Clinical Symptoms and Electrolytes Description of Children with Malaria: An Outpatient Setting in Kabupaten Mandailing Natal

Chairul Yoel

Department of Child Health, Medical School,
University of Sumatera Utara/H. Adam Malik Hospital, Medan, Indonesia

Abstract: Malaria can manifest in children with a wide range of symptoms. Instead, young children exhibit fever, gastrointestinal symptoms such as diarrhea, irritability, and respiratory symptoms. Hyponatremia, hypokalemia, and hypercalcemia may be seen in these patients. We undertook a study of malaria cases of an out patient setting in Kabupaten Mandailing Natal, looking into their demographic, clinical profiles, and electrolytes measurements. Venous blood was collected from the study subjects three milliliter to assess electrolyte. Analysis for baseline s characteristics data, symptoms and electrolytes with descriptive statistics. The concentration of plasma electrolytes was in normal limit so that our study had suggested that is unnecessary to perform electrolyte concentration in outpatient children with malaria.
Keywords: malaria, electrolytes, clinical symptoms of malaria

Abstrak: Gejala malaria pada anak dapat timbul dengan berbagai gejala klinis. Pada anak keluhan yang sering adalah demam, gejala gastrointestinal seperti diare, iritabilitas, dan gangguan pernapasan. Hiponatremia, hipokalemia, dan hiperkalsemia dapat terjadi pada penderita malaria. Kami melakukan suatu studi pada kasus malaria pasien rawat jalan di Kabupaten Mandailing Natal untuk mengetahui data demografi, gambaran klinis, dan pemeriksaan elektrolit. Analisa data karakteristik dasar, gejala klinis, dan elektrolit menggunakan statistik deskriptif. Konsentrasi elektrolit plasma berada dalam batas normal,oleh karena itu hasil dari studi ini menyarankan bahwa tidak dibutuhkan pemeriksaan elektrolit pada penderita malaria yang rawat jalan.
Kata kunci: malaria, elektrolit, gejala klinis malaria

INTRODUCTION

Malaria remains a major health problem for children in tropical areas of the world. There are an estimated 300-500 million cases of malaria each year, with 1,5 to 2,7 million deaths annually (World Health Organization, 1997). The diagnosis of malaria is commonly considered in patients who live and are cared for in malaria endemic areas, although it is an unusual cause of illness in children returning from the tropics.[1]

Malaria can manifest in children with a wide range of symptoms. Clinical diagnosis is unreliable, and blood smears or alternative diagnostic tests must be performed. A majority of children do not present with severe disease. Instead, young children exhibit fever, gastrointestinal symptoms such as diarrhea, irritability, and respiratory symptoms.[1,2] Hyponatremia, hypokalemia, and hypercalcemia may be seen.[3]

Even if optimal treatment is available, mortality rates remain high once the patient develops severe disease. Prevention strategies and early diagnosis and treatment with effective antimalarial drugs in the public health sector are therefore equally important.[4]

We undertook a study of malaria cases of an out patient setting in Kabupaten Mandailing Natal, looking into their demographic, clinical profiles, and electrolyte measurements. A cross sectional study was

conducted on October 2004 in Panyabungan Jae and Siabu district, a malaria endemic area at Kabupaten Mandailing Natal.

METHODS

A cross sectional study was conducted on October 2004 in Panyabungan Jae and Siabu district, a malaria endemic area at Kabupaten Mandailing Natal. All children aged less than 15 years who presented to the health center were screened for the study. A finger stick blood sample was taken from children. Children with positive Plasmodium falciparum were considered eligible for inclusion criteria. Exclusion criteria included refused to participate and hospitalized patient.

Venous blood was collected from the study subjects three ml to assess electrolytes. We also assessed body weight with MIC weighing-machine (sensitivity 0.5 kg) and body height also with MIC (sensitivity 0.5 cm). Nutritional status measured with standardized anthropometry according to CDC NCHS-WHO 2000.[6]

Subjects were collected by consecutive sampling and we used SPSS for WINDOWS 10 (SPSS Inc, Chicago) for all statistical computations. Analysis for baseline characteristics data, symptoms and electrolytes with descriptive statistics.

RESULT

Seventy seven children were assigned to the study based on positive blood smear. Thirty six point four percent of them were < 5 years of age and 59,1% were boys (Table 1).

