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ORIGINAL ARTICLE

Oral Rehydration on Infants and Children in the Dr. Hasan Sadikin General Hospital, Bandung

by

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Abstract

Fifty-nine out of one hundred and fifty-four patients with gastroenteritis and dehydration admitted between April and September 1975 to the Department of Child Health, Dr. Hasan Sadikin General Hospital, were treated with oral glucose electrolyte solution and studied.

Twenty-nine patients (group I) were treated with P.3.M. formula and thirty patients (group II) with Hirschhorn formula. In both groups no significant differences were noted in grades of volume depletion which ranged between 5 to 10%, with a peak incidence of 8%. Rehydration was excellent in 41 (69.6%), good in 14 (23.7%) and poor in 4 patients (6.7%). No significant differences were found between both groups. The mean weight gain after rehydration was 4.5% (of the initial weight) in group I and 4.49% in group II (no significant differences). In the study of Hirchhorn et al. (1973) the mean weight gain was about 3%. Fifty-four patients (91.5%) had a recognized pathogen in their stool. In general, the result of oral rehydration in this study was satisfactory; statistically the treatment with both oral glucose electrolyte solutions gave the same good results.

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Introduction

Gastroenteritis is one of the major diseases highly prevailing in developing countries. This is reflected in the morbidity data in the Department of Child Health, Dr. Hasan Sadikin General Hospital, which always place gastroenteritis as the first cause of admission in the Paediatric wards far exceeding the other causes (Rosmajudi et al., 1976). Equal data were also noted by Sudianto (1974) in he Dr. Cipto Mangunkusumo Hospital, Jakarta.

The main cause of death is severe dehydration; about 1 out of 5 cases of gastroenteritis could become severely dehydrated (Seminar Rehidrasi I, 1974). Oral rehydration might reduce the incidence of severe dehydration and is very valuable for rural areas where the facilities for intravenous fluid drip are poor.

Numerous investigators (Hirschhorn et al, 1972; Sunoto and Sanityo, 1974; Nalin et al., 1970 and Pierce, et al 1968) found that oral glucose electrolyte solution was very beneficial in treating dehydration caused by gastroenteritis and cholera.

The purpose of this study is to investigate the result of oral rehydration in the Department of Child Health, Dr. Hasan Sadikin General Hospital, using oral glucose electrolyte solution, Hirschhorn formula and P.3.M. 's formula, and also to compare the results of these two different solutions.

Material and Method

Fifty-nine out of 154 infants and children suffering from gastroenteritis and dehydration admitted to the Department of Child Health, Dr. Hasan Sadikin General Hospital between April and September 1975 were treated with 2 different oral glucose electrolyte solutions and studied. These solutions were Hirschhorn's formula and P.3.M.'s formula (Table 1).

TABLE 1: *Oral Glucose Electrolyte Solutions*

Composition	P.3.M.'s formula	Hirschhorn' formula
NaCl	4 Gm/L	2.5 Gm/L
NaHCO3	4 Gm/L	2.5 Gm/L
KCL	1.2 Gm/L	1.25 Gm/L
Glucose	10 Gm/L	30 Gm/L

Alternate patients were assigned on one of the other formula. Those treated with P.3.M. formula were marked as group I and those with Hirschhorn formula were marked as group II.

Body weight, grade of dehydration, nutritional status and plasma electrolytes were measured at the time of admission. The stool was also examined macroscopically, microscopically and cultured. Close observation was done during the oral treatment. In case there was profuse or frequent vomiting, the oral treatment was then stopped, and the patient was treated by means of intra venous fluid drip.

After rehydration the oral treatment was stopped. Body weight and plasma electrolytes were remeasured and refeeding started. The grade of severity of dehydration was determined based on the scoring system of Maurice King and the criteria of the Lembaga Kesehatan Nasional 1974 (Abdurachman Sukadi et al., 1975; Julie Sulianti Saroso, 1975).

The nutritional status was expressed as percentage of the 50th percentile of Harvard Standard curve (1959) and defined by criteria of Gomez and associates. Recovery from dehydration was recognized by the judgement of the signs of rehydration, i.e. the absence of thirst, sunken eyes and depressed anterior fontanel with regaining skin turgor and body weight for at least 9%.

Rehydration was classified as follows.

a. excellent if the patient recovers within 12 hours,

b. good if the patient recovers within 12 - 24 hours,

c. poor if the patient recovers more than 24 hours after the oral treatment was started.

