In the first group 4 (16.67%) cases were without diarrhea, and from these cases none (0%) had Giardia lamblia in their stools. From the 20 (83.33%) with diarrhea 15 (62.50%) of the stools were Giardia lamblia negative and 5 (20.83%) were Giardia lamblia positive. In the second group 13 (76.48%) had diarrhea, 4 (23.52%) out of them had no Giardia lamblia and 9 (52.96%) had Giardia lamblia in their stools.

When we observed the cases with positive Giardia lamblia in their stools, there were 2 (12.5%) without diarrheal symptoms and 14 (87.5%) with diarrhea.

**TABLE 3: The Lipiodol Absorption Test on the PCM with Giardia lamblia.**

<table>
<thead>
<tr>
<th>B.W.</th>
<th>Giardia lamblia (+)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>&gt;60%</td>
<td>5</td>
</tr>
<tr>
<td>II</td>
<td>&lt;60%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

In the first group 3 (60%) were lipiodol absorption test positive, it means there was no fat malabsorption; and 2 (40%) were lipiodol absorption test negative, it means there was fat malabsorption.

In the second group 2 (18.18%) cases were found with lipiodol absorption test positive and 9 (81.82%) cases with lipiodol absorption test negative. In all of them the stools were Giardia lamblia positive. When we observed all the 16 cases with positive Giardia lamblia in their stools, there were 11 (68.75%) with lipiodol absorption test negative.

**Discussion**

In the human body Giardia lamblia lives in the distal part of the duodenum and the proximal part of the jejunum (Hoskins et al., 1967; Barbieri et al., 1970; Kamath Murugasu, 1974; Ament, 1972; Barbezat et al., 1967; Belding, 1961). Giardia lamblia lives in the intervillus spaces and sticks on the surface of the villi with the sucking disk.

The pathogenesis of the Giardia lamblia is not understood clearly. Ament (1972) found that Giardia lamblia causes lesions in the mucosa of the jejunum.

**Original Article**

**Heparin in the Treatment of Cerebral Malaria**

*by*

M. MUNIR, H. TJANDRA, T.H. RAMPENGAN, I. MUSTADJAB and F.H. WULUR

(Department of Child Health, Medical School, Sam Ratulangi University/Gunung Wenuang Hospital, Manado)

**Abstract**

Cerebral episodes in malaria are considered to be due to thrombin in the cerebral capillaries. Heparin is beneficial in arterial thrombosis, not only on account of its anticoagulating property, but also by virtue of its slight vasodilating effect which promotes collateral circulation. Based on these, a study was undertaken with the objective of finding out the effect of heparin in the treatment of cerebral malaria.

Thirty-three cases admitted to the Child Health Department, Medical School, Sam Ratulangi University/Gunung Wenuang Hospital, Manado from July 1, 1973 until October 31, 1977 were divided into 2 groups: a study group receiving 300 u/kg bw/day of heparin either intramuscularly or intravenously for 3 consecutive days along with antimalarial drugs; and a control group receiving only antimalarial drugs.

Thirteen out of 17 patients of the control group succumbed (76.5%) as compared to 2 out of 16 patients of the heparin group (12.5%). This study shows that heparin seems to be of real benefit in the treatment of cerebral malaria in children, since not only the mortality rate reduced significantly but the general condition improved rapidly.

Received 7th. August 1979.
Introduction

Malaria constitutes one of main diseases in children. Repeated attacks may lead to severe anemia, wasting, stunted growth, enlargement of the spleen and nutritional disturbances. One of the most serious complications, which is almost always caused by Plasmodium falciparum infection, is cerebral malaria. In children the clinical manifestation can be very acute and rarely present as a classical picture.

The cerebral episode is thought to be due to cerebral intravascular thrombosis. Heparin, a well-known antithrombotic agent, has been considered effective in the prevention of capillary sludging and thrombosis (Smitskamp and Wolthuis, 1971).

The purpose of this study is to find out whether or not heparin is really useful in lowering the mortality of cerebral malaria in children.

Materials and methods

All patients admitted to the Child Health Department, Medical School, Sam Ratulangi University/Gunung Wenang Hospital, Manado from July 1, 1973 until October 31, 1977 with the diagnosis of cerebral malaria, were subjected to this study.