Pallor was the commonest symptom (68,8%), followed by fever and headache (64,9%). In addition, shivering (55,8%) and nausea (54,2) also occur in some of the patiens (Table 2).

The concentration of plasma electrolytes are shown in Table 3. The mean (SD) concentrations of sodium, potassium, and chloride was in normal limit.

Table 1.
Baseline characteristics

Karakteristik	n (%)
Age (year)	
< 5	16 (36.4)
5 - < 10	15 (34.1)
10 - < 15	13 (29.5)
Sex	
Boy	26 (59.1)
Girl	18 (40.9)
Nutritional Status	
Severe Malnutrition	1 (2.3)
Moderate Malnutrition	4 (9.1)
Mild Malnutrition	9 (20.5)
Normal	24 (54.5)
Overweight	6 (13.6)

Table2.
Symptoms of malaria

Symptoms	Number of cases	Frequency	%
Fever	77	50	64,9
Headache	77	50	64,9
Shivering	77	43	55,8
Nausea	77	42	54,2
Epigastric pain	77	24	31,2
Vomits	77	29	37,7
Pallor	77	53	68,8
Diarrhea	77	20	26,0

Table 3.
Electrolytes measurements

Electrolytes	Mean (n=77)	SD
Sodium	138,3	3,2
Potassium	4,1	0,6
Chloride	108,2	3,3

DISCUSSION

Malaria is the major cause of mortality and morbidity in the tropical and sub tropical regions in the world. An estimated 300-500 million persons suffer from malaria every year and more than 1 million die each year. [3] P. falciparum is the species most commonly associated with severe and complicated disease.[2]

Infections lead to growth faltering and malnutrition by causing anorexia, loss of nutrients, changes in metabolism, malabsorbtion, and changes in feeding practices. Conversely, protein-energy malnutrition and deficiency in micronutrients such as iron, vitamin A and zinc are known to adversely affect immunity.[7] According to Shankar AH et al. (2000), several cross-sectional surveys also favor a synergistic relationship between malnutrition and malaria. Study in Malawi, Zambia, Papua New Guinea, Sudan, Tanzania, Chad and Zaire indicate greater risk for infection, malaria illness, or spleen enlargement among malnourished children.[8] Most of children in our study had normal nutritional status as express by anthropometry at baseline.

Generalized constitutional symptoms include fever, chills, dizziness, backache, myalgia, malaise, and fatigue. Gastrointestinal symptoms (i.e. anorexia, nausea, vomiting, abdominal pain, and diarrhea) can be prominent, causing confusion with gastroenteritis. Young children and semi immune adults may present with only fever and headache. [2,5] Uncomplicated malaria usually presents as fever, headache, dizziness, and arthalgia. Gastrointestinal symptoms may predominate and include anorexia, nausea, vomiting, and abdominal discomfort or pain that may mimic appendicitis.[9,10] In this study, pallor was the commonest symptom, followed by fever and headache, shivering and nausea, epigastric pain, vomits, pallor and diarrhea.

Fryatt RJ, et al (1989) suggested that the mild hyponatraemia sometimes seen in the acute stages of malaria is not related to inappropriate secretion of vasopressin, although this condition may be of importance in more severe cases of hyponatraemia.[11]

Maitland K, et al (2005), describe changes in potassium, calcium, magnesium, and phosphate levels in 56 Kenyan children (42 who survived and 14 who died) admitted to the hospital with clinical features of severe malaria (impaired consciousness or deep breathing) complicated by acidosis (base deficit, >8 mmol/L). At admission to the hospital, hyperkalemia may complicate cases of acidosis due to severe malaria and is associated with high, early mortality. After admission, mild asymptomatic deficiencies in magnesium and phosphate levels were common but were not associated with any deleterious effect.[12] The concentrations of sodium, potassium, and chloride was in normal limit in this study.

The limitation of this study, we did not count the parasitemia from blood smear to differentiate the severity of malaria. Further studies are needed to determine the relation between the severity of malaria with electrolyte concentration in both hospitalized and outpatient.

To summarize, our study had suggested that is unnecessary to perform electrolyte concentration in outpatient children with malaria, beside that the limitation of cost and measurement availability are usually occur at developing countries.

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