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## Solid food in Typhoid Fever \*

by

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### Introduction

Typhoid fever (enteric Fever, typhus abdominalis) is still a common infectious disease in Indonesia, the chief manifestations of which are in the intestines. It is however not an intestinal disease. The early involvement of Peyer's patches with their subsequent coagulative necrosis and resulting ulcerations is the outstanding pathologic feature. In addition, there are extensive changes in the liver, with involvement of the gall-bladder and bile passages. All this interferes with digestion, but strange to say, to a much less extent than the pathologic anatomy would lead one to expect. In spite of all these changes, food is digested and absorbed remarkably well (Mc. Lester, 1952).

There have been many changes in the dietetic management of typhoid fever since the beginning of the 20th century. Formerly, the diet had been

greatly restricted, both in volume and calorie value, resulting in marked emaciation and long convalescence.

It is now conceded that a diet rich in carbohydrate will not only provide the patient with readily assimilable food, requiring a minimum amount of digestive energy, but will also prevent the rapid destruction of body tissue with the loss of nitrogen which is characteristic of this disease (Saxl, 1937).

In the Department of Child Health, Medical School, University of Indonesia, all children admitted with the diagnosis of typhoid fever were previously given a high carbohydrate, high caloric strained diet until two weeks after the fever subsided. Then soft food was given for one week. Afterwards, before being discharged, he was given plain cooked food for one week (Sutedjo, 1961).

This paper will present a trial done in the Department of Child Health,

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Dr. Tjipto Mangunkusumo General Hospital, Jakarta, where typhoid patients were given "solid" food as soon as possible.

"Solid" food in this paper means soft as well as plain cooked rice with egg, meat, fish, low cellulose vegetables, fruit and milk or milk products (yoghurt, cheese). Whether to give soft or plain cooked food, depends on the condition of the patient.

Several considerations which have stimulated us to do this trial were:

1. The bulk of either the protein, the fat or the carbohydrate of the ordinary solid food is physiologically digested in the mouth and stomach, and by the time the food reaches the small intestines it has already been reduced to a liquid chyle.

And although physiologically most of the digestion and absorption takes place here, Du Bois as early as in 1912 demonstrated that the involvement of the Peyer's patches in the ileus does not affect digestion and absorption to a great extent: large amounts of food are as readily absorbed in typhoid as in health.

2. Almost all patients with typhoid fever have no appetite, due partly to the disagreeable condition of the mouth and partly to the fever and disease itself. Strained food being strange to the pa-

tient is not appetizing in appearance as well as taste.

3. The preparation of strained food is more difficult and time consuming than the usual way of cooking rice.

#### Material and methods

Included in this trial were all patients admitted to the Department of Child Health, Dr. Tjipto Mangunkusumo General Hospital, Jakarta, from October 1968 until October 1970, with the diagnosis of typhoid fever. The diagnosis was based on the clinical picture, positive Salmonella typhi findings of the bile culture and on Widal's agglutination titer of Salmonella typhi O antigen of more than 1/200.

The patients were divided into three groups:

*Group A:* Typhoid patients who were admitted with dehydration and required intravenous fluid drip. After rehydration, they were given liquid or solid food, depending on the condition of the patients. The amount given was 100 calories per kg of body weight.

*Group B:* Patients who were unconscious, delirious, very restless or weak and malnourished, without signs of dehydration, were given liquid food to make feedings easier. If needed, tube feedings were applied. As soon as the patient's condition improved, solid foods were given.

*Group C:* Patients with a milder form of typhoid fever than those of

group A or B, were given solid food directly.

Those who were admitted with high fever, malaise and anorexia, and too weak and malnourished patients were given soft cooked food, but as soon as their appetite has improved, the diet was switched into plain cooked food.

Those who were admitted in a reasonable good condition were given the usual, plain cooked diet directly.

To all patients who were given solid foods, additional milk was given as well. Contrary to the conventional strict way of immobilization, where typhoid patients were only allowed to sit up one week after the fever had subsided, they were now encouraged to shorten this immobilization period. Besides dietetics, all patients were also given 100 mg of Chloramphenicol per kg of body weight for at least 10 days, vitamins, and if needed, other antibiotics for secondary infections.

The patients were closely observed for possible deleterious effects of their diet. Special attention was given to body weight, appetite, complaints of abdominal pain or distention, vomiting, diarrhea, and the possibility of complications in particular perforation and intestinal hemorrhage.

### Results

The results are summarized in tables 1, 2, 3.

