Effect of Omega−3, fatty acids on ovarian tissue in polycystic ovarian (PCO) rats.

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Objective: Polycystic ovary syndrome (PCOS) is the most frequent cause of female infertility, affecting about 5–10% of women in age of procreation. To study the protective effects of omega−3 polyunsaturated fatty acid on experimental PCO induced by estradiol−valerat(PVA) in rats. Methods: Wistar female rat (n=40) were allocated into three groups, control (n=10) and test groups (n=30), that subdivided into groups of 3 ,one group received omega−3 (60 mg/rat/orally/daily),second and third groups were induced PCO by single injection of estradiol−valerate (4mg/ rat/IM),third group , was received omega−3 (60 mg/rat) ,for 60 consequence day. Animals were kept in standard conditions. In sixty day the ovarian tissues of Rats in whole groups were removed and prepared to pathological analysis. Results: haemorrhagia, hyperemia and fibrosis were seen in pcogroups, these side effects in groups that received omega−3 significantly decreased (p<0.05) in comparison to experiment groups and ovarian weights in both experimental and control group were similar (p<0.05).Conclusion: Results revealed that administration of omega−3 significantly treated pco. This suggested that polyunsaturated fatty acid may be promising in PCO patients.

ABSTRACT

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then with hydrogen peroxide, a reactive oxygen species[6]. Omega−3 fatty acids (popularly referred to as ω−3 fatty acids or n−3 fatty acids) are fats commonly found in marine and plant oils[5]. This study was designed to evaluate antioxidants effects of Omega−3 on ovarian tissues in experimental induces PCO in rats.

2. Material and methods:

2.1. Animals

Forty adult 8 weeks old Wistar albino female rats of 250 ±10 grams were obtained from Animal Facility of Pasture Institute of Iran. Rats were housed in temperature controlled rooms (25°C) with constant humidity (40–70%) and 12h/12h light/ dark cycle prior to use in experimental protocols. All animals were treated in accordance to the Principles of Laboratory Animal Care [NIH]. The experimental protocol was approved by the Animal Ethical Committee in accordance with the guide for the care and use of laboratory animals prepared by Tabriz medical University. All rats were fed a standard diet and water. The daily intake of animal water was monitored at least one week prior to start of treatments in order to determine the amount of water needed per experimental animal. Thereafter, the rats were randomly selected and divided into control (n=10) and test groups (n=30), that subdivided into groups of 3, one group received omega−3 (60 mg/rat/orally/daily), second and third groups were induced PCO by single injection of estradiol-valerate (4mg/rat/IM), third group of this research was received omega−3 (60 mg/rat), for 60 consequence day. Animals were kept in standard conditions. In sixty day the ovarian tissues of Rats in whole groups were removed for pathology analysis.

2.2. Induces PCO

Thirty days before the experimental procedure, twenty rats were each given a single intra muscular (i.m.) injection of 4 mg EV (Riedeldehaen, Germany) in 0.2 ml oil in order to induce PCO (PCO group).

2.3. Surgical Procedure

In the 60th day, at the end of the treatment period, the blood samples in control & experimental groups were immediately obtained.

2.4. Histopathology of Ovary

The ovarian tissues were fixed in 10% buffer formalin and embedded in paraffin wax. Five micron thick sections were obtained and prepared than stained with hematoxylen and eosin (H&E). The specimens were examined using an Olympus 3H light microscope.

2.5. Statistical analysis

Statistical analysis was done using the ANOVA and test for comparison of data in the control group with the experimental groups. The results were expressed as mean ± S.E.M (standard error of means). P-value less than 0.05 were considered significant and are written in the parentheses.

3. Results

results of ovarian tissue weights ,percentages of Hemorrhagic area per 100 microscopic cross sections , artery hyperemia and percent of cysts all PCO induces groups were significantly increased(P<0.05),in compartment to control and Omega−3 groups,(Table-1).

<table>
<thead>
<tr>
<th>Groups</th>
<th>Control</th>
<th>Omega−3, fatty acids</th>
<th>PCO</th>
<th>PCO plus,1cc Omega−3, fatty acids / rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>ovary (gr)</td>
<td>1.09±0.55</td>
<td>1.88±0.54</td>
<td>0.07±0.55</td>
<td>0.09±0.55</td>
</tr>
<tr>
<td>Hemorrhagic (%)</td>
<td>0.01±0.55</td>
<td>0.01±0.55</td>
<td>4.11±0.55</td>
<td>1.60 ± 0.56</td>
</tr>
<tr>
<td>Hyperemia (%)</td>
<td>0.01±0.55</td>
<td>0.02 ± 0.11</td>
<td>4.90 ± 0.55</td>
<td>2.1 ± 0.55</td>
</tr>
<tr>
<td>Percent of cysts (%)</td>
<td>0.02±0.11</td>
<td>0.01±0.11</td>
<td>10.87 ± 0.11</td>
<td>5.01±0.11</td>
</tr>
</tbody>
</table>

Data are presented as mean ± SE.

*Significant different at P< 0.05 level , (compared with the control group).

Figure A) photomicrograph of ovary tissue in control group show normal structure of follicle, H&E staining, X160. Figure B) photomicrograph of ovary tissue in of ω−3 group show normal structure of follicle, T.C staining, X160. Figure C) photomicrograph of ovary tissue in of PCO group show cystarrow and hyperemia, H&E staining, X160. Figure D) photomicrograph of ovary tissue in of PCO group that treated with ω−3,show decreasing of cystic follicle and fibrosis(arrow) and present of inflammation cells(bold arrow) H&E staining, X160.
3.2. Pathology results

The results obtained from this study showed that in the ω-3 group, ovarian follicles were similar to control group but blood vessels were increased in the corpus luteum (Figure-A,B). In the PCO group the arteric follicles were increased in comparison to control group and fibrosis was seen. The results obtained from PCO group that received ω-3, showed that ovarian contains of primary and multilayer follicles and also ovary contains of several blood vessels in comparison to control group. The histological changes in this group showed that the collagen fibers increased in the tunica adventitia and in the external theca of follicles (Figure-C,D).

3.3. Photomicrograph

4. Discussion

There are now health experts who consider that an inadequate supply of the Omega 3 fats in our diet is one of the most serious health issues confronting our generation. And studies are showing that a low level of the Omega 3 fatty acids in our diet is as serious a health problem as other high risk issues like a high intake of the trans fats, or an inadequate supply of the Omega 3 fats in our diet is one of the most serious health issues confronting our generation.

Conflict of interest statement

We declare that we have no conflict of interest.

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References


modulate endometrial breakdown, leading to menstruation.