
SPECIAL ARTICLE

Recent Advances in the Indonesian Paediatric Gastroenterology*)

by

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Abstract

Recent advances in the Indonesian Paediatric Gastroenterology have been presented in the 4 following headings and conclusions :

- (1) 'ROSE' system as the principle of treatment of diarrhoea, which is proven to be effective and gives an excellent result in reducing the case fatality rate of acute gastroenteritis,, especially cholera.
- (2) MCT and low lactose containing formula in low birth weight infants gives good to excellent results in improving fat malabsorption, ceasing the diarrhoea and increase of body weight.
- (3) The preliminary study in malnourished Indonesian children has shown that the paediatric enterotest duodenal capsule can be used to study the upper intestinal microflora.

It is useful in studying the human intestinal microflora in places where radiologic examination is not available and can easily be used in field studies.

- (4) The present report is the first study to document duovirus shown electron microscopically as virus particles in faecal specimens from children in Indonesia where malnutrition and diarrhoea remain important problems.

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Progress of Indonesian Paediatric Gastroenterology — in particular on some aspect of diarrhoeal diseases e.g. intestinal microflora, small intestinal histology, immunological factors, developments in management of diarrhoea, decrease in mortality due to gastroenteritis in Indonesian children was reported on May 1976 at the Fifth Asian Pacific Congress of Gastroenterology (APCG) in Singapore (Sutejo et al., 1976).

This progress was achieved based on a collaborative work with the Gastroenterological Research Unit, Princess Margaret Children's Medical Research Foundation, Perth, W. Australia. Besides that, there is an increasing interest in this medical branch, so that a National Coordinating Board for Pediatric Gastroenterology was established in 1974. With government support various seminars were held on gastroenterological topics for doctors practising in all parts of the Indonesian archipelago. Research activities in this field were also encouraged.

The present paper will report and focus the recent advances in the field under the four following headings :

- (1). 'ROSE' system consisting principles of the treatment of diarrhoea.
- (2). MCT (Medium Chain Triglycerides) and low lactose containing formula in low birth weight (LBW) infants with diarrhoea.
- (3). Use of a simple enterotest duodenal capsule to study the upper intestinal microflora.

(4). Duovirus in Indonesian malnourished children.

(1) 'ROSE' system.

The four principles in the treatment of diarrhoea can be summarized as follows.

R = Rehydration; in Indonesia it is preferable to carry out with Ringer's Lactate Solution, which is inexpensive and available throughout the country.

O = Oralyte or oral glucose electrolytes solution besides continuation of breast-milk in infants.

S = Simultaneous rehydration i.e. intravenously and orally-

E = Education to the parents of their supplementary help in oral rehydration.

The Seminar on Rehydration in Jakarta in 1974 recommended the intravenous (R) followed by (O), whereas Morley (1973) suggested R and O simultaneously. Since in developing countries like Indonesia there is lack of paramedical personnel, it is extremely important to educate the mothers for their supplementary help in giving oral glucose electrolyte fluids during the period of rehydration. Thus, the E factor plays a similarly important role to make the rehydration successful.

During two short cholera outbreaks in Jakarta from 6th to 15th February 1976

and from 26th to 30th May 1976 respectively, using the ROSE system, none out of the total 165 children with choleric diarrhoea died.

It was proven microbiologically that respectively 78.9% were V. Cholera Inaba type (Suharjono et al., 1976) and 71.9% Ogawa type positive (Adnan and Sutejo, 1976). Non ROSE system used until 1974, in acute gastroenteritis or cholera always gave a mortality rate of higher than 10%. (Widya, 1974). As a matter of fact, since the pathophysiology of cholera is very well understood and the drug and fluid of choice have been known, no one should die due to cholera. The present concept is that the cholera toxin stimulates the chlor-ion secretion of the gut via the increased production of cyclic Adenosin Monophosphate (c-AMP) enzyme as a result of toxin stimulation for the activity of adenyl cyclase. The secretion of water and chlor by the intestinal wall is followed by the secretion of other electrolytes i.e. sodium, potassium and bicarbonate. The Ringer's lactate solution suits very well for cholera treatment since the composition can restore the losses of the electrolytes. The disadvantage is only the lack of calories but it can be overcome by oral electrolyte solution containing glucose.

Intravenous fluid rates are given as follows:

(1) During the first hour: the child's weight in kg \times 30 ml of fluid an hour or 10 drops per kg body weight per minute,

(2) followed by the next 7 hours infusion with a 10 ml per kg body weight an hour or 3 drops per kg body weight per minute.

Oral electrolyte glucose solution or oralyte must be given simultaneously with the intravenous Ringer's lactate solution. The possibility of overhydration is very minimal. None out of the above mentioned 165 cholera cases gave such side effect.

Let us show you some figures of gastroenteritis and cholera in Indonesia before and after the 1974 Seminar on Rehydration especially after using the 'ROSE' system. It shows a significant improvement in reducing the case fatality rate. Detailed information on the 'ROSE' system has been put forward in the panel group discussion on Gastroenterology in this Congress (Suharjono, 1976).

(2). MCT and low lactose containing formula in low birth weight infants with diarrhoea.

