Difference between Effects of Conjugated Estrogen on Neurotics and Non-neurotics of Climacteric Women Complaining of Menopausal Symptoms and Its Clinical Application for Their Screening

TETSURO ABE, NOBUAKI FURUHASHI, ICHIO OHASHI and MASAKUNI SUZUKI

Department of Obstetrics and Gynecology, Tohoku University School of Medicine, Sendai

ABE, T., FURUHASHI, N., OHASHI, I. and SUZUKI, M. Difference between Effects of Conjugated Estrogen on Neurotics and Non-neurotics of Climacteric Women Complaining of Menopausal Symptoms and Its Clinical Application for Their Screening. Tohoku J. exp. Med., 1976, 119 (2), 197-200 — In order to screen the neurotics and non-neurotics of climacteric women with menopausal symptoms, conjugated estrogen was injected intravenously and the reactions were compared. Menopausal symptoms were represented by Kupperman's menopausal index. After estrogen injection the non-neurotics showed a decrease of the index, i.e., alleviation of the symptoms, while the neurotics showed no change of the index. Taking advantage of this difference, a discriminant function between neurotics and non-neurotics was calculated using, as variables, Kupperman's menopausal indices determined before and after administration of the conjugated estrogen. The calculative screening obtained from this discriminant function yielded consistency with clinical diagnosis in about 94% of the neurotics and about 87% of the non-neurotics, suggesting that this test is of value in the screening of neurotics and non-neurotics in the climacteric women with menopausal symptoms. ——— neurotics; menopausal symptoms; conjugated estrogen; Kupperman's menopausal index; climacteric

At the time of menopause, most women experience a group of symptoms composed of vague somatic complaints, such as hot flushes, sweats, chilly sensation, numbness, general malaise, dull headache, etc., without any identifiable objective signs accountable for the symptoms. Etiology of these symptoms has been reported to be implicated in low output of ovarian estrogen and high production of pituitary gonadotrophin (Ferriman and Purdie 1965; Jeffcoate 1967; Aitken et al. 1974), and based on this implication, estrogentic preparations are explained to be effective on the symptoms.

Neurotics in menopausal women, who are connected with psychotic origin rather than endocrine one, complain of similar symptoms. The hormonal treatment is effective only for the non-neurotics. Therefore, differential diagnosis between neurotics and non-neurotics is necessary for the treatment of climacteric women with menopausal symptoms.

Received for publication, January 23, 1976.
In an attempt to differentiate the non-neurotics from the neurotics, we administered conjugated estrogen to climacteric women complaining of the menopausal symptoms and evaluated the differences in their reactions.

**Patients and Methods**

A total of 64 women aged 35 to 69 years who complained of the menopausal symptoms but showed no signs of either gynecological or any other somatic disorders at the moment and in the past time were subjected for this study.

They were requested to fill a questionnaire concerning various symptoms, and their Kupperman's menopausal indices (Kupperman et al. 1959; Abe et al. 1975) were calculated. Then, the patients were given an intravenous injection of 20 mg of conjugated estrogen (Premarin) and the menopausal indices were calculated again on the third or the fourth day after injection. Subsequently, they were entrusted to psychiatrists to determine the presence or absence of neurotic abnormality. They were divided into two groups, one with and the other without neurotic abnormality, according to the diagnosis by the psychiatrists. A comparison was made between the two groups with respect to the effect of conjugated estrogen on the menopausal index.

**Results**

Of 64 women, 18 were with neurotic abnormalities and 46 without them. There was no significant difference in age between the two groups of the patients, as shown in Table 1. Fig. 1 shows the menopausal indices calculated before and after administration of conjugated estrogen. The indices before administration are represented on the abscissa and those after administration on the ordinate. The neurotic group is indicated by the solid circles and the non-neurotic group by the open circles. All patients of the non-neurotic group showed a decrease of the menopausal index after intravenous injection of conjugated estrogen, while most of the neurotic group showed little change and some of them rather an increase. This difference in the reaction to the conjugated estrogen between the two groups was proved to be significant by the t-test (Abe et al. 1975) ($p<0.01$).

With Kupperman's menopausal indices determined before and after administration of conjugated estrogen, which were expressed as variables $X_0$ and $X_1$, respectively, a discriminant function between the two groups was calculated by the following formula:

**Table 1.** Comparison between the two groups, neurotics and non-neurotics, of climacteric women complaining of the menopausal symptoms as for the age

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Neurotics</th>
<th>Non-neurotics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of women</td>
<td>%</td>
</tr>
<tr>
<td>35-39</td>
<td>5</td>
<td>27.8</td>
</tr>
<tr>
<td>40-49</td>
<td>8</td>
<td>44.4</td>
</tr>
<tr>
<td>50-59</td>
<td>3</td>
<td>16.7</td>
</tr>
<tr>
<td>60-69</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Effects of Conjugated Estrogen on Menopausal Symptoms

\[ Y = 0.24127X_0 - 0.30206X_1 - 0.40947 \]

According to this formula, a discriminant line was drawn in Fig. 1. When a dot is located in the lower area below this line it is classified into the non-neurotic group; and when located in the upper area over the line, it is classified into the neurotic group.

This calculative screening was consistent with the clinical diagnosis in about 94% of the cases of the neurotic group and about 87% of the cases of the non-neurotic group, as shown in Table 2.

![Fig. 1. Kupperman's menopausal indices before and after intravenous injection of conjugated estrogen to the neurotics (●) and the non-neurotics (○) of climacteric women complaining of the menopausal symptoms](image)

Table 2. Comparison between results of differentiation of climacteric women complaining of the menopausal symptoms by screening with the calculative method using discriminant function and by clinical diagnosis

<table>
<thead>
<tr>
<th>Clinical diagnosis</th>
<th>Calculative screening</th>
<th>Coincidental rate*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of neurotics</td>
<td>Number of non-neurotics</td>
</tr>
<tr>
<td>Number of neurotics</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>Number of non-neurotics</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>41</td>
</tr>
</tbody>
</table>

* Coincidental rate (%) of calculative screening to clinical diagnosis

Discussion

It is generally believed that menopausal symptoms such as vasomotor symptoms are most prevalent and severe at the time of the cessation of ovarian
function and that these symptoms are due to a generalized hypothalamo-
hypophysial disorder including raised gonadotrophin production and excretion
(Aitken et al. 1974). Many reports have proposed that the administration of
estrogen would relieve the symptoms by its inhibition or stimulation of pituitary
gonadotrophin (Jasani et al. 1965).

The neurotics of the climacteric women also complain of similar symptoms.
But these patients show different reaction to estrogen administration as compared
with the non-neurotics, and hence the intravenous injection of estrogen would
be of value for screening of the neurotics and the non-neurotics complaining of
menopausal symptoms (Abe et al. 1975).

In this study, estrogen was administered intravenously to the patients with
menopausal symptoms and found that the symptoms were relieved in the non-
neurotics but not altered in the neurotics. The mechanism of this difference in
reaction is unknown but the difference was evaluated to be of value for clinical
screening of the neurotics and the non-neurotics.

References

   for screening of unidentified complaints syndrome in pre-, mid- and post-menopausal
3) Ferriman, D. & Purdie, A.W. (1965) Mechanism of menopausal hot flushes indicated
4) Jasani, C., Nordin, B.E.C., Smith, D.A. & Swanson, I. (1965) Spinal osteoporosis
   114.