Medical treatment was given depending upon its recognized etiology. The statistics used in this study was the Student test.

Results

The results are summarized in the following tables :

TABLE 2 : *Age and sex distribution*

	Group I	Group II
Male	17	18
Female	12	12
Range of age	1 mo. — 15 yrs	1 mo. — 4 yrs
Age groups : 1 mo. — 1 yr.	20	23
1 yr. — 3 yr.	7	5
3 yr. — 5 yr.	2	2

TABLE 2a : *Nutritional status*

	Group I	Group II
Wellnourished	17	18
Underweight	9	10
Marasmic Kwashiorkor	3	2

TABLE 2b : *Symptomatology*

	Group I	Group II
Duration of diarrhea	1 - 5 day	1 - 5 day
Frequency of diarrhea	3 - 20 times/day	4 - 20 times/day
Grade of volume depletion	5 - 10%	5 - 10%
Profuse vomiting during treatment	0	0

TABLE 3 : *Grade of dehydration and number of patients*

Grade	Group I	Group II
5%	3	4
8%	22	22
10%	4	4

Table 3 showed no significant difference in grade of dehydration on both groups.

TABLE 4 : *Number of patients as related to time of complete rehydration*

Time of recovery	Group I	Group II	Total	%	Score
Within 6 — 12 hours	20	21	41	69.6	Excellent
Within 12 — 24 hours	7	7	14	23.7	Good
After 24 hours	2	2	4	6.7	Poor
T o t a l	29	30	59		

$p > 0.05$

Table 4 showed that fourty-one patients (69.6%) were rehydrated within 6 - 12 hours after the oral treatment had been started (excellent), founteen patients (23,7%) within 12 - 24 hours (good), four patients (6.7%) after 24 hours (poor), all of them were malnourished (marasmic kwashiorkor) and had recurrent diarrhea, one of them with 10% dehydration and the other three with 8% dehydration.

TABLE 5 : *Average weight gain after rehydration*

	Number of patients	Average weight gain
Group I	29	245.4 grams (4.50%)
Group II	30	237.6 grams (4.49%)

$p > 0.05$

Table 5 showed that in both groups, the average weight was satisfactory and showed no significant differences.

TABLE 6 : *Plasma electrolytes before and after rehydration*

Group I				Group II			
Case No.	Grade of dehydration	Plasma Sodium (mEq/L)		Case No.	Grade of dehydration	Plasma Sodium (mEq/L)	
		Before	After			Before	After
3	10%	130	138	2	10%	125	140
23	8%	150	140	4	10%	130	136
47	10%	120	140	8	10%	120	138
49	10%	120	136	10	10%	132	140
				16	8%	156	140

On laboratory examination there were some cases with hyper or hyponatremia which were readily corrected after rehydration in group I as well as in group II (Table 6).

Fifty-four cases has a recognized pathogenic bacteria in their stool: Klabsiella 8, EPEC 15, E. Coli 10, Paracolon 'Coliforme 19, Salmonella 1 and Vibrio Eltor 1.

Discussion

Many years ago Darrow and Harrison suggested that an orally administered electrolyte solution containing glucose could often be used as a substitute for parenteral therapy in diarrhea.

From 1958 — 1966 numerous investigators (Richlis and Quastel, Schutz and Zalusky, Crane, Schedl and Clifton and Levinson) demonstrated a coupled transport of glucose and sodium in the small intestine and the consequent acceleration of solution and water absorbtion in their presence. Based on this biophysical principle, stool losses could be replaced by oral glucose electrolyte solution so that the need for intravenous fluid administration could be reduced. In the absence of vomiting, children with mild to moderate volume depletion due to diarrhea, are able to take sufficient amount of fluid and electrolytes by mouth for volume replacement and maintenance if they are able to drink.

In this study we found that the use of oral glucose electrolyte solution was effective, comfortable, inexpensive and able to reduce the incidence of severe dehydration. Most of the patients were generally able to take sufficient amounts of the solution appropriate to their requirements for volume replacement of volume depletion and stool losses. Al-

though these solutions had a different sodium concentration, they all had the same good result in treating dehydration caused by diarrhea, and both could readily correct hypo or hyper-natremia after rehydration.

In our study no complication was noted and the mortality rate was nil.

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