Original article

Astaxanthin treatment decreases pro‐inflammatory cytokines and improves reproductive outcomes in patients with polycystic ovary syndrome undergoing assisted reproductive technology: A randomized clinical trial

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**Abstract:**

**Research Question** In a randomized, triple-blind, placebo-controlled clinical trial (RCT), we investigated the effect of astaxanthin (AST) on pro-inflammatory cytokines, oxidative stress (OS) markers, and assisted reproductive technology (ART) outcomes in 44 infertilePolycystic Ovary Syndrome (PCOS) patients.

 **Design** Patients with PCOS were randomly divided into two groups. The intervention group received 6 mg AST, and the control group received placebo daily for 8 weeks. Blood samples were obtained from all patients before and after intervention and follicular fluid (FF) was collected during the ART procedure. Interleukin (IL) ‐6, IL‐1β were evaluated from serum samples and FF and OS markers (malondialdehyde [MDA], catalase [CAT], superoxide dismutase [SOD], and reactive oxygen species [ROS]) were measured from FF. The groups were compared for ART outcomes as well.

**Results** A significant decrease in IL-6 and IL-1β concentrations (both, P=<0.01) serum levels was found following AST treatment. FF cytokine levels and OS markers did not differ significantly between the groups. Reproductive outcomes, including the number of oocytes retrieved (P= .01), the MII oocyte count (P= 0.007), oocyte maturity rate (MII %) (P= 0.02) and number of frozen embryos (P= 0.03) significantly improved after intervention. No significant differences were found in chemical, clinical and multiple pregnancies between the groups.

**Conclusions** AST pretreatment has been shown to modify inflammation and improve ART outcomes in PCOS infertile patients

**Keywords:** Polycystic Ovary Syndrome**;** Astaxanthin; ART; Inflammation; Oxidative stress; Infertility