The diagnosis was based on the following criteria:

1. Hyperpyrexia.
2. Cerebral manifestations with or without convulsion, e.g.:
   a. disturbances of mental alertness: apathy to coma, excitement
   b. behavioral changes or psychotic syndrome
   c. convulsive seizures.

3. Negative cerebrospinal findings, e.g.: negative Nonne/Pandy reaction, normal cell count, normal glucose and protein content.

Patients showing abnormal cerebrospinal fluid findings were excluded from the study. Those fulfilling the above mentioned criteria were divided into 2 groups by labeling with a number according to the sequence of admission, an odd number being the control group and an even number the study or heparin treated group. There were totally 33 patients, 17 of them belonged to the control and 16 to the study group. Each group was given the same treatment and management except for the additional heparin in the study group. Details of this procedure has been previously described (Munir et al., 1976).

Results

Thirteen out of 17 patients of the control group succumbed as compared to 2 out of 16 of the heparin group. This gives a mortality rate of 76.5% and 12.5% respectively (Table 1). One of the heparin group patients’ death was due to severe anemia before blood transfusion could be given. And the other one was moribund when admitted.

The dose of the orally offered Lipiodol is 5 ml for patients with a body weight up to 10 kg, 0.5 ml/kg body weight for patients between 10 kg and 20 kg and 10 ml for patients above 20 kg.

The negative Lipiodol Absorption Test means: there is fat malabsorption.

The positive Lipiodol Absorption Test means: there is no malabsorption.

Results

Patients without steatorrhoea give a positive reaction (blue colour) due to iodine in up to 1/32 dilution of the urine. Patients with steatorrhoea give no reaction (no blue colour) in all dilutions or give only a positive reaction (blue colour) in undiluted (1:1) or up to 1:4 dilution of the urine.

From the 41 cases in this trial 24 were in the first group and 17 cases in the second group (Table 1). From the first group 5 (20.83%) had Giardia lamblia positive and 19 (79.17%) Giardia lamblia negative in their stools.

The difference in the two groups was statistically significant (p < 0.05).

<table>
<thead>
<tr>
<th>Group</th>
<th>B.W.</th>
<th>G.L. neg.</th>
<th>G.L. pos.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>&gt;60%</td>
<td>19</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>II</td>
<td>&lt;60%</td>
<td>6</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>25</td>
<td>16</td>
<td>41</td>
</tr>
</tbody>
</table>

It means: the more severe the PCM, the more positive Giardia lamblia in the stools is. Table 1 shows 16 (39.02%) stools with positive Giardia lamblia out of 41 cases.

Table 2: The Giardia lamblia examination on the stools of PCM children with and without diarrhea.

<table>
<thead>
<tr>
<th>Group</th>
<th>B.W.</th>
<th>Without diarrhea</th>
<th>With diarrhea</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>G.L. —</td>
<td>G.L. +</td>
<td>G.L. —</td>
</tr>
<tr>
<td>I</td>
<td>&gt;60%</td>
<td>4</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>II</td>
<td>&lt;60%</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>8</td>
<td>33</td>
<td>41</td>
</tr>
</tbody>
</table>
Introduction

Protein Calorie Malnutrition (PCM) is one of the 5 major diseases in Indonesian children with a high mortality rate (Djuned S. Pusponegoro, 1968; Poey Seng Hin, 1957). It is known that the etiology of the Protein Calorie Malnutrition is a.o. due to: poor social economic condition, ignorance in the sense of nutrition and chronic infection.

Beside these causes, there is a vicious circle between diarrhea and PCM (Gracey, 1977). Chronic diarrhea or recurrent diarrhea for a long period will result in pathological changes in the mucosa of the gastrointestinal tract (Suaharyo et al., 1971) which will further cause a malabsorption syndrome. Malabsorption syndrome for a long period will finally cause PCM (Suaharyono, 1974).

In our cases Giardia lamblia infection gave gastrointestinal symptoms, acute diarrhea, chronic diarrhea, fat and carbohydrate malabsorption (Hoskins et al., 1976; Barbieri et al., 1970; Bajoghi and Maleki, 1974). Sometimes Giardiasis does not show clinical symptoms (Cornier, 1959; Ament, 1972; Bancroft, 1974), so that Giardiasis is often not suspected.

