Status of Antioxidants Vitamin and Plasma Malondialdehyde (MDA) in Sickle Cell Anaemia Patients of Chhattisgarh Region

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ABSTRACT

Background: Sickle cell spontaneously generates approximately two times more amount of reactive oxygen species. Lipid per oxidation has a major role in the pathophysiology of sickle cell anaemia, this may overwhelm the antioxidant defence system. Therefore, the study was undertaken to evaluate the levels of plasma Malondialdehyde (MDA), and antioxidants vitamins.

Material and Method: The present study was carried out in the Department of Biochemistry, Chhattisgarh Institute of Medical Sciences, Bilaspur, Chhattisgarh. Total eighty subjects were age between 15-35 years both male and female was selected for this study.

Results: We found significantly (P<0.001) elevated plasma MDA level and the antioxidant vitamin level were reduced significantly (P<0.001) in homozygous sickle cell cases as compared to controls.

Conclusions: These observations provide the evidence of imbalance between oxidant and antioxidant status leading to chronic oxidative stress. Therefore supplementation with antioxidants vitamin may ameliorate some of the sickle cell symptoms and improve quality of life.

Keywords: MDA - Malondialdehyde, SCA - Sickle cell Anaemia, Antioxidants

INTRODUCTION

Sickle cell anaemia results from a point mutation in the genetic code such that glutamic acid is replaced by valine at 6th position of β-globin chain of haemoglobin (Hb). This substitution transforms normal adult haemoglobin (Hb A) into sickle haemoglobin (HbS). In a low oxygen tension environment, the replaced valine can bind to a complementary hydrophobic site on beta subunits of another haemoglobin tetramer in a polymerization process that leads to the sickling of the red blood cells (RBCs)[1]. Sickle cell spontaneously generates approximately two times more amount of reactive oxygen species [2].

A high production rate of reactive oxygen species in Sickle cell disease caused by several factors such as chronic inflammation, intravascular haemolysis, ischaemia reperfusion injury [3]. The reactive oxygen species can attack erythrocytes membranes directly, causing alteration in lipid and protein structure that may ultimately result into haemolysis due to instability of Haemoglobin S result in generation of superoxide (O2-) and hydrogen peroxide (H2O2) the combination of which potentially form the hydroxyl radical (OH) [4].

Under normal condition there is a balance between the ROS and the defence system of antioxidants, thereby preventing or limiting oxidative damage, further in sickle cell disorder the Haemoglobin-stabilising capacity is also impaired making the RBC even more vulnerable to oxidative stress. This may overwhelm the antioxidant defence system [4].

The exogenous antioxidants are mainly vitamins which play a an essential role in antioxidant defence system [5]. Vitamin E & C have protective role against...
LEVELS OF UREA, CREATININE AND URIC ACID IN CHILDREN WITH SICKLE CELL ANEMIA


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Introduction: Uric acid is the end-product of purine metabolism in man and is derived from the catabolism of nucleic acids. Some uric acid is also produced during the synthesis of nucleotides. Sickle cell disease (SCD) is clinically one of the most important haemoglobinopathies. Erthrocytes containing mainly haemoglobin “S’ have a short life span. It would be expected that during enthropoiesis increased Synthesis of nucleic acid might occur, thus the destruction of red blood cells lead to increased nucleic acid degradation. which means that lysis of red cells in person with sickle cell disease does liberate the uric acid content in the cell. Hyperuricemia was encountered in several studies on sickle cell disease patients.

Material and methods: The present study was carried out on 60 cases of sickle cell anaemia attending the sickle cell training & research centre, Department of Biochemistry at Chhattishgarh Institute of Medical Sciences, Bilaspur (C.G.). All cases of sickle cell anaemia were confirmed by haemoglobin electrophoresis. Out of the 60 cases, 38 were heterozygous (20 males and 18 females) and were 22 homozygous (12 males and 10 females). A total number of 30 healthy, age and sex matched controls were also chosen for the study. Homozygous cases belonged to the age group 3-15 years while heterozygous cases and controls were between the age group of 3-13 years. Homozygous patients with history of blood transfusion within past 3 months were excluded from the study.. All subjects were from milliliters of blood was drawn in EDTA tubes by veinpuncture. The plasma separated from the blood by centrifugation was used, in duplicates, for the estimation of uric acid, urea and creatinine as by using standard kit methods..

