IS IT NECESSARY TO REGRADUATE MILK AFTER ACUTE GASTROENTERITIS IN CHILDREN?

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Received June 6, 1983
Accepted for publication August 31, 1983

Summary. To assess the best possible method of reintroducing milk in children suffering from acute gastroenteritis, 150 children (76 males and 74 females) admitted with acute gastroenteritis were allocated to one of three regimens:

a. clear fluids initially, followed by increasing strengths of milk, in quarter strength steps;
b. clear fluids initially and then reintroducing full strength milk;
c. regimen of continuing full strength milk.

There was no difference between the three groups in the outcome or in the length of stay in the hospital, but those who were continued on full strength milk gained more weight. The weight gain did not attain statistical significance; it is our impression on clinical grounds that this weight gain may be important in the malnourished infant who is more prone to enteritis.

Introduction

It is customary to give clear fluids to children with acute enteritis initially, but there are many opinions on the method and rate of reintroducing of milk to these children. Standard textbooks [1, 2] recommend that milk should be either withheld for some time or reintroduced gradually increasing in quarter strength steps. Because of differences in the method of reintroducing milk in children with gastroenteritis even in our individual practice, we decided to evaluate the various feeding regimens we were using and to report our findings.

Material and methods

During the period between February and November 1982, children admitted in the hospital under our care with gastroenteritis alone, were included in the present study. These children were randomly allocated to one of three regimens: a) initial clear fluids (glucose-electrolyte solution), then graduated milk feeds in quarter strength steps; b) initial clear fluids, then full strength milk feeds; c) to continue on full strength feeds.

In groups a and b, the initial glucose-electrolyte solution was given for 6-24 hours, but never more than 24

hours. Clear fluids were re-introduced if diarrhoea recurred on introduction of milk feeds. The children were assessed clinically on admission and then daily till their discharge from hospital. Biochemical assessment was done on admission and then frequently depending on the condition of the patient.

Results

A total of 150 children (76 males and 74 females), between the ages of one month and two years were studied; 84.6% were Saudi's and 15.4% of various other nationalities.

Table 1 shows the feeding pattern of these children at various ages in periods of six months. The patients presented between 6-120 hours (mean 28.4 hours) after the appearance of symptoms, the frequency of stools ranged between 3-15 and more per day (mean 8). Bacteriological cultures were positive in only 18 (12%) of cases, of whi 8 had salmonella, 6 grew pathogenic *E. coli* and 4 were positive for campylobacte

Standard clinical criteria, according to estimated weight loss were used to assess the degree of dehydration (see *Table 2*). Daily or more frequent biochemical analysis was undertaken until the child was in correct electrolyte balance. Only 23.3% of the infants were nutritionally normal; the majority (76.6%) had some degree of malnutrition (see *Table 3*). Of the malnourished children, most (94) were infants; they were either being bottle fed or they received mixed feeding i.e. breast plus bottle, or bottle plus solids, or all three.

Table 4, shows the number of patients in each group, the effect of various feeding regimens on weight, cessation of diarrhoea, vomiting and the length of hospital stay.

Discussion

The administration of glucose electrolyte preparation in the early stages of rehydration is based on the findings of Gray [3]. The discovery that sodium transport and glucose transport are coupled in the small intestine, so that glucose accelerates

Table 1. Feeding patterns of children before admission

Age in months	*Breast*		*Bottle*		*Mixed*	
	n	%	*n*	%	*n*	%
0- 6	6	27.2	7	31.8	9	40.9
6-12	12	16.2	21	28.3	41	55.4
12-18	3	7.6	9	23.0	28	71.7
18-24	1	6.6	3	20.0	11	73.3
Total	22	14.6	38	25.3	89	59.3

Table 2. Degree and type of dehydration

Degree of dehydration number and percentage	< 5% 72 (48%)	5-7% 46 (31%)	8% or more 32 (21%)
Type of dehydration number and percentage	Isotonic 102 (68%)	Hypotonic 27 (18%)	Hypertonic 21 (14%)

Table 3. Nutritional status of patients according to Gomez classification

Age in months	*Total*	*Normal*		*1ste degree malnutrition*		*2nd degree malnutrition*		*3rd degree malnutrition*	
		n	*(%)*	*n*	*(%)*	*n*	*(%)*	*n*	*(%)*
0- 6	22	12	(54.5)	6	(27.2)	3	(13.6)	1	(4.5)
6-12	74	14	(18.9)	32	(43.2)	23	(31.0)	5	(6.7)
12-18	39	4	(10.2)	12	(30.7)	21	(53.8)	2	(5.1)
18-24	15	5	(33.3)	5	(33.3)	4	(26.6)	1	(18.4)
	150	35	(23.3)	55	(36.6)	51	(34.0)	9	(6.0)

absorption of solute and water is a very important medical advancement of this century [4]. However, there is no general agreement as to the best way of reintroducing milk in children with acute gastroenteritis. Some gastroenterologists [2] and texts on the subject [5] suggest that early introduction of milk in these children is contraindicated as being potentially harmful to the child.

Our findings in the present study support other studies [6, 7] showing that there is no advantage in regraduating milk feeds over giving full strength feeds in an uncomplicated case of gastroenteritis. Dugdale [7] was critisizied by DeSouza [8] on the lack of data on nutritional status of the patients in his study. In our study only 35 (23.3%) of the children fell in the normal range of the Gomez classification [9]; the majority (76.6%) had some degree of malnutrition, but this did not seem to make any difference in the outcome and the period of recovery. The above findings were surprising to us, as in our community the incidence of secondary lactose intolerance is about 36% [10], but none of the three feeding regimens made any difference in the period or the process of recovery.

In our study of children looked after in a busy childrens hospital (daily outpatient attendance 1200-1400) we found no significant differences in the duration, period of recovery or in length of hospital stay, regardless whether the milk was continued in full .rength concentration or reintroduced gradually in quarter strength steps. A point worth making is that we found it more difficult to teach the mother to regraduate feeds than to continue on full strength feeding. The slightly increased weight gain in the group who continued on full strength milk – though it did not achieve statistical significance – may be clinically significant in malnourished children, who form nearly 80% of our patient population.

In conclusion we would recommend that in uncomplicated cases of gastroenteritis, milk feeding should not be withdrawn, and gradual reintroduction of milk in varying strengths is unnecessary.

I am very greatful to Prof. Abdurrahman for advice and to Mr. Moazamullah for typing the manuscript.

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Table 4. Effects of different feeding regimens

Feeding regimen	*No. of patients*	*Increase in weight at discharge in kilograms*	*Diarrhoea stopped after days mean ± S.D.*	*Vomiting stopped after days mean ± S.D.*	*Average length of stay in hospital in days mean ± S.D.*
Clear fluids* then graduated feeds**	52	0.4 ± 0.1	3.0 ± 1.4	1.0 ± 1.1	3.1 ± 1.4
Clear fluids then full strength milk***	46	0.8 ± 0.2	3.0 ± 1.3	1.8 ± 1.3	3.6 ± 1.2
Full strength milk***	52	1.2 ± 0.7	3.8 ± 1.2	1.6 ± 1.2	3.8 ± 1.2

* Clear fluids were given for 6-24 hours (mean 8 hours).
** Graduated feeds were given for 12-48 hours (mean 24.6 hours).
*** Breast feeders are included in this group.
p = not significant.

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