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THE INFLUENCES OF SERUM LIPIDS LEVEL ON SOME HEMATOLOGICAL PARAMETERS AMONG SUDANESE PATIENTS WITH SICKLE CELL DISEASE

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Abstract

Background:
The search for sickle cell disease (SCD) prognosis biomarkers is a challenge. These markers identification can help to establish further therapy, later severe clinical complications and with patients follow-up. We attempted to study a possible involvement of plasmalipid level in steady-state children with SCD, once that this lipid marker has been correlated with hematological parameters .

Methods:
We prospectively analyzed plasma lipid profile and hematological biomarkers of 50 steady-state infants with SCD in Sudan, Khartoum state mindary BA88A made in china . Clinical data were collected from patient medical records.

Results:
This study was done to determine the plasma lipid profile in sickle cell anaemia patients. Fifty sickle cell anemia (HbSS) patients aged 9-17 years were used for the study. The plasma cholesterol (172.9±30.2 mg/dl) in sickle cell anemia were significantly decreased ($p<0.05$) when Also the serum high density lipoprotein cholesterol (HDL-C) and low density lipoprotein cholesterol in sickle cell anaemia (65.0±31.0 mg/dl and 68.0±14.9 mg/dl) were significantly decreased ($p<0.05$). There is no significant variation in the mean level of triglyceride in sickle cell disease.
This result shows that sickle cell disease patients are not prone to coronary heart disease.

Conclusions:
We hypothesize that some SCD patients can have a specific dyslipidemicsubphenotype characterized by low HDL-C with hypertriglyceridemia and high VLDL-C in association with other biomarkers, including those related to inflammation. This represents an important step toward a more reliable clinical prognosis.

Keywords: Biomarkers, Including those Related , Inflammation, Triglycerid

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INTRODUCTION

Sickle cell disease (SCD) clinical outcomes vary widely from mild to severe and the disease has been associated with multi-organ damage and risk of early mortality (Ohene-Frempong and Steinberg, 2001; Stuart and Nagel, 2004) Acute and chronic clinical manifestations of SCD include vaso-occlusive pain episodes (VOE), impaired blood flow as a result of intravascular sickling in capil-laries and small vessels, inflammation processes and high susceptibility to infection. Researchers have found a complex network of associations among laboratory analyses and clinical events predicting a probably risk of death (Ohene-Frempong and Steinberg, 2001; Nagel and Platt, 2001; Sebastiani *et al*., 2007). The sickle cell disease vaso-occlusive phenomenon has been described as a complex event with the participa-tion of stressed sickled erythrocytes, leuko-cytes, platelets and endothelium activation (Stuart and Nagel, 2004; Okpala, 2004; Telen, 2007; Villagra, 2007; Johnson and Telen, 2008). Reactive oxygen species (ROS), scavenger molecules and nitric oxide (NO) play important roles as regulators of vascular homeostasis in SCD pathogenesis (Gladwin, 2003). Several biomarkers have been associated with SCD clinical prognosis; some, such as fetal hemoglobin (HbF) concentration, leukocytes count and reticulocyte count are considered to be classic (Stuart and Nagel, 2004; Okpala, 2004) Recently, serum lactate dehydrogenase (LDH), a well-known marker of intravas-cular hemolysis, was described as a biomarker of prog-nosis in SCD (Kato *et al*., 2006) It has been associated with nitric oxide resistance, priapism, leg ulceration, pulmonary hypertension, and death in SCD patients (O'Driscoll, 2007).

Objectives

The purpose of this study was to aimed at evaluating the impact of changes in lipid profile on the complete blood count

in sickle cell disease patients (SCD) patients referring to soba hospital.

MATERIALS AND METHODS

Total of 50 steady-state SCD children from Khartoum city, in Sudan were prospectively analyzed for laboratory (biochemical and hematological) markers.The study was conducted from December 2014 to January 2015 were enrolled to participate in this study.2.5 mL blood sample was collected from each subject into lithium heparin containers during the period of steady state. The serum was separated and stored at −20°C on the day of collection until analysis for estimation of lipid profile which was measured using mindray BS (200) made in china , Another 2.5 mL of blood was collected in EDTA for determination of Hematological parameters .

Statistical Analysis

Data of this study was analyzed by statistical package for social sciences (SPSS). Correlation between lipid profile and hematological parameter's and quantitative variable were tested by anova test.

Ethical considerations

This study was approved by the faculty of medical laboratory sciences, Al neelainUniversity , and informed consent was obtained from each participant before sample collection .

RESULTS

50 Sudanese patients diagnosed with Sickle cell anemiincluded in this study , The statistical analysis showed that theHb(Mean± SD: 7.28 ±1.56), PCV (Mean± SD: 20.7 ±4.13) , RBC (Mean± SD: 2.78 ±.864) , MCV (Mean± SD: 81.3 ±8.79) , MCH (Mean± SD: 27.2 ±3.17) , MCHC (Mean± SD: 33.4 ±2.64) , WBC(Mean± SD: 19.6 ±10.2) , Platelets (Mean± SD: 430.5 ±162.6) serum cholesterol (Mean± SD: 172.9 ±30.2), LDL(Mean± SD: 68.0 ±14.9)and HDL(Mean± SD: 65.0 ±31.0)were significantly decreased ($p<0.05$). Serum triglyceride(Mean± SD: 197.6 ±70.3) was not statistically different .In our study, it was observed that the plasma LDL-cholesterol was significantly . This is also consistent with the previous work of Saha and Samuel (1982).

