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Vitamin C suppresses ovarian pathophysiology in experimental polycystic ovarian syndrome

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ABSTRACT

Background: Polycystic ovary syndrome (PCOS), also known as the Stein-Leventhal syndrome is one of the most common causes of anovulation, infertility and hyperandrogenism in women, affecting between 5–10 % of women of reproductive age (12–35 years) worldwide. Despite substantial effort to define the cause of PCOS, its pathophysiology remains poorly understood. Consequently, determining the mechanisms of PCOS and the possible treatment is the major goal of medical research in endocrine and reproductive physiology.
Aim: To investigate the mechanism of ovarian metabolic changes in dehydroepiandrosterone (DHEA)-induced polycystic ovary in Wistar rats treated with vitamin C.
Methods: Twenty-eight immature female Wistar rats weighing (16–21 g) were randomly divided into four groups (n = 7/group): group I served as control and was given water, group II were injected with DHEA (6 mg/100 g in 0.2 ml corn oil subcutaneously to induce PCOS condition), group III received 150 mg/kg BW of Vitamin C orally, group IV were co-administered with 6 mg/kg BW DHEA in 0.2 ml of corn oil subcutaneously and 150 mg/kg BW of Vitamin C orally. All treatments lasted for 15 days. Twenty-four hours after the last administration, the rats were sacrificed by cervical dislocation. Blood samples and ovaries were collected for reproductive hormonal analysis, biochemical and histopathological analysis. The expressions of mRNA androgen receptor gene in the ovary were determined by real-time reverse transcriptase polymerase chain reaction. All data were analysed using one-way ANOVA.
Results: There was a significant decrease ($p < 0.05$) in the antioxidant and metabolic enzyme activity in the DHEA treated group compared with the control group. DHEA co-administration with Vitamin C showed a significant decrease in Malondialdehyde, cytokines and Estrogen and a significant increase ($p < 0.05$) in antioxidant and metabolic enzymes compared with DHEA treated group only. The histopathological evaluation demonstrates a reduction in cystic and atretic ovaries, increased expression of Bcl_2 and E-Cadherin with a reduction in *Bax* expression in the group co-administered with DHEA and Vitamin C. The DHEA group showed overexpression of mRNA Androgen Receptor gene in the ovaries compared to the control group.
Conclusion: This study shows that Vitamin C plays a protective role against DHEA-Induced Polycystic Ovary in Wistar rats via its antioxidant and anti-apoptotic mechanisms.

1. Introduction

Infertility is the inability of a sexually active non-contracepting couple to achieve spontaneous pregnancy in one year of unprotected sexual intercourse [1]. According to Idrisa et al. [2], about 20–35 % of infertility cases are due to female factor commonly

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