Seventy eight patients, consisting of 47 boys and 31 girls, the youngest of whom was two and the oldest twelve years old, were admitted to the Department of Child Health of the Dr. Tjipto Mangunkusumo General Hospital, Jakarta, between October 1968 and October 1970.

Eleven patients (14,3%), required intravenous fluid drips (IVFD) on admission because of dehydration due to gastro-enteritis (3 patients), vomiting (3 patients), bronchopneumonia and total loss of appetite (5 patients).

One patient (Su, boy, 12 years old), had melena on the second day of hospitalization (before given any food). He was treated conventionally, e.g. IVFD for 3 days followed by liquid food for 10 days, soft food for 5 days and then plain food for 14 days. Total time of hospitalization was 32 days.

Another patient (Ha, a 10-year-old boy), had melena before admission but on the 21st day of hospitalization - after 12 days of soft food - he again passed bloody stools and even hematemesis. He was also treated conventionally, and given IVFD + blood transfusion for 2 days, liquid food for 18 days, strained food for 9 days followed by soft food for 4 days. He was discharged in a reasonable good state, after 56 days of hospitalization.

Average time in hospital for this group (Group A) was 24,9 days, ave-

rage duration of fever treatment was 11,1 days. Average administration of IVFD (including the patients with complications) was 2,3 days, liquid food 4,6 days and solid food 15,5 days. In spite of the severity of the illness, not one patient died in this group and loss of weight was only slight (less than 10%) i.e 36,4% (4 patients).

Twenty-five patients (32,4%) had to be given liquid food on admission because of severe malnutrition and weakness. The average time required for giving liquid food was 4,8 days in this group B. Whether to give soft or plain cooked food afterwards, depends on the patient's condition and appetite.

One patient (Sul, a 12-year-old boy), had to be given liquids for 16 days because of bronchopneumonia and malnutrition; the fever subsided only after 21 days.

One patient (Loe, a 7-year-old girl), needed 12 days of liquid feeding due to malnutrition and weakness; she frequently complained of abdominal pain.

Another patient (Agus, a 9-year-old boy), acquired choreatic movements on the second day in hospital; the cerebrospinal fluid was clear, Nonne (+) Pandy (+), cell count was 456/3, segments 14% and lymphocytes 86%; he died on the sixth day because of bronchopneumonia and presumably tuberculous meningitis. He was the only death in the whole series.

Average duration of hospitalization for this group (group B) was 18 days, duration of fever after installment of treatment was 9,3 days (complications were included). Weight loss occurred in 5 patients (20%), but all less than 10% of the body weight on admission.

Forty-one patients (53,2%) could be given solid food directly, 30 patients started with soft food and eleven patients were given plain food on admission. These patients, who were given the usual solid foods right from admission, seemed to be doing remarkably well, with the exception of 2 patients described below, who required tube feeding because of their condition.

Patient Mur ( a 7-year-old girl) had an asthma attack and bronchopneumonia on the third day of hospitalization, so that her diet had to be changed into liquids for nine days.

Another patient (Daj. boy, 5 years old) became somnolent on the eighth day; he was given tube feeding/liquids for three days.

Average stay in hospital for this group (group C) was 16,8 days, fever subsided after 8,3 days of treatment (complications included). Slight loss of weight (less than 10%), occurred in seven patients (17%). Mortality in this group was nil.

The eleven patients who were given plain cooked food since admission, had no intestinal or abdominal complaints whatsoever. After institution of solid food, only 3 patients

complained of slight abdominal pain (4%); 1 in group A, 2 in group B. Diarrhea and vomiting occurred in 2 patients (2,7%), both in group B; hematemesis and melena in one patient (1,3%), who belonged to the first group (group A).

Loss of weight occurred in 20,7% of the total number of patients, but all less than 10% of the body weight on admission.

### Discussion

It was Shaffer (1908) who first pointed out the advantages of a high caloric diet, opposite to the semi-starvation regime long in vogue. Then came the time of radical change in the method of feeding patients with typhoid fever; especially after the works of Coleman (1909), La Fetra (1912) and other investigators like Du Bois (1912), who demonstrated that the typhoid patient has a remarkable capacity to absorb large amounts of food. Taneja (1957) in India, kept all typhoid children on a normal hospital diet regime with excellent results; no complications were noticed.

It must be considered, that physiologically the chyle that enters the duodenum is of a semi solid consistency, and is well mixed up. It therefore does not make any difference whether the patient is kept on milk diet, strained food, rice or any other solid food, provided that the selected constituents do not contain too much roughage.