Result: The uric acid level was elevated in sickle cell patients as compared with the normal control group. The 95% confidence intervals for differences in the mean of the two groups: HbAA vs. HbAS was 4.22 (0.3), while for HbAA for HbSS was 3.4 (0.06), both being statistically highly significant p<0.0001]. Urea and creatinine levels were considerably lower in the sickle cell disease patients. The difference in the patient’s mean for urea compared to the mean in the normal group (HbAA) was 9.64 (1.95) and 8.55 (1.76) for HbSS and HbAS, respectively. Likewise, the difference in the mean for creatinine in HbSS group was 0.71 (0.12) and in HbAS was 0.76 (0.1 2), which was statistically significant [p<0.0001].

Conclusion: The results showed that the uric acid levels were increased while urea and creatinine levels were significantly decreased in the sickle cell group patients as compared with their age and sex-matched controls. Raised serum uric levels were found in children with sickle cell disease. Clearance test studies are important to be carried out on these patients as well as with other age groups for the evaluation of their renal function.
**ACBICON 2013 | POSTER ABSTRACTS**

**Introduction:**
Recombinant human erythropoietin (rhEPO) and intravenous iron sucrose infusion are commonly used in patients with maintenance hemodialysis for the correction of iron deficiency anemia. Iron sucrose may lead to release of non-transferrin bound iron (NTBI) in blood leading to raise in oxidative stress. The objective of the present study is to measure the amount of NTBI in stable patients on maintenance hemodialysis treated with increasing dose of intravenous iron infusion.

**Methods:**
A total of 30 stable patients on maintenance hemodialysis (mean age 43.6 ± 15.05) having serum ferritin <500 ng/ml, transferrin saturation <20% were included for this study. Each patient received 50, 100 and 200 mg of intravenous iron sucrose; these being at least a 10 day interval between each infusion. Blood samples were collected for NTBI before iron sucrose infusion and subsequently at 30 minutes, 2 hours, 4 hours, 6 hours, 24 hours and 48 hours after the infusion. Serum total iron, TIBC, transferrin saturation & ferritin was measured at baseline, 6 hours and 48 hour blood samples. Area under the curve (AUC) for NTBI was calculated based on the 7 samples.

**Results:**
The mean dialysis duration in the study population was 8.63 ± 9.74 months. The mean area under curve (μmol/hr/L) for NTBI were 470.95 after 50 mg iron sucrose infusion, 902.25 after 100 mg and 1798.69 after 200 mg infusion.

**Conclusion:**
Intravenous iron sucrose infusion led to release of NTBI in a dose dependent manner. Increasing doses of iron infusion resulted increase in the median AUC for NTBI. Though the study did not have any other indicator of oxidant stress or any clinical evidence of toxicity we believe iron-sucrose may have a potential for oxidant injury.

**TOTAL ANTIOXIDANT CAPACITY AND ANTIOXIDANT ENZYMES IN SICKLE CELL ANAEMIA PATIENTS OF CHHATTISGARH REGION**

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**Background**
Sickle cell spontaneously generates approximately two times more amount of reactive oxygen species. Lipid per oxidation has a major role in the pathophysiology of sickle cell anaemia, this may overwhelm the antioxidation defence system. Therefore, the study was undertaken to evaluate the levels of antioxidant enzyme and total antioxidant capacity in Sickle cell anemia patients.

**Material and Methods**
The present study was carried out in the Department of Biochemistry, Chhattisgarh Institute of Medical Sciences, and Bilaspur (C.G.). Total ninety subjects were age between 15-40 years both male and female was selected for this study.

**Results**
We found significantly (P<0.001) decreased antioxidant enzymes activity and total antioxidants capacity were reduced significantly (P<0.001) in HbSS as compared to Hb AS and HbAA.

**Conclusion**
These observations provide the evidence of imbalance between oxidant and antioxidant status leading to chronic oxidative stress. Therefore supplementation with antioxidants vitamin may ameliorate some of the sickle cell symptoms and improve quality of life.

**Key word**
SCA – Sickle cell Anemia, Antioxidants, TAC – Total antioxidant capacity
POSTER PRESENTATIONS

It is an opportunistic human pathogen which causes to hyphal transition and secretion of hydrolytic enzymes of infection process. Attraction of these virulence mechanisms will assist to develop novel antifungal therapy. Aim of the study: This study investigates the essential oil component of basil, production of protease and phosphatase and the morphological transition of Candida Albicans from yeast to hyphal form. This opportunistic pathogenic fungus was isolated from major infection sites from infected patients. Methods: Out of forty three screened C. Albicans isolates of twenty nine strains including two standard laboratory strains were strongly producers of protease and phosphatase. The isolates were exposed to sub inhibitory concentrations of test compounds and yeast to hyphal transition, protease and phosphatase production was assessed. The results were analyzed using Student’s t-test. Unilanol inhibited the morphological transition of C. Albicans and had significant effect on proteinase and phosphatase production. Conclusions: Unilanol inhibited the initial steps of infection process of C. Albicans. Significance and Impact of Study: Unilanol has a therapeutic potential even at sub inhibitory concentrations and presents study advocates the determination of its optimal concentrations for clinical applications also.

