

SERUM PROTEIN FRACTIONS OF NIGERIANS WITH PLASMODIUM INFECTIONS: ILORIN EXPERIENCE.

*Adebisi S.A., Soladoye A.O., Adekoya D., Odunkanmi O.A.

[†]Department of Chemical Pathology and Immunology,

[‡]Department of Human Physiology and Biochemistry, Faculty of Health Science, University of Ilorin, P.M.B. 1515, Ilorin.

Malaria fever is a very common and often severe disease in the tropical countries like Nigeria. Measurement of serum proteins is simple and widespread in developing countries. Thus this study aimed at evaluating the relationship (if any) between plasmodium infection and serum protein. A total of 80 subjects were used for this study, 40 people with confirmed plasmodium infection, and 40 clinically healthy adults as control subjects. Their height, weight, age and sex were recorded. Their serum total protein and albumin were assayed while the serum globulin was obtained from the difference.

We obtained a mean BMI of 20.0kg/m² for the control subjects and 21.63kg/m² for patients with plasmodium infection. The serum total protein was 71.25g/L and 60.43g/L for the control and malaria patients respectively. With (P<0.05) and T-value of 6.4, the serum albumin value was 44.24g/L and 36.66g/L for the control and the patients respectively with (P<0.05) and T-value of 6.5, the value for the serum globulin was 27.03g/L and 23.77g/L for the control and the patients respectively with (P<0.005) and T-value of 3.1, these results show that the serum total protein, albumin and globulin are all significantly higher in control subjects.

We conclude therefore that haven't established the existence of these significant differences, we suggest that further studies be done

INTRODUCTION

The protein fractions in the blood are commonly estimated in the serum and does not include fibrinogen that will be precipitated when the blood clots. The main serum protein are albumin and globulin. The total serum protein averages 63.86g/L; albumin 34.53g/L; the remainder being globulin (1). Various biochemical changes are observed in disease condition. It is a known fact that, many disease conditions involved among other things, derangement of protein metabolism.

Understanding the importance of adequate protein in the blood and the high prevalence of certain disease condition in this environment no doubt opens the gate toward the research work. Malaria fever is a very common and severe disease in our immediate environment. The morbidity and mortality resulting from plasmodium infection cannot be over emphasized in a topical country like Nigeria (2).

The importance of establishing the basic bio-chemical data in a particular center in normal subjects for the purpose of comparison in disease states is well established (3). Various biochemical changes are observed in malaria which include inhibition of mitochondrial electron transport activity, change in various serum lipid fraction, serum C-reaction and Amyloid-A-proteins (4,5). There are also reported changes in serum and urinary electrolytes (6). It is quite displeasing that no readily available comprehensive report on the serum protein changes in malaria is available. These findings then raise some vital questions. What is the effect of malaria on principal serum proteins? What

is the usefulness of changes in serum protein levels, if any in assessing the severity of malaria. Therefore the present study was designed to answer these questions.

MATERIALS AND METHOD

This research was carried out in the Chemical Pathology department of University of Ilorin Teaching Hospital (UTH). A total of 80 subjects made up of males and females were used for this study. 40 clinically healthy members of University of Ilorin community comprising of 25 males and 15 females were used as control for this study. These control subjects were not on drug, no recent report of illness or chronic diseases, obese subject were not used. 40 patients with confirmed plasmodium infection were randomly selected from the general Out Patient department f UTH. Fluid was allowed freely. The height and weight of each subject were recorded in meter and kilometer respectively.

About 5ml of venous blood was collected from the antecubital area of each subject without stasis. The blood was allowed to clot and retract before serum was separated into clean covered bottles. The analysis were done on the same day of sample collection. Total protein was determined by the Chemical Biuret method (7). Serum albumin was determined by bromocresol green-dye-binding method. Serum globulin level was determined by subtracting serum albumin from total protein.

Data obtained from this research was grouped and analyzed in a tabular and graphical form using Microsoft excel 2000. The data were presented as mean +SEM statistical analysis was by the unpaired student t-test. Differences were considered significant at P<0.05.