We also know from experience as well as from the literature, that complications, including hemorrhage and perforation of the bowel are less frequent in children than in adults; intestinal hemorrhage seldom occurs in patients under ten years of age (Nelson, 1969).

However, in our series of 77 patients, there were 2 cases with bleeding of the intestines; one patient had melena on the second day of hospitalization, which was the third week of his illness, and the other one had already suffered from intestinal hemorrhage before admission. This latter was given IVFD on admission for one day, followed by liquids for 8 days. After 12 days of solid food (actually soft food), this 10-year-old boy contracted again intestinal bleeding. Whether the solid food was the major cause responsible for this only one example of bleeding could certainly not be underlined.

Almost all of our patients had no appetite on admission. However, we noticed that in most of them appetite had improved within a few days, especially after the fever had subsided. They eagerly took the (solid) food offered. To improve the appetite, Mc. Lester (1952) asked attention for the disagreeable condition of the mouth (in our series, 17 patients suffered from stomatitis); he suggested that the mouth should be washed with a mild antiseptic solution before and after each feeding, and the teeth should be carefully

brushed two or three times each day. Indeed, we have to admit that more attention should be given to the mouth hygiene of our typhoid patients. The chewing of gum could help keep the mouth clean and is recommended.

Complaints of abdominal pain (4%), diarrhea and vomiting (2,7%) after institution of solid were rare.

The other accompanying diseases or conditions had nothing to do with the diet, they were bronchopneumonia, bronchitis, lung tuberculosis, asthma, pharyngitis, stomatitis, acute otitis media, febrile convulsions and meningitis. We did not encounter heart failure as in the series reported by Alisjahbana (1970).

Slight weight loss occurred in 27% of our cases, the rest had increased or stationary body weight. It should be noted, that none of our patients had a decrease of body weight of more than 10%.

Mortality rate in this series was only 1,3% (one out of 77 patients) which is low indeed if compared to the mortality rate reported by Sutedjo in 1961 (5,8%). or to the 9,6% reported by Alisjahbana (1970).

Total days of hospitalization for the children in our series was 19,6 days, the fever subsided after 9,6 days (complications included). We would like to compare this to the

report of Sutedjo et al. (1961) where 8 patients of their series who were also treated with 100 mg of chloramphenicol per kg of body weight, had an average hospitalization time of 24 days; fever in their small series, however, subsided after 2,2 days.

### Summary and conclusions

Seventy-eight patients, 47 boys and 31 girls, aged 2 to 12 years, with a predominance in the 5 — 12 years age group, were admitted to the Department of Child Health, Dr. Tjipto Mangunkusumo General Hospital, Jakarta, between October 1968 and October 1970, with the diagnosis of typhoid fever. They were treated with 100 mg of chloramphenicol per kg body weight for at least 10 days, IVFD and liquid foods; solid foods were given as soon as the condition permitted, instead of the conventional strained foods. Acceptance of the patient was very good.

Complications were rare and the mortality was only 1,3%. Loss of weight was slight (less than 10%) and occurred in only 27% of the patients.

Solid foods adapted to the habits of the patients can be safely and more advantageously given to typhoid patients as substitute of the conventional (strained) foods.

TABLE 1 : *Age and sex incidence*

Age in Years	Group A			Group B			Group C			No. of Patient
	boys	girls	total	boys	girls	total	boys	girls	total	
0 — 1	—	—	—	—	—	—	—	—	—	—
1 — 3	—	—	—	3	1	6	—	4	1	5
3 — 5	2	2	2	3	3	6	5	7	17	13
5 — 9	2	2	4	6	4	10	10	7	17	31
9 — 10	4	1	5	5	—	5	11	3	19	29
Total numbers	7	4	11	17	8	25	23	19	42	78

TABLE 2 : *Average administration of IVFD liquid and solid food in each group.*

	Group A	Group B	Group C
Average IVFD adm. (days)	2,3	—	—
Average time on liquid food (days)	4,6	4,8	—
Average time on solid food (days)	15,5	13	16,8

TABLE 3 : Results of treatment.

	Group A	Group B	Group C	Average
Number of patients	11	25	42	
Average stay in hospital (days)	24,9	13	16,8	19,6
Duration of fever after the start of treatment (days)	11,1	9,3	8,3	9,4
Number of patients with weight loss (percentage)	4 (33,2 %)	5 (20 %)	7 (17 %)	13 (20,7 %)
Mortality	0	$\frac{1}{25}$ % (one patient)	0	1,3 %

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