



Malondialdehyde (MDA) Total Antioxidant Capacity and Vitamin E Levels in Preterm and Term Infants

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ABSTRACT

Introduction: Oxygen radical injury is thought to be one of the common mechanisms for several diseases in premature infants. Lipid peroxidation plays a vital role in the pathogenesis of many neonatal complications. Broncho pulmonary dysplasia, Intraventricular hemorrhage and Retinopathy of Prematurity are due to excessive production of oxygen free radicals.

Objectives: The main objective of the study is to find the Malondialdehyde (MDA), total antioxidant capacity and Vitamin E levels in preterm and term infants.

Material and methods: We aimed to determine the levels of Malondialdehyde (MDA), Total antioxidant capacity and vitamin E in cord blood of term and preterm infants. To determine the oxidative stress and antioxidants in cord blood of term and preterm infants that may have clinical implications. In the present study we determine MDA, Total antioxidant capacity and vitamin E levels in the umbilical cord blood of term (n=50) and preterm (n=50) infants by manual method. Blood samples were collected during delivery. MDA is high in preterm infants compared to term infants.

Results: Total antioxidant capacity and Vitamin E levels are high in term infants compared to preterm infants. Therefore it is possible to postulate that preterm infants are more susceptible to oxidative stress than term infants.

Conclusion: It is concluded that Preterm neonates are exposed to increased oxidant stress at birth and are susceptible to anti-oxidant deficiencies.

KEYWORDS: Antioxidant, Infants, MDA, TAC

INTRODUCTION

Oxidative stress emerges when the pace of free extreme creation is more noteworthy than the pace of expulsion by the cell guard components. Receptive oxygen and responsive nitrogen species will make cytotoxic harm lipids, proteins or DNA, except if the enzymatic and non-enzymatic cancer prevention agents can adjust their restricting impacts. Responsive oxygen species (ROS) likewise created by various components, for example, the ordinary electron transport chain in mitochondria and unsaturated fats, digestion of prostaglandin, reperfusion, hypoxia and hyperoxia, neutrophil and aggravation, the endothelial cell hypoxanthine oxidase framework, expanded flow of free metals, and the Fenton response [1].

Mammalian cells contain both enzymatic and non-enzymatic instrument of cancer prevention agent protections to lessen the cell injury which is brought about by contact between cell constituents and oxygen free revolutionaries (OFRs). Responsive oxygen species (ROS, for example, hydrogen peroxide, super oxide and hydroxyl extremists assault on bio layers, invigorate peroxidation of lipids and prompting an increment impermeability of cell and loss of endothelial honesty [2].

The development of ROS can increments because of many circumstances which influence both mother and baby. Anticipation of maternal diabetes which in the event that not treated is likewise connected with an expanded creation of ROS [3]. There are many examinations on creatures which show that untimely newborn children are formatively ill-equipped to battle with the oxidative pressure. For instance studies on bunnies showed that there is an extensive expansion in cancer prevention agent compound exercises during the last time of growth. Oxygen free extremists have been involved as specialists of cell harm in numerous sicknesses related with untimely babies [4].

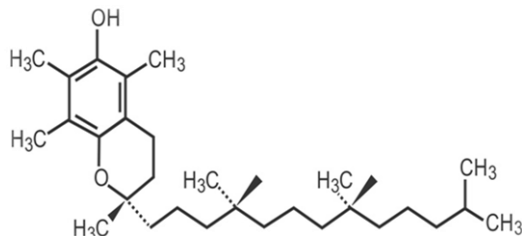


Figure 01: Structure of Vit-E

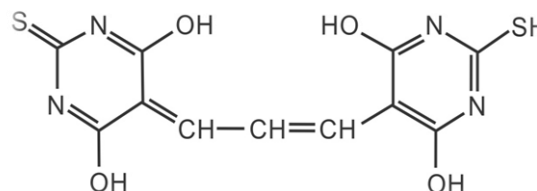


Figure 02: Structure of TBARS

OBJECTIVES

The main objective of the study is to find the Malondialdehyde (MDA), total antioxidant capacity and Vitamin E levels in preterm and term infants.