DISCUSSION

Sickle cell disease is disease of red blood cell that is passed from a parent to a child. It could be from parents to children. Individuals with sickle cell disease have red blood cells with haemoglobin which is different from normal haemoglobin (Luzzato, 1981). When a red blood cell containing sickle haemoglobin gives up its oxygen to the tissues it changes from its usual doughnut shape to sickle shape and becomes stiff rather than soft and flexible like normal red blood cells. The abnormal viscoelastic properties of oxygenated sickle cell erythrocytes and formation of irreversibly sickled erythrocytes are related to abnormal properties of their membrane which affect the plasma lipid profile.In this study, it was observed that serum cholesterol in sickle cell disease was significantly decreased when compared with the control.

This is consistent with the work of Ugonabo *et al*. (2007) in which serum cholesterol was lower in sickle cell anaemia. Hashmi and Nishat (1982) have earlier observed a low cholesterol in sickle cell anaemia. The decrease in plasma cholesterol could be that the "sickled cell" gets stuck in the tiny blood vessels blocking the flow of blood and causing pain. This condition probably could reduce the circulating cholesterol and hence low cholesterol level.Also it was observed that there was no significant difference in triglyceride of sickle cell disease subjects when compared with the control. This is in line with the work of Ngonabo *et al*. (2007). Triglyceride is mainly used in diagnosis and treatment of patients with diabetes, nephrosis, liver obstruction and other disease involving lipid metabolism. Similarly, the plasma high density lipoprotein cholesterol was depleted in sickle cell disease when compared with the control. The low HDL-C level seen in sickle cell patients would be expected to predispose them to increase risk of coronary heart disease. This is in line with the work Saha and Samuel (1982). HDL cholesterol is inversely related to the risk of developing coronary artery disease. The higher the HDL-C the less chance of developing coronary heart disease.

From this study, it was observed that the serum LDL-cholesterol was significantly decreased. This is also consistent with the previous work of Saha and Samuel (1982). The low level of LDL-cholesterol is highly desirable to the body. The low plasma lipid profile observed in this study could probably be due to the fact that sickle cells get stuck in the blood vessels and cannot re-circulate through the body so that the number of circulating blood cells reduces and individual becomes anaemic and hence low plasma lipid profile.

Conclusion

It could be noted from the result that sickle cell disease patients may not be prone to coronary heart disease. Also, it could be inferred that plasma cholesterol is not a contributory factor to congestive heart failure.

REFERENCES

Gladwin, M.T., Crawford, J.H. and Patel, R.P. 2003. Serial review: Biomedial implications for hemoglobin interactions with nitric oxide. Free Radical Biology and Medicine, 36:707-717.

Johnson, C. and Telen, M.J. 2008Adhesion molecule and hydroxyurea in the pathophysiology of sickle cell disease. Hematologica, 93:481-486.

Kato, G.J., McGowan, V., Machado, R.F., Little, J.A., Taylor, J., Morris, C.R., Nichols, J.S., Wang, X., Poljakovic, M., Morris, S.M. Jr, Gladwin, M.T. 2006. Lactate dehydrogenase as a biomarker of hemolysis-associated nitric oxide resistance, priapism, leg ulceration, pulmonary hypertension, and death in patients with sickle cell disease. Blood, 107:2279-2285.

Nagel, R.L. and Platt, O.S. 2001. General pathophysiology of sickle cell anemia. In Disorders of Hemoglobin: Genetics, In Pathophysiology, and Clinical Management. Edited by: Steinberg MH, Forget BG, Higgs DR, Nagel RL. New York: Cambridge University Press;494-526.

O'Driscoll, S., Height, S.E., Dick, M.C., Rees, D.C. 2007.

Serum lactate dehydrogenase activity as a biomarker in children with sickle cell disease. *Br. J. Haematol*, 140:206 -2009.

Ohene-Frempong, K. and Steinberg, M.H. 2001. Clinical Aspects of sickle cell anemia in adults and children. In Disorders of Hemoglobin: Genetics, In Patophysiology, and Clinical Management. Edited by: Steinberg MH, Forget BG, Higgs DR, Nagel RL. New York: Cambridge University Press;611-70.

Okpala, I. 2004. The intriguing contribution of white blood cells to sickle cell disease- a red cell disorder. Blood Reviews, 18:65-73.

Sebastiani, P., Nolan, V.G., Baldwin, C.T., Abad-Grau, M.M., Wang, L., Adewoye, A.H., McMahon, L.C., Farrer, L.A., Taylor, J.G., Kato, G.J., Gladwin, M.T. and Steinberg, M.H. 2007. A network model to predict the risk of death in sickle cell disease. Blood, 110:2727-2763.

Stuart, M.J. and Nagel, R.L. 2004. Sickle cell disease. Lancet, 364:1343-60.

Telen, M.J. 2007. Role of adhesion molecules and vascular endothelium in the pathogenesis of sickle cell disease. Hematology Am Soc of HematolEduc Program 2007 84-90.

Villagra, J., Shiva, S., Hunter, L.A., Machado, R.F., Gladwin, M.T., Kato, G. 2007. Platelet activation in patients with sickle cell disease, hemolysis-associated pulmonary hypertension, and nitric oxide scavenging by cell-free hemoglobin. Blood, 110:2166-2172.

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