

Study of Estrogen Hormone as Antioxidant for Healthy Pregnant in Kirkuk City

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ABSTRACT

The antioxidant resistant system of the human body is depend on the balance between free radicals production and presence of antioxidant substances in pregnancy. Oxidative stress is closely related to the marker of lipid peroxidation malondialdehyde (MDA), while antioxidant marker is glutathione (GSH), and sometime estrogen hormone is regarded as indicator of antioxidant. The aim of study to indicated the action of estrogen acts as antioxidant in healthy pregnancy . Methods: A total of 92 healthy female were included in this study,23 non pregnant women control groups and made up of 69 healthy pregnant women 23 per each trimester, and whose ages ranged between 19 years and 42 years. Result :The level of MDA gradually significant increased early state for the pregnant women ($p<0.05$) at the third trimester as compared with non-pregnant control groups, however a significant decreased in GSH level at first trimester as compared to no pregnant control groups. There was an observed increase in level of estrogen at third trimester as compared to control groups. So the present result showed that there was significantly increased in level of MDA & serum estrogen in third trimester, while level of (GSH) decreased at the same state. Conclusion : The risk factors for pregnant women which represented by increased MDA and decreased GSH become more clear with increase in body mass index of pregnant women (BMI) in first trimester and the antioxidant mechanism action of estrogen is probably associated with increased activity of antioxidants mechanisms of body during third stage of pregnancy by diminishes the free radicals .

Keywords:

Pregnancy , MDA, GSH, and Estrogen

Introduction

The aim of the study is to determine the role of estrogen as a marker of antioxidant in the assessment of the stages of Pregnancy ,which is a physiological state has been requirement a large amount of oxygen to obtained energy needed for child and mother ,thus increasing oxidative stress by increasing oxygen intake to mitochondria and formation of free radicals superoxide ¹. These substances like superoxide, hydroxyl radical in cell body and cause result oxidative stress in normal pregnancy due to damage with DNA in cord blood, and stimulates antioxidant activity ;In which this adaption and balance effect healthy pregnant² . The malondialdehyde (MDA) is lipid peroxidation substance that generate during state of oxidative stress during evaluation of pregnancy may be affect ova ,sperm and development of embryo and lead to systematic complication in mothers ,such as abnormal placenta development lead to hypoxia as result of cytokinesis and reduction of endothelial cells activity ³. Reactive oxygen species (ROS), increased during early pregnancy, because the high metabolic rate of the placenta ⁴. Although some studies suggested that plasma lipid peroxidation levels decreased in the third trimester of pregnancy ,perhaps for protective effectives of estradiol during this period of pregnancy and also possess antioxidant properties during induced oxidative stress , may be after free radicals scavenging in third trimester ⁵ ,also synergistic interaction between free radicals and glutathione , and estradiol may also weakly function as a metal ion during osteoporosis due to prevented ROS generation can up regulation endogenous antioxidant defense by indirect action on the expression activity for enzymes ⁶ , because estrogen is hormone produce from group of steroid derivatives from cholesterol and synthesized from androgen in the ovaries, and from adrenal cortex has important role in regulation growth development, metabolism, sexual

functions ,reproduction and impact antioxidant activity ⁷. Glutathione (GSH) can conjugating a number of toxic substances, but can also catalyze reaction to reduce peroxidase ⁸. The regulation of GSH synthesis by follicular stimulating hormone FSH in follicles and granulosa cells also activated protein kinase A and stimulation of estradiol synthesis in Pregnancy ⁹

Subjects and Methods

92 female were participate in present study. Consist from 69 pregnant females at different trimester of pregnancy, divided into three groups. Twenty three (23) pregnant for each pregnancy trimester. These were attending antenatal clinic at General kirkuk hospital and maternity in Kirkuk City and children hospital. Also, 23 women as control group.

Age, body weight and height was measured. Body mass index, (BMI) is calculated with a mathematical wording that takes in to account not just a weight but also height of person .The BMI equals a weight in kilograms divided by height in meters squared.($BMI=kg/m^2$) .Ten ml blood samples were collected and placed in a plastic tube with tight cover and left at room temperature until it was coagulated. The blood was then centrifuged at 400g for 15mins. The serum get to plain bottles and stored in the freezing until it was used to measurement various biochemical tests which referred in the research.

