groups in clinical recovery from diarrhea. No child developed prolonged diarrhea and no new cases of clinical atopy were observed at 1 month follow-up. There were no significant increases in the total or milk-especific IgE levels. Althoght serum IgG ang IgA antibidies to Beta lactoglobulin and Alfa-casein were initially present in the majority of the children, no appreciable changes in these cow milk antibodies were observed after gastroenteritis regadless of the type of diet.

EVIDENCE OF LACTOSE INTOLERANCE IN INFANTS WITH ACUTE DIARRHEA

A limited number of studies have produced evidence that some infants with acute diarrhea are at risk for developing lactose intolerance. One such study included infants with severe diarrhea and indicated an advantage of a lactose-free formula over a cow milk product (13). Another study reached the same conclusion although the population studied was not necessarily affected by a severe illness (14). The continuos feeding of lactose-based formula in infants with prolonged dehydrating gastroenteritis was also found to affect outcome adversely (15).

USE OF MILK IN PROLONGED DIARRHEA

The clinical and nutritional consequences of lactose feeding during post-enteritis diarrhea was studied by Penny et al. (16). Sixty-four children aged between 3 and 36 months who had diarrhea for at least 14 days were randomly assigned to receive either a milk-based diet containing intact lactose or the same diet in which the lactose had been pre-hydrolyzed to >95% with the use of a alfa-galactosidase. In the lactose feeding group, 12% of the patients were considered to have treatment failure because of excessive purging with or without refusal to accept the diet, compared to only 3% in the hydrolyzed lactose group. Although fecal excretion among the successfully treated was initially similar, the amount of purging was significantly higher on days 3 to 5 of the trial in the lactose group compared to the hydrolyzed lactose group. In the lactose-hydrolyzed group, more children stoped their diarrhea within 30 hrs of admission compared to the lactose group and fecal excretion of carbohydrate, nitrogen, and energy was significantly greater in the lactose group. The authors concluded that feeding lactose containing non-human milk as a sole nutrient source to children with persistent diarrhea resulted in substantially greater purging, which was sufficiently severe to increase the risk of dehydration.

ACIDIFIED AND FERMENTED MILKS

The effect on diarrheal disease of an acidificied, modified powdered cow milk infant formula was evaluate in 82 infants during 6 months (17). During the same period, a group of 104 infants who received the same formula which was not acidified served as controls. Although some children rejected the taste of the acidified milk, the incidence of diarrhea was lower in those who receive the acidified milk and the proportion of days in which the children suffered from acute diarrhea and the duration of the episodes were also lower in that group. The authors concluded that acidified milk exerts a protective effect against diarrhea disease.

Beau et al. successfully managed malnourished children with acute diarrhea and sugar intolerance by feeding for a mixture of fermented milk to which castor sugar and vegetable oil had been added (18). Although this study did not have a control population, it addressed a group of children in enegal who were at great risk for developing complications of diarrhea (19).

Yogurt has been proposed as a substitute of milk in the diet of children with chronic diarrhea and lactose deficiency because of its nutritional similarity to milk and its property of preventing malabsorption and lactance deficient adults. Dewit et al. compared the absorption of lactose and clinical tolerance after ingestion of milk and yogurt in 9 Algerian boys, aged between 7 and 29 months who were suffering from chronic diarrhea, small bowel villous atrophy, and lactase deficiency (20). They observed lactose malabsorption (as defined by a rise in breath hydrogen concentration) more frecuently after the feeding of milk than after yogurt. Evidence of lactose intolerance was also seen in a greater number of children after milk than after yogurt.

Isoluari et al. (21) determined the effect of a human Lactobacillus strain on recovery from acute diarrhea in 71 malnourished children between 4 and 45 months of age, 82% of whom had rotavirus. Following oral rehydration, the patients randomly received either a lactobacillus-fermented milk product, a lactobacillus freeze dried powder, or a placebo (a pasteurized yogurt). Each diet was given for 5 days in addition to full normal diet. Duration of diarrhea after commencing therapy was significantly shorter in the group that received the lactobacillus-treated milk than in the placebo.

In conclusion, data indicates that the continuation of milk in infants with acute diarrhea is the feeding modality

that will be successful in the majority of infants, particulary in those who are well nourished and whose diarrhea is not severe.

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