Investigating The effect of Atorvastatin on Serum levels of Glutathione, Total Antioxidant Capacity and Malondialdehyde of Serum in Rats with Premature Ovarian Insufficiency induced by Cyclophosphamide

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Background and Object: Premature ovarian insufficiency (POI) is one of the endocrine disorders that occurs due to the reduction of ovarian follicular reserve. One of the causes of POI is the chemotherapeutic drug cyclophosphamide (CTX), mainly through the creation of oxidative stress and apoptosis in the cells forming ovarian follicles. Atorvastatin (ATV) is widely used in the treatment of hyper cholesterol diseases and has an antioxidant effect. In the present study, the effect of atorvastatin on the levels of malondialdehyde (MDA) total antioxidant capacity (TAC), and glutathione (GSH) in rats after induction of POI by cyclophosphamide was investigated.

Materials and Methods: 18 female Wistar rats were randomly divided into 3 groups (n=6); Control, POI (50 mg/kg CTX on 1st day and 8 mg/kg CTX for 14 consecutive days, i.p.) and POI + atorvastatin (ATV 10 mg/kg for 10 consecutive days. i.p.). 24 hours after the last injection of atorvastatin, the rats were anesthetized and serum levels of MDA, TAC, and GSH were measured by Thiobarbituric acid reactive substances, Ferric reducing ability of plasma and ELISA, respectively. The data were analyzed using SPSS software, one-way ANOVA, and Tukey's test, and the significance level of $P < 0.05$ was considered.

Results: POI caused a significant decrease in the mean serum GSH and TAC concentrations and an increase in mean serum MDA concentrations compared to the control group ($P<0.001$). In the POI + atorvastatin group, a significant increase in the mean level of serum GSH ($P < 0.05$) and TAC concentration ($P < 0.001$) and a significant decrease in the mean serum MDA concentration level ($P < 0.05$) were observed compared to the POI group.

Conclusion: Our results showed that atorvastatin could increase the levels of serum GSH and TAC and decreased the level of MDA in the serum of rats after POI induction by cyclophosphamide.

Keywords: POI, Atorvastatin, Cyclophosphamide, Oxidative stress