Biochemical tests

-Estimation of serum MDA concentration, used (thiobarbituric acid 0.37% and detection by Ultraviolet at 532 nm.¹⁰

-Estimation serum glutathione by Modified procedure utilizing Ellmans reagent ¹¹.

-Serum estrogen concentration was measured by used kit from Roche (Germany). Immulite 1000 Elecsys2010 ¹².

Statistical analysis:

All values were presented as mean±SD. Analysis of variance by using un-paired student T-test (at p-value of< 0.05) for social sciences (SPSS)version. P less than 0.05 was used as indicator of significant value.

Result

The table1 show the level of MDA significantly increased during third trimester of pregnancy(5.59 ± 0.43 mmol/ml) compared with control groups(1.31 ± 0.62 mmol/ml),while the same table shows the level of GSH significantly decreased during in third trimester(2.79 ± 0.56 mmol/ml)compared with control groups (11.18 ± 0.23 mmol/ml) and highly significantly increased in estrogen level in third trimester(1237.14 ± 0.43 pg/ml) compared with control groups(739 ± 78 pg/ml).

Table (1) Serum concentration of MDA, Glutathione, Estrogen for control and pregnant women

parameters	3 st trimester N=23	2 st trimester N=23	1 st trimester N=23	Control N=23	P<0.05
MDA mmol/ml	5.59±0.43	2.35± 0.76	1.63±0.61	1.31±0.62	0.013
GSH mmol/l	2.79±0.56	3.20±0.53	8.21±0.53	11.18±0.23	0.020
Estrogen pg/ml	1237.14±0.43	718.86±0.37	186.22±0.12	739± 78	0.017

Mean ±SD at p < 0.05.

Table (2): age ranged ,BMI, Weight, high in pregnant women

Data	3 st trimester	2 st trimester	1 st trimester	control	P<0.05
Ages(years)	31.6± 0.89	30.6± 0.29	29.15± 0.74	29.70± 0.46	0.038
BMI(kg/m ²)	42.7± 0.7	38.4± 0.3	33.7± 0.9	26.4± 0.1	2.20
Weight/kg	81.30± 0.5	77.40± 0.1	66.80± 0.3	62.4± 0.4	0.05
High/m ²	138± 0.3	142± 0.8	159± 0.5	136± 0.2	0.1

mean ±SD at p < 0.05.

The table 2 show the significantly increased in the quantum of weight in third trimester(81.30± 0.5Kg) than control groups(62.4± 0.4Kg);therefore ,the BMI increased significantly in third trimester(62.4± 0.4 kg/m²) than control groups(26.4± 0.1 kg/m²) at age ranged(31.6± 0.89years).

Discussion

The study showing a significant increase in the concentration of serum malondialdehyde during third trimester of pregnancy as compared with control groups, While serum glutathione concentration was found to be lowest in third trimester of pregnancy as compared with groups in 1st trimester. The result is agreement with several study(Ozkaya,2008)¹³, that the level of MDA higher in normal pregnancy than control groups without complications must be result from increased ability of pregnancy to blocking the effects of free radicals due to collaboration effect of estrogen by interpenetration free radicals with GSH and increased ability of normal pregnancy to consumption more oxygen due to mobilization of energy and used for cellular respiration, which has been converted to free radicals ,and this result agree with(Young,2001)¹⁴.Also from table (1) which was confirmed by some research (doi et al.,2014)¹⁵, there was a significant decrease in concentration of GSH in pregnant women compared with control group, these finding suggested with other reports (Sang et al.,2009)¹⁶ . The antioxidant action of estrogens is increased partially in third trimester due to the stimulation of glutathione activity, when the estradiol acts as antioxidant, if GSH level reduced have been suggested in some study by producing a number of beneficial effects on vascular biology and this result agree with(Niki,1990) ¹⁷.However, the body mass index explicated in table (2) increase from first trimester and second trimester to the third trimester, compared to the control groups at age ranged above 30years, the elevated BMI of women in the first trimester of pregnancy is associated with the risk factors of pregnancy (de Bruin et al.,2002) ¹⁸.

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