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Study of Oxidative Stress during Pregnancy

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Abstract

Oxidative stress is defined as an imbalance in the balance between antioxidants and pro-oxidants in favor of antioxidants. The increase in lipid peroxidation and the significant decrease in GSH and total antioxidant power ORAC in the serum and erythrocytes of pregnant women especially during the third trimester of pregnancy clearly show the evolution of the state of stress oxidative therapy associated with pregnancy in pregnant women. So pregnancy is a physiological state characterized by oxidative disturbance that contributes to the initiation and progression of complications associated with pregnancy.

Keywords : Pregnancy; Diagnosis; Fetus; Oxidative stress

Introduction

Pregnancy is a period of intense physical and physiological changes, which is accompanied by certain changes in the maternal organism from fertilization to childbirth and during which the embryo and then the fetus develops in the maternal uterus [1,2]. It is characterized by physiological changes related to the development and growth of the fetus, maternal adaptation to the pregnancy, preparation of the mother at childbirth, maintenance of maternal homeostasis and preparation for breastfeeding [3]. This event is accompanied by serious health risks, even for women with no previous health problems [4]. Oxidative stress is defined as an imbalance in the balance between antioxidants and pro-oxidants in favor of antioxidants [5]. Antioxidants play a major role in protecting against molecular oxidative damage [6]. Indeed pregnancy exposes too many complications that can be related to an alteration of oxidative stress that is also associated with the appearance of several pathologies during pregnancy. Oxidative stress is considered a risk factor during pregnancy [7].

Oxidative Stress and Pregnancy Complications

Radical phenomena play an important role in the reproduction, the nesting of the fertilized egg and the development of the embryo. But an imbalance between their production, intense during gestation, and their elimination can generate oxidative stress [8]. On the other hand, iron supplementation during pregnancy contributes to the increase of oxidative stress in pregnant women who take it, in particular an increase in maternal and placental plasma MDA [9]. Oxidative stress is closely related to the clinical severity of pregnancy-induced nausea and vomiting and suggests that the evaluation of markers of total oxidant/antioxidant status would be effective as an additional diagnostic of this symptomatology [10]. Gestational diabetes and fetal macrosomia are associated with a decline in antioxidant status regulation and macrosomia is associated with altered lipid metabolism [11]. Increased oxidative stress is a widely accepted participant in the development and progression of diabetic tissue damage and induced changes in the activities of antioxidant enzymes in various tissues [12]. Pre-eclampsia and pregnancy hypertension are a major cause of maternal mortality and morbidity, and are often the cause of premature childbirth. Oxidative stress is considered to be one of the factors inducing this pathology. The increase in the level of lipid peroxidation, particularly MDA in pre-eclampsia patients, is due to the decline in antioxidant defenses (SOD, catalase and glutathione peroxidase and glutathione reductase) [13].

Oxidative Stress and Fetal Development

Disruption of maternal antioxidant vitamin status during pregnancy can affect fetal development [14]. Reactive oxygen species (EOR) act as primary or secondary messengers on both growth and cell death. Several studies have been able to demonstrate the important and direct role of ROS on development because the redox status acts on the regulation of certain transcription factors that influence pathological cellular signaling due to proliferation and erroneous differentiation evolving towards apoptosis. However, oxidative stress could alter several reactions that affect embryonic development [15]. Oxidative stress may even exist during intrauterine life in the fetus [16]. Pregnancy is also associated with a significant increase in oxidative stress [17]. In addition, oxidative stress could alter several reactions that affect embryonic development [18].