

ORIGINAL ARTICLE

Sucrose Tolerance Test in Children With Diarrhoea.

by

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Abstract

A study of Sucrose Tolerance Test has been done in 30 children with the ages ranging between 1½ and 18 months suffering from diarrhoea who were admitted to the Department of Child Health, Gadjah Mada University Hospital, Yogyakarta during November 1979 until April 1980.

Ten out of 30 children (33.33%) had blood sugar level increase more than 40 mg%, and one of them developed diarrhoea, while 20 out of 30 children (66.67%) had blood sugar level increase less than 40 mg%, one of them developed diarrhoea.

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Introduction

Oral glucose electrolyte for rehydration in children with diarrhoea was famous and successfully used especially in the developing countries. (Nalin, 1975).

But glucose is very expensive, and not always available in rural areas, so sucrose was also being used as oral electrolyte solution instead of glucose, because it is cheaper and available everywhere, and have been reported successfully in some trials (Moenginah et al, 1977).

Congenital Sucrase Isomaltase Deficiency was reported and observed over a period of 6 years in 10 children who have been diagnosed as having Congenital Sucrase Isomaltase Deficiency and confirmed by a quantitative estimation of disaccharidase activity of small intestinal mucosa. Repeated biopsies were performed, and there was no evidence of sucrase isomaltase activity acquired. (Antonowicz et al., 1972).

Congenital Sucrase Isomaltase Deficiency was now recognised as an important cause of sugar intolerance in infancy and childhood.

Sugar intolerance especially is caused by damage of the villi intestinal mucosa. There is a correlation between altered morphology of the villi intestinal mucosa and lactose intolerance. (Soenarto. Y. et al 1976).

Gastroenteritis was estimated as one of the factors causing damage of the intestinal mucosa.

Sugar intolerance has been reported being 56% in children with gastroenteritis. (Sebodo, T. et al, 1974).

It is still a question whether gastroenteritis can also cause intolerance of other carbohydrate especially sucros, because it is much used in artificial-milk, and oral rehydration solution.

The purpose of this study is to know more about sucrose intolerance in children with acute gastroenteritis.

Material and Methods

Thirty children with diarrhoea, aged between 1½ — 18 months who were admitted to the Department of Child Health, Gadjah Mada University Hospital, during November 1979 until April 1980, were included in this study.

All children on the third day of hospitalization were tested for Sucrose Tolerance Test.

After fasting 4 — 6 hours early in the morning, the children were fed with 2 gr sucrose/kg of body weight diluted in water as 20% solution.

Capillary blood from the fingertip was obtained at 0,30,60,90 and 120 minutes, and put in anticoagulant perservation. The blood samples were sent to the Province Health Laboratory, for measuring glucose concentration by the Ortho-Teluidin Test method.

Clinical signs such as vomiting, meteorism and diarrhoea, were observed during ½ — 4 hours thereafter.

Sucrose malabsorption was diagnosed if :

1. The children developed meteorism, vomiting, and diarrhoea.

2. The blood sugar level increase less than 40 mg %.
3. Stool pH is less than 6.

Oral antibiotics were not given in this study.

Results

Ten out of 30 children (33.33%) had blood sugar level increase more than 40 mg %. One of them developed diarrhoea. In the other 20 children (66.67%) the blood sugar level increase less than 40 mg %, and one of them developed diarrhoea. (Table 1).

The result of the stool pH examination in the children with blood sugar level increase more than 40 mg %, nine children had pH. more than 6, and one had pH. less than 6. While in the children with blood sugar level increase less than 40 mg %, all had pH. more than 6. (Table 2).

The result of blood sugar level increase can be seen at the figure of the increase of blood sugar levels on the sucrose tolerance test. (Figure 1).

Discussion

The dietary carbohydrate is absorbed in the intestinal mucosa, especially at the duodeno-jejunal junction.

The carbohydrate is hydrolysed to monosaccharide by an enzyme, which is produced in the brush border surface of the columnar epithelial cells of the small intestine and is most active in the jejunum (Gray, 1971).

The unhydrolysed disaccharides will pass into the organic acid/lactic acid, and make the stool pH less than 6.

If the carbohydrate is not fermented, it was going to be excreted in the stool which can be detected with a clinitest tablet. Since sucrose is not a reducing substance, we can only use a pH paper for detecting it.

Antibiotic will influence the micro-bacteria in the colon and will disturb the sucrose tolerance examination.