* Corresponding Author

RESULT

Table I shows that the values of the mean weight and mean height of both the control subjects and the patients with confirmed plasmodium infection. The average weight of the control subjects was 58.kg while their mean height was 1.71m. for the patients with confirmed malaria infection the average weight was 64kg while their mean height was 1.72m. there was no significant difference in either their weights or in their heights ($P>0.05$). The mean Body Mass Index (BMI) for the control group was 20.01kg/m² while the the corresponding value for patients with malaria was 21.63kg/m²

Table II shows the values of different protein fractions of the control subjects and patients with malaria. From this table the mean total protein value for the control subjects was 71.25g/L compared to the value of 60.43g/L for patients with malaria. The difference between these values is significant ($P<0.05$). the mean serum albumin for the control subjects was 44.24g/L while the corresponding value for patients with malaria was 36.66g/L. The difference between these values is also significant ($P<0.05$). The mean serum globulin for the control subjects was 27.03g/L, while the corresponding value for the malaria patients was 23.77g/L, the difference between these values is also significant ($P<0.05$). These shows that there exist a statistically significant difference between the two groups.

	Mean Weight (kg) (SEM)	Mean height (M) (SEM)	BMI (kg/ m ²)
CONTROL n = 40	58.5 (±1.2)	1.71 (±0.01)	20.01
MALARIA n = 40	64.0(±1.08)	1.72 (±0.01)	21.63
P. Value	0.095	0.105	0.780

TABLE 1
ANTHROPOMETRIC DATA OF CONTROL SUBJECTS AND THOSE WITH CONFIRMED PLASMODIUM INFECTIONS

	Control			Malaria Patients			T- Value	P- value
	Mean	SD	±SEM	Mean	SD	±SEM		
TOTAL PROTEIN g/L	71.27	6.00	0.95	60.43	8.86	1.40	6.4	<0.05
ALBUMIN g/L	44.24	3.89	0.62	36.66	6.28	0.99	6.5	<0.05
GLOBULIN g/L	27.03	5.04	0.80	23.77	4.20	0.66	3.1	<0.05

TABLE 2
THE VALUES OF DIFFERENT PROTEIN FRACTIONS OF THE CONTROL SUBJECTS AND PATIENTS WITH MALARIA

DISCUSSION

Malnutrition is a common problem in the tropics. However, the Body Mass Index obtained from this study clearly shows that the result of serum protein analysis for the patients with plasmodium could not be traced to malnutrition. The result obtained showed derangement in all the protein fractions of malaria patients compared to the control subject.

The mean total protein of 71.27g/L in control subjects compared to malaria patients of 60.43g/L show significant difference in the mean total protein ($P<0.05$). This is in agreement with report of Edozien et al (8). Anorexia often occur in majority of malaria patients, this might lead to rapid gluconoeogenesis and so protein stores may suffer depletion. In addition Edozien et al reported that the anti-malaria drugs used by the malaria patients affects the protein constituents of the blood by decreasing the protein fractions of malaria patients.

In the albumin fraction the result obtained indicated higher mean albumin value in control subjects (44.24g/L) compared to patients with malaria (36.66g/L). The difference between these values is significant ($P<0.05$). The study further

revealed that the difference between serum albumin is more significantly different than that between the serum total proteins. This is in agreement with earlier reports (9, 10, 11).

Also in the globulin fractions, the result obtained showed a greater mean globulin in control subjects (27.03g/L) when compared to malaria patients' globulin (23.03g/L). This result agrees with earlier work (1,8). Also this study revealed that serum globulin is the less affected compared to serum albumin. Edozien et al in their work documented that prophylactic doses of anti-malaria drugs cause lower mean serum globulin concentration. However the issue of hepatic involvement in plasmodium infection leading to decrease production of the other non-gamma globulin cannot be totally ruled out.

We conclude that all serum protein fractions are significantly low in plasmodium infection and suggests that more work be done to determine the values of serum fractions in patient with plasmodium at various levels of severity with a view to determine the prognostic value of serum protein in plasmodiasis.

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