Oxidative Stress and Superoxide Dismutase (SOD) Activity in Post Menopausal Women

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Abstract: Menopause is a natural step in the process of ageing and oxidative stress has been proposed as an important causative agents of ageing. The main objective of the present study is to know the status of antioxidant enzymes (SOD) in pre and postmenopausal women and to find their correlation with lipid profile.

Keywords: Super Oxide Dismutase, Oxidative Stress, Hormonal imbalance, Pre and Post Menopausal women, Lipid Profile, Antioxidant

1. Introduction

The process of ageing is enhanced due to the damage caused by free radicals; hence menopausal women are proposed to develop oxidative stress because of estrogen deficiency and advancing age (Srivastava V 2005). Oxidative stress influences the entire reproductive lifespan of a woman and even thereafter i.e. menopause (Agrwall A 2005).

The main objective of the present study is to know the status of antioxidant enzymes (SOD) in pre and postmenopausal women and to find their correlation with lipid profile. The blood samples were analyzed for plasma lipid pre-oxidation, reduced glutathione and antioxidant enzymes like glutathione peroxidase, catalase and superoxide dismutase. Lipid profile was done by standard kit method (Span Diagnostic Ltd.), and estrogen was estimated by Omega Kit method. Metal analysis (copper, iron and zinc) was done by atomic absorption spectrophotometer [(AAS)-Model Analyst 100 Perkin Elmer USA]. For statistical analysis, post-menopausal women were compared to pre-menopausal women treated as control. Statistical analysis was done by using softwares.

Oxidative stress influences the entire reproductive lifespan of a woman and even thereafter i.e. menopause. The antioxidant system seems to be affected in post-menopausal women due to deficiency of estrogen, which is a powerful antioxidant.

2. Material and Method

200 cases diagnosed with menopause from Gynaecology OPD of Glocal Medical College and Super Speciality Center was chosen for the present study. The study group was divided in two groups; first 100 subjects were post-menopausal while rest 100 were pre-menopausal women served as control group. The blood samples were analyzed for Lipid Profile, SOD. T-test and Pearson correlation coefficient were applied for statistical analysis.

3. Discussion

5ml blood samples were drawn from post-menopausal and pre-menopausal women at early morning in plane vacationer. Blood samples allowed clotting for 5-10 min and then immediately centrifuged at 3000rpm for 10min. Serum were separated from the clotted blood and refrigerated at -200C until analysis the next day. Blood sample status of antioxidants was determined by spectrophotometric estimation of Superoxide Dismutase (SOD). Data obtained was analyzed by T-test, ANOVA, and Pearson’s correlation coefficient (r). P < 0.05 was considered significant.

Biochemical analysis

All collected samples of the study populations’ serum, lipid profile and SOD activity fasting were estimated. All reagents, calibrator, controls and samples were brought to room temperature before starting the test run. We measured serum lipid profile by standard methods on an automated chemistry analyzer(VITROS ECi/ECIQ) and SOD activity measured by ELISA and SPECTrophOTOMETER.

Statistical Analysis

Done in Microsoft Excel; Firstly data were coded in Microsoft Excel then analyzed by analysis of variance (ANOVA) in Microsoft Excel. We have taken p value 0.05 as a standard. The p value <0.05 is significant.
The study reveals that, there is enhanced oxidative stress and as compared to Pre-menopausal women. We suggest further studies on this issue which may involve larger sample size, additional parameters, and may also look into the nutritional aspects especially in reference to non-enzymatic anti-oxidants, so that the intricate relationship between menopause and oxidative stress is understood more clearly and such knowledge may contribute in attenuation of distress caused by menopause to half of the world’s population.

### References


[8] Shrivastava V, Singh S, Singh N, Sapre S: Status of antioxidant enzymes and trace metals in

### Table 2: Mean levels of lipid profile factors in pre menopausal women

<table>
<thead>
<tr>
<th>Mean age of the sample</th>
<th>Mean HDL</th>
<th>Mean LDL-C</th>
<th>Mean VLDL-C</th>
<th>Mean T.CHL</th>
<th>Mean T.G-C</th>
<th>Mean SOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 yrs</td>
<td>54.05</td>
<td>93.30</td>
<td>29.40</td>
<td>171.95</td>
<td>120.90</td>
<td>4.82</td>
</tr>
</tbody>
</table>

### Table 3: Mean Levels of Post-Menopausal Women

<table>
<thead>
<tr>
<th>Mean Age</th>
<th>Mean HDL</th>
<th>Mean LDL-C</th>
<th>Mean VLDL-C</th>
<th>Mean T.CHL</th>
<th>Mean Tg.-C</th>
<th>Mean SOD ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>61.6</td>
<td>51.42</td>
<td>103.66</td>
<td>31.18</td>
<td>195.85</td>
<td>155.56</td>
<td>1.04</td>
</tr>
</tbody>
</table>

### 4. Findings

The Mean value of SOD is more in Pre-menopausal women (4.82 ± 4.73) as compared to Post-menopausal women (1.35 ± 0.58). These variation were significant (p < 0.05). Findings of this study corroborate the hypothesis that gradual loss of ovarian function is associated with a concomitant decrease in antioxidant status.

### 5. Results

The Mean value of SOD is more in Pre-menopausal women (4.80 ± 1.73) as compared to Post-menopausal women (1.35 ± 0.58). These variation were significant (p < 0.05). Findings of this study corroborate the hypothesis that gradual loss of ovarian function is associated with a concomitant decrease in oxidative stress as exhibited both by decreased levels of antioxidants in pre and post-menopausal women.