In this study, 20 children (66.67%) had blood sugar level increase less than 40 mg %, stool pH more than 6. May be the patients have been treated with antibiotics for a long time, before admitted to the hospital.

The passage of sucrose from the mouth to the intestine is not always fluent, after two hours, some or the sucrose will be still accumulated in the ventriculus, so although the patients had sucrose malabsorption, no clinical signs such as meteorism, vomiting and diarrhoea appear (Mitchel J.D., 1981).

Sucrose tolerance test in the newborn have been done and had a similarity in the results with this study, although the increase of the blood sugar levels were less than 40 mg %, but no clinical signs appeared (Suryantoro P. et al, 1980).

When the increase of blood sugar levels were less than 40 mg % on the sucrose tolerance test, it may suggest that glucose and fructose malabsorption were present. Since the incidence of glucose and fructose malabsorption is rare, the increase of the blood sugar levels less than 40 mg % can be diagnosed as sucrose malabsorption.

Paper chromatography is useful in diagnosing the type of sugar malabsorption. (Soeparto et al 1972).

Summary

1. Sucrose Tolerance Test has been done on 30 children with diarrhoea, with the result :

Ten out of 30 children (33.33%) had blood sugar level increase more than 40 mg %, and one of them developed diarrhoea, 20 out of 30 children (66.67%)

had blood sugar level increase less than 40 mg %, one of them developed diarrhoea.

2. On 20 children with the increment of the blood sugar levels less than 40 mg %, further examination should be done, especially on the one with diarrhoea.

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TABLE 1 : *The result of the clinical observation in conjunction with the blood sugar level.*

The increase of the blood sugar levels	Number of cases	%	The clinical signs		
			diarrhoea	meteorism	vomiting
more than 40 mg%	10	33,33	1	—	—
less than 40 mg%	20	66,67	1	—	—
T o t a l	30	100	2	—	—

TABLE 2 : *The result of stool p.H. in conjunction with the blood sugar level.*

The increase of the blood sugar levels	Number of cases	Stool p.H.	
		less tan 6	more than 6
more than 40 mg%	10	1	9
less than 40 mg%	20	—	20
T o t a l	30	1	29

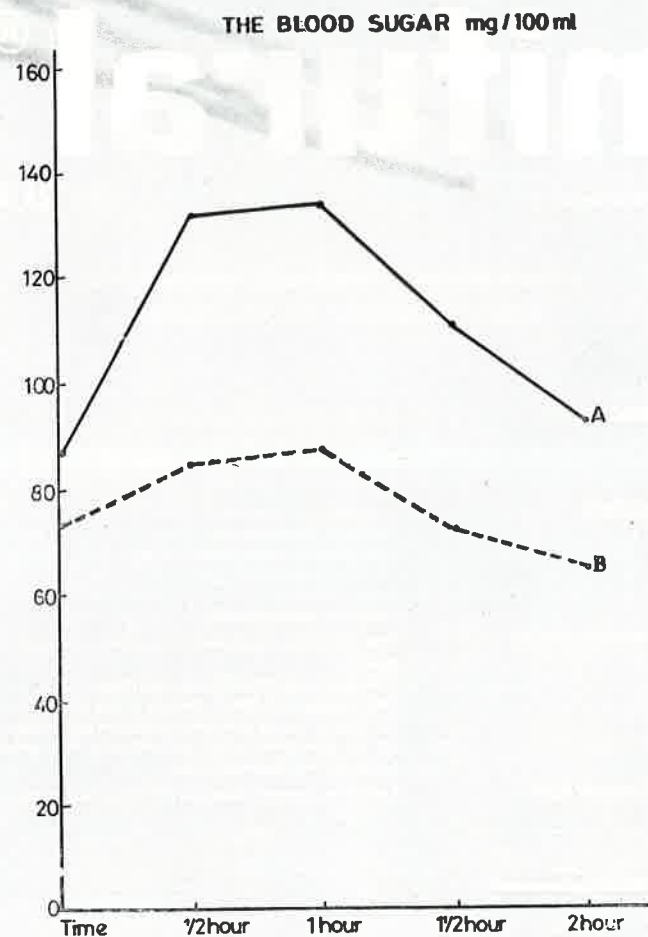


Figure 1 The increase of the blood sugar levels on The Sucrose Tolerance Test :
 A. The increase of the blood sugar levels more than 40 mg % :
 B. The increase of the blood sugar levels less than 40 mg % :