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Comparative Study of Sympathetic Function Tests in Premenopausal and Postmenopausal Women

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Abstract

Background: Menopause is defined as the stage of aging process which marks the transition from the reproductive phase of life to the post-reproductive phase.

Methods: The present study was carried out in 50 premenopausal and 50 postmenopausal women. Subjects were selected by simple random sampling method.

Results: When comparing the blood pressure in premenopausal and postmenopausal women difference between both found statically significant.

Conclusion: Sympathetic dominance was observed in post-menopausal women as compared to pre-menopausal women of similar age group.

Keywords: Sympathetic function, Premenopausal women, Postmenopausal women.

Introduction

Menopause is defined as the stage of aging process which marks the transition from the reproductive phase of life to the post-reproductive phase. Menopause generally begins around the age of 40 years and varies considerably from one woman to another.[1]Technically, it is the last menstrual period which is termed as menopause, but the process begins months or years before the actual event.[2] The ovaries begin with a finite number of follicles and these atrophies at a steady rate throughout the reproductive years.

Menopause in humans is characterized by reduced circulating estradiol level which is due to falling numbers of functional follicles as the age advances.[3] Menopause predisposes women to many diseases and changes their quality of life.

Menopausal symptoms that impair the quality of life of menopausal women include hot flushes, night sweats, sleep disorders, sexual dysfunction, and alterations in mood. Alteration in autonomic nervous system (ANS) functions primarily due to changes in estrogen level is responsible for symptoms associated with menopause.[4]

Pre-menopausal women have a lower risk of coronary heart disease as compared to men of same age. In post-menopausal age group, the incidence of coronary heart disease becomes equal in both sexes. Data from the Framingham study shows a two-fold age-adjusted increase in risk for coronary heart disease in post-menopausal compared with pre-menopausal women. Young women with bilateral oophorectomy have an increased risk of coronary heart disease if they are not treated with estrogens. These observations, along with the favorable effect of hormonal replacement therapy on cardiovascular morbidity and mortality in post-menopausal women, have led to the assumption that

ovarian hormones, especially estrogens, protect women from coronary heart disease.

So the objective of this study was to compare the autonomic function tests in premenopausal women and postmenopausal women. Early detection of subclinical autonomic dysfunction in postmenopausal women, therefore, will improve the quality of life by proper medication and lifestyle modification.

Materials and Methods

The present study was carried out in 50 premenopausal and 50 postmenopausal women. Subjects were selected by simple random sampling method.

Selection criteria

A. Premenopausal women

1. Age group 25-35 years. With regular menstrual cycle with an average length of 28 days.

2. They were in the follicular phase of their menstrual cycle.

B. Postmenopausal women

1. Age group 45- 60 years.

2. They had completed a period of at least 12 months since their last menstrual period.

Exclusion criteria

The following women were excluded from study:

1. Those on oral contraceptive pills or hormonal therapy in any form.

2. Those consuming drugs that alter the cardiovascular functions.

3. Those having any history of diabetes, cardiovascular disease, surgical menopause or history of addiction to tobacco, alcohol, smoking.

4. Those suffering from any other disease or complication.

All the subjects were explained the procedure to alleviate any fear or apprehension. Before starting the procedure, the physical examination of all the subjects was done with the help of proforma and the consent form was signed by the subjects.

Results

The mean age of both group was comparable

Table 1: Comparison of resting systolic blood pressure and diastolic blood pressure between premenopausal and postmenopausal women

Blood pressure	Premeno pausal	Postmenopausal	p-value
Systolic blood pressure	116.20±4.80	122.64±7.98	<0.05
Diastolic blood pressure	75.20±5.01	79.12±4.46	<0.05

When comparing the blood pressure in premenopausal and postmenopausal women difference between both found statically significant.

Table 2: comparison of change in systolic blood pressure and diastolic blood pressure in response to standing from supine position between premenopausal and postmenopausal women

Blood pressure	Premeno pausal	Postmenopausal	p-value
Systolic blood pressure	112.30± 5.04	118.20±8.10	>0.05
Diastolic blood pressure	76.20±3.40	81.20±3.24	>0.05

Not significant change was seen in systolic blood pressure and diastolic blood pressure in response to standing from supine position between premenopausal and postmenopausal women.

Discussion

During menopause the ovarian functions gradually become diminished and so, the estrogen production from the granulosa cells of the ovary also reduces.

Mean SBP recordings in the post-menopausal group were higher as compared to the pre-menopausal group. Similarly, mean pre-test DBP recordings in the post-menopausal group were more as compared to the premenopausal group. Our finding matches with the study conducted on 38 pre-menopausal and 28 post-menopausal women which showed that basal SBP and DBP were significantly higher in post-menopausal women as compared to pre-menopausal women.[5]

In our study there was a statistically significant increase in the resting blood pressure, blood pressure response to standing from supine position in the postmenopausal women when compared with the premenopausal women. In our study there was a statistically significant increase in the sympathetic function in the postmenopausal women when compared with the premenopausal women. The physiological levels of estrogen account for an increased vagal and lower sympathetic modulation[6]. As suggested by some studies, estrogen binds to the membrane receptors to stimulate the nitric oxide release from the endothelium. It facilitates calcium efflux and reduces the calcium sensitivity of contractile elements. Thus, estrogen promotes vasodilation.[7,8] Estrogen also increases b-adrenergic receptor sensitivity to catecholamine to promote vasodilatation.

Conclusion

Sympathetic dominance was observed in post-menopausal women as compared to pre-menopausal women of similar age group.

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