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EVALUATION OF AN ENZYMATIC METHOD AND KINETIC JAFFE’S METHOD FOR DETERMINING CREATININE IN SERUM

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Aim: To assess performance characteristics and practicability of an enzymatic kit methodology compared with kinetic Jaffe-based method for the determination of serum creatinine and optimize for use with auto analyzer.

Objectives:
1. To compare analytical performance and practicability of the enzymatic method and kinetic Jaffe’s method for serum creatinine for routine use
2. To assess the degree of agreement among enzymatic method and kinetic Jaffe’s method for serum creatinine

Methodology: We assessed 318 consecutive serum samples obtained for routine clinical care. Creatinine estimation was achieved both by kinetic Jaffe’s method and enzymatic method for creatinine. Data were divided into 3 groups. Group I (n=167) serum bilirubin < 3 mg/dl; plasma glucose < 126 mg/dl; group II (n=33) serum bilirubin > 3 mg/dl; plasma glucose > 126 mg/dl and group III (n=118) plasma glucose > 126 mg/dl; serum bilirubin < 3 mg/dl. Data were analyzed by using paired "t" test and regression analysis.

Results: Mean paired difference between enzymatic to kinetic Jaffe’s methods were -0.42 (p<0.001) in group I; -0.158 (p<0.001) in group II and -0.116 (p<0.001) in group III. Overall mean paired difference between the two methods was -0.081 (p<0.001).

VARIATION IN SERUM ELECTROLYTES IN SICKLE CELL DISEASE IN CHHATTISGARH POPULATION.


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Electrolyte abnormalities have been associated with Sickle Cell Disease. Studies on Serum Electrolyte (Na+ K+) in SCD have been contradictory. This study was done to determine the serum level of Na+ and K+ in Chhattisgarh Population with SCD. A case–control study was carried out on 50 adult subjects between age 15–45 (both male and female). 35 cases were Homozygous for HbSS and were compared with 15 age matched control with HbAA. Serum electrolyte were measured using ilyte Electrolyte Analyzer. The cases were divided into two groups, Steady state and Crisis State of SCD. The mean values of concentration of Na+ and K+ were found 135.30±1.80/3.81±1.23, 127.12±2.05/4.69±0.26 & 123.02±1.62/5.10±2.9 in control, Steady State and Crisis State respectively. The value of Serum Na+ and K+ of control group was significantly different when compared with steady state group. There was highly significant difference found when control group was compared with Sickle Cell Crisis Group. There was only significant difference observed when Steady group compared with Crisis Group. Adult with SCD in this study had Hypoanemia and Hyperkalemia during Steady State and Crisis State. Such finding could be useful in designing of the better management of Sickle Cell Patients.

SERUM PROCALCITONIN, INTERLEUKIN 6 AND UDP-N-ACETYL-D-GLUCOSAMINE IN INDIAN PATIENTS WITH SEPSIS

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BACKGROUND: Sepsis is a systemic inflammatory response that has a proven or suspected microbial etiology. Both culture is gold standard for diagnosis, but a definitive result can take 24 hours before a conclusive
Vikas Gupta et al., IJSID, 2012, 2 (1), 239-243

Variation in Serum Electrolyte in Sickle Cell Patients in Chhattisgarh Population

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Received: 14.01.2012
Accepted: 20.03.2012

ABSTRACT

Sickle cells are defined as those erythrocytes remaining sickled following extensive oxygenation. In addition to this, sickle cells also have abnormal monovalent cation composition mainly potassium loss that is incompletely compensated by an increase in sodium. Studied on serum electrolyte in sickle cell have been contradictory. This study was set out to determine the serum level of Na+ and K+ in Chhattisgarh population with sickle cell disease. The study had been carried out on total 93 subjects. Out of this number, 33 (13 female and 19 male) were in crisis state. Thirty steady haemoglobin SS (17 males and 13 females) and thirty their age and sex matched healthy haemoglobin AA individuals. Serum electrolytes were measured using Ilyte Electrolyte analyser. The value of Serum Na+ and K+ of control group was significantly different when compared with steady state and crisis state. There was highly significant (P<0.001) difference found when control group compared with sickle cell crisis group. There was only significant (P<0.01) difference observed when steady state compared with crisis. Adult with sickle cell disease in this study had hyponatraemia and hyperkalaemia during steady state and crisis state. Such finding could be use in designing of the better management of sickle cell patients.

Key Words: Sickle cell anaemia, electrolytes, crisis, steady.