MCT is now a well accepted form of therapy in a variety of diseases in children (Gracey et al., 1970 and 1974; Suharjono et al., 1976). There are, however, some situations in which the potential usefulness of MCT has not been adequately documented, e.g. in low birth weight infants. The incidence of fat malabsorption in low birth weight infants is very high i.e. 89.5% (Suharjono, 1976). It is caused by a lot of factors, a.o. insufficiency of the pancreas, liver and intestines and the presence of overgrowth of bacteria (bacteroides) in the

intestines which may cause deconjugation of the bile salts.

Besides that, in LBW infants there is usually a temporary preterm lactose intolerance.

In a study on the clinical usefulness of MCT and simultaneously low lactose containing formula in 40 LBW infants with steatorrhoea and diarrhoea, Caprilon formula (Nutricia, Holland) was used which gave good to excellent results in improving fat malabsorption, ceasing the diarrhoea and increase of body weight.

MCT and low lactose milk formula may be recommended in treating LBW infants, next to overcoming other accompanying infections. (Suharjono et al., 1976).

(3). Use of a simple enterotest duodenal capsule to study upper intestinal microflora. Since 1974 there were reports on using enterotest duodenal capsule in the diagnosis of intestinal haemorrhage (Babb and Beal, 1974) and in the diagnosis of giardiasis (Thomas et al., 1974).

The preliminary study in 10 malnourished Indonesian children below 2 years of age (Gracey et al., 1976) has shown that the paediatric enterotest duodenal capsule can be used to study the upper intestinal microflora.

The paediatric Enterotest capsule**) consists of a number 1 size gelatin cap-

sule (20 mm × 6 mm) containing a silicone rubber bag.

Attached to the bag and packed into the capsule is a fine yarn line 90 cm long. The patient is asked to swallow a little water, then the capsule is introduced into the mouth while holding the free end of the line.

The patient is then asked to swallow a little more water. After the capsule has been swallowed the free end is taped to the cheek and the patient allowed to walk about with his parents. The gelatin dissolves and the weighted bag passes into the duodenum.

Our practice is to leave the capsule for 2 hours before withdrawal; in all instances the end of the line had reached the upper intestine by that time.

One patient pulled the line out after 30 minutes but even then the upper intestinal lumen has been reached. The line is withdrawn gently and usually about 50 cm of the distal end is bile stained; the pH can be checked with a pH stick which is provided and which leaves a colour which can be read off against a chart.

The intestinal secretions can be scraped off with a sterile glove and examined immediately under the microscope. Specimens were also collected for microbiological investigations.

Microbiological methods :

A throat swab was taken from each patient before the tube was swallowed.

**) Enterotest (TM) Health Development Corporation, Paolo Alto, California, United States of America.

After the line was withdrawn a small sample of intestinal secretion was scraped off with a sterile rubber glove and examined microscopically for parasites. A specimen of approximately 0.2 ml was then collected into 2 ml of transport medium (1.8 ml glucose broth and 0.2 ml glycerol) and immediately deep-frozen. Specimens were transported personally by air on dry ice to Australia where the microbiological studies were done. Specimens were plated aerobically and anaerobically on selective media and growth measured quantitatively as described previously (Gracey et al., 1973). Results of throat swabs were used to exclude artefactual contamination of intestinal specimens from above during collection. Results given refer only to specimens where such contamination was excluded.

Result

Trophozoites of *Giardia lamblia* were found by microscopy in the fresh smears from 2 patients, in more patients ascaris worms and eggs were found and in 3 patients profuse fungal mycelia were observed.

Large numbers (more than 10^5 /ml) of organisms were isolated from intestinal samples of 6 patients, in 3 others more than 10^4 bacteria/ml were grown.

Heavy growth of anaerobes occurred in 9 specimens while faecal bacteria were isolated in excessive numbers in 5 and enterobacteriae in 3 instances.

Cultures of intestinal samples showed that all except one of these patients had

microbial contamination of the upper gut similar to the results found in a similar group of patients in the same institution some years ago (Gracey et al., 1973).

The safety and simplicity of the method make it attractive. It has the added advantages over standard methods of intestinal intubation that it can be performed by relatively inexperienced operators and does not require radiological facilities. It should be useful in studying the human intestinal microflora in places where radiologic procedures is not available and could easily be used in field studies.

(4). Duovirus in Indonesian malnourished children..

Recently, arbovirus-like particles have been found in faecal specimens from children with acute gastroenteritis and it has been suggested that this is a major cause of diarrhoeal illnesses in children, especially in infants. Faecal specimens were examined by electron microscopy as described elsewhere (Bishop et al., 1974) from 19 Indonesian infants and children admitted to the Dr. Cipto Mangunkusumo Hospital, Jakarta. The ages of the patients ranged from 4 weeks to 18 months; all had acute enteritis and various degrees of protein calorie malnutrition.

Virus-like particles of 60 — 64 nm in diameter were found in specimens from 9 subjects out of the total 19 (see figures 1 and 2); bacteriophages were found in specimens from 5 other patients.

Acute diarrhoeal illnesses contribute substantially to the high mortality rates amongst children in the tropics. The present study is the first to document virus particles in faecal specimens from children in Indonesia (Gracey et al., 1975)

where malnutrition and diarrhoea remain important problems. This suggests that viruses may be important aetiological agents in diarrhoeal diseases of children in South-East Asia.

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