MATERIAL AND METHODS

The study was conducted in Services Hospital Lahore during June 2019 to June 2020. The data was collected from 100 participants. The experimental design is as follows:

Group 1: pre-term infants

Group 2: term infants

In group 1 pre-term infant were selected whose gestational period is ≤ 36 weeks. Group 2 is the term infants group, the gestational period of term infants are ≥ 37 weeks. For each group physical characteristics of infants were also noted. That includes weight, sex, type of delivery, hemoglobin (Hb), hematocrit (Ht) and ferritin (Fe) levels.

Inclusion criteria

The infant whose gestational age is ≤ 36 weeks is considered as pre-term infants and those whose gestational age is ≥ 37 weeks is taken as term infants.

Exclusion criteria

Those pregnant women who suffer from the following diseases will not be considered for study:

1. Women who smoke
2. Suffering from gestational diabetes
3. Suffering from heart diseases
4. Suffering from kidney diseases

Collection of blood

5.0 ml cord blood sample was taken in a clean sterile container at the time of delivery. Then allow this blood to clot for 30 minute and after that blood was centrifuged at 3000 rpm for 10 minutes. The serum was separated and stored at -85°C for further analysis.

Statistical analysis

Statistical analysis (t-test) was performed using the SPSS software program (17.0). All results were expressed as the mean \pm standard deviation (SD). As P value <0.05 was considered to be statistically significant. Correlation between vit-E and TBARS was also calculated by using pearson's correlation. Malondialdehyde (MDA), total antioxidant capacity and Vitamin E levels in preterm and term infants was measured according to criteria.

RESULTS

The data was collected from 100 patients. 50 patients in group I and 50 patients in group II. All the baseline and demographic data is present in table 01.

Table 1: Demographic characteristics of groups

Characteristics	Group 1 (Pre-term infants)	Group 2 (Term infants)
Gestational age	30.12±2.56	37.13±4.56
Birth weight	2.34±1.00Kg	3.5±1.2Kg
Sex (M/F)	32/18	24/26
Haemoglobin (Hb)	8.23 g/dL	11.5g/dL

Level of cancer prevention agents expansions in term newborn children when contrasted with pre-term babies. The degree of MDA, SOD, GSH and CAT change in an alternate way. The degree of SOD become diminishes. Cell reinforcements are intensifies that can trap ROS and subsequently might be fit for lessening oxidative harm. Cancer prevention agents end the chain responses of ROS by eliminating free extreme intermediates, and repress other oxidation responses.

Table 01: Analysis of Antioxidants in hypertension patients

No. of Observation	Analysis of blood	Normal $\mu\text{g/mL}$	Group I $\mu\text{g/mL}$	Group II $\mu\text{g/mL}$
01	SOD	0.32±0.00	0.33±0.23	0.39±0.00
02	CAT	4.16 ±0.00	0.90±0.00	0.43±0.39
03	GSH	1.89 ±0.00	2.48±1.29	3.23±0.03
04	MDA	2.35±0.00	4.26±0.00	4.95±0.97

DISCUSSION

ROS are produced both by endogenously or exogenously. In vivo free extremists are made during ordinary vigorous breath, by start of phagocytosing cells, in peroxisomes where unsaturated fats are discolored, and via auto-oxidation of different atoms [5]. The most generally utilized technique to observe oxidative stress is to decide lipid peroxidation with the thiobarbituric corrosive responsive substances (TBARS) strategy. It is the result of lipid peroxidation which can be identified by TBARS measure utilizing thiobarbituric corrosive as a reagent [6]. Among these objectives, the peroxidation of lipids is fundamentally harming on the grounds that the development of lipid peroxidation item prompts spread of free extreme responses [7].

Vitamin E is an expansive term which incorporates eight lipid-solvent mixtures. Vitamin E includes a gathering of four tocols, and four toco-trienols [8]. Most dynamic particle is alpha-tocopherol which makes up 90% of the vitamin E found in human tissue. Vitamin E is found in practically all tissues, where it goes about as a cell reinforcement and free extreme scrounger [9-10]. It hinders the normal peroxidation of Polyunsaturated Fatty Acids (PUFAs) found in lipid layers of cell films. Lipid peroxidation begins when a molecule of hydrogen gets away from the twofold obligation of one of the lipid carbons and creating what is happening that is profoundly positive for response with an oxygen free revolutionary [11-12].

CONCLUSION

It is inferred that Preterm youngsters are presented to expanded oxidant stress upon entering the world and are helpless to against oxidant inadequacies. The examination of oxidative stress and cancer prevention agents in rope blood of untimely infants might be helpful in the anticipation of certain pathologies.



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