The reasons for conducting this study are a.o. to investigate:
1. The correlation of Giardiasis and PCM.
2. The percentage of fat malabsorption in Giardiasis with PCM.

Material and method

Forty-one patients over 1 year of age with PCM and a body weight of less than 80% of 50 percentile of Harvard standard admitted to the Child Health Department of the Gadjah Mada Hospital in Yogyakarta from 1 April 1976 until 30 September 1976 were included in this trail. These patients were divided into 2 groups, i.e.:

Group I: consisting of patients with PCM and body weight more than 60% of the Harvard standard;

Group II: consisting of patients with PCM and body weight less than 60% of the Harvard standard.

The stools of the patients were examined on 3 consecutive days by the concentrated method of Faust (1964) in the Department of Parasitology, Medical School, Gadjah Mada University.

In the stools of the patients whose Giardia lamblia was positive, Lipiodol Absorption Test was done. Lipiodol Absorption Test is a screening method to determine fat malabsorption.

Lipiodol Absorption Test:

Lipiodol consists of poppy-seed oil with the addition of hydrodric acid oil containing 40% iodine. The amount of iodine in the urine reflexes the percentage of lipiodol absorption which in turn is an indication of the ability to absorb dietary fat, mostly "Long Chain Triglyceride" (LCT). The patients should not be on a restricted fat diet for 2 days prior to and on the day of testing.

Discussion

Sensorium disturbances and convulsions were the main features which brought our patients to the hospital. All showed mental disturbances ranging from lethargy to coma. Only a few showed excitement. Nineteen patients showed convulsive disorders either prior to admission or during hospitalization.

The pathogenesis of cerebral episodes has been described by Maegraith (1948) who considered anoxia to be of primary importance. This primarily effects the endothelial lining of capillaries and leads to increased permeability of the capillary wall and cell diapedesis. The fluid loss produces intravascular concentration of cells, agglutination and sludging which in turn lead to stasis and anoxia. A vicious cycle thus occurs. Sludging and thrombosis are found especially in the cerebral capillaries (Smitskamp and Woltthuis, 1971). This is in accordance with the opinion of Devakul et al., (1966), that intravascular coagulation may be important in producing intravascular changes in Plasmodium falciparum infection.

Smitskamp and Woltthuis (1971) believed that the benefit of heparin in preventing occlusion of cerebral capillaries by anticoagulation outweighs the risk of haemorrhage. This has also been stated by Devakul et al., (1966) and later suggested by Borochovitz et al., (1970) and Jaroonsama (1972). On the other hand, Howard and Collins (1972), based on their result in the absence of a controlled trial in man, stated that heparin therapy must be regarded as experimental in human malaria and potentially harmful. Adverse reactions by heparin in our study have not been encountered.

One of the causes of the death from cerebral malaria is severe anaemia and delay in giving blood transfusion (Munir et al., 1976). This was the case in one of our heparin group patients.

The significant difference in mortality (p<0.0001) between the 2 groups in this study revealed that heparin proved to be useful in lowering the mortality of cerebral malaria in children. Beside that the patient's general condition also rapidly improved.
REFERENCES


ORIGINAL ARTICLE

Giardiasis in Protein Calorie Malnutrition at Gadjah Mada Hospital, Yogyakarta

by

SOEHAJI, SOEPRAPTO, MOENGINAH P.A., ISMANGOEN; NOERHAYATI S* and SITI MUSTFIROH*

(From the Department of Child Health and Department of Parasitology*, Medical School, Gadjah Mada University, Yogyakarta)

Abstract

The study consisted of forty-one patients hospitalized at the Child Health Department of the Gadjah Mada Hospital in Yogyakarta: 24 children were suffering from PCM with a body weight of more than 60% of the Harvard standard and 17 children from PCM with a body weight of less than 60% of the Harvard standard.

The stools of these patients were examined for Giardia lamblia. The result was 16 (39.02%) positive. The Lipiodol Absorption Test of the patients with Giardia lamblia revealed:

1. 40% from the PCM with a body weight of more than 60% of the Harvard standard were negative.

2. 81.82% from the PCM with a body weight of less than 60% of the Harvard standard were negative.

The lower the nutritional status the higher the risk for Giardia infection.

Received 31st. July 1979.