Original Article

Incidence of Low Diastolic Blood Pressure as a Sign of Elderly and a Cardiovascular Risk Factor in the Early Age Post Menopause Women

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ABSTRACT

Objective: To determine the post menopausal changes of diastolic blood pressure in the early age menopause women.

Study Design: A comparative and cross-sectional study.

Place and Duration of Study: This study was conducted at the Department of Physiology BMSI., JPMC, Karachi in collaboration with the Abbassi Shaheed Hospital and National Institute for Cardiovascular Diseases, Karachi from Oct 2009 to June 2010.

Materials and Methods: This study included a total of 100 women, 50 with early age post menopause and 50 with normal age post menopause. For the statistical analysis , the degree of probability was computed by comparing the calculated value of "t" with tabulated value in the table of "t" distribution against the degree of freedom.

Results: Diastolic blood pressure was found to be significantly increased with a P-value of <0.001 in the early age post menopause women.

Conclusion: This suggests that an early age post menopause is more likely to develop a sign of elderly and a cardiovascular risk factor such as decreased diastolic blood pressure.

Key Words: Early age post menopause, Normal age post menopause, Diastolic blood pressure (DBP), A sign of elderly, Cardiovascular (CV) risk factor, Cross sectional study.

INTRODUCTION

In 1998, Tuomilehto et al., indicated that low DBP alone was a significant predictor of CV and non-CV mortality among persons aged >50 years (most >70 years). However, the evaluation of the underlying pathophysiological mechanisms was limited, particularly regarding hemodynamic parameters. Low DBP could also be a marker of cardiac function. Indeed, in the population of North Karelia, especially in patients >70 years of age, the DBP–mortality relation was considered as a direct main result of cardiac failure, and there was an age dependence regarding the effect of low DBP on mortality.[1]

In the recent years, in subjects >50 years of age with advanced renal failure, Blacher et al[7] showed that increased aortic stiffness and low DBP were independent predictors of CV risk. Low DBP could also be a marker of cardiac dysfunction.[2]

A low diastolic blood pressure has been associated with increased cardiovascular mortality.[3]

According to Bots et al, the following proposed mechanisms underlie this phenomenon: a low diastolic pressure that compromises coronary blood flow, a low diastolic pressure that is due to deteriorating health, and a low diastolic pressure that is a consequence of stiffening of the large arteries. [4]

Natural menopause is recognized to have occurred after 12 consecutive months of amenorrhea for which there is other pathological or physiological cause. Early age menopause is a broader term to include those women who have experienced menopause under the age of 45 years.[5] Low or absent estrogen and high levels of FSH and LH, is the picture of menopause.[6]

In Pakistan, the mean age at menopause has been found to be 49 years (+/-3.6 years) in rural areas and 47 years in urban areas.[7] Whereas mean age at menopause in rural chandigarh (India) is 48.22+/_2.47 years and in urban is 49.30+/-2.80 years. [8] Menopause before 45 years of age, is considered to be early age menopause .[9]

After age 60 years, stiffening of the large arteries leads to decreased diastolic pressure and increased pulse pressure, and this changes the relationship between low diastolic pressure and cardiovascular disease.[10]

Menopause may interact with or accelerate event of normal ageing. Early menopause may be a risk factor for early mortality from diseases related to decreased estrogen levels and may promote increased incidence of osteoporosis, heart diseases, diabetes, breast cancer, osteoarthritis and autoimmune diseases .[11,12,13]

MATERIALS AND METHODS

This was a cross sectional and comparative study conducted in the department of B.M.S.I., J.P.M.C. in collaboration with Abbassi Shaheed Hospital and National Institute of Cardiovascular Diseases, Karachi.

A total sample of 100 post menopausal women, was selected for the study. 50 women with a history of cessation of menstruation since 2 years, ages between 40 – 45 years, were selected as early age post

menopause. Whereas, 50 women as normal age post menopause consisting of women with a history of cessation of menstruation since 2 years ,ages between 50 – 58 years.

Systolic blood pressure and diastolic blood pressure were recorded by mercury type of sphygmomanometer. The blood samples of those subjects who fulfilled the criteria were collected after an overnight fasting of 10-12 hrs. About 4 ml of blood was drawn from venepuncture after all aseptic measures while the subjects were sitting in upright position. 2 ml blood was taken for serum cholesterol and hormonal analysis, each. After centrifugation, serum were stored at -20 degree centigrade.

Serum total cholesterol was estimated by the enzymatic colorimetric method. Serum follicle stimulating and serum leutinizing hormones were measured by enzyme linked immunoassay.

Statistical Analysis: The degree of probability was computed by comparing the calculated value of "t" with tabulated value in the table of "t" distribution against the degree of freedom. The difference with mean values of the two groups was regarded as statistically significant, if the P-value was less than 0.05 and it was taken as highly significant if P-value was less than 0.001. Correlation coefficient was detected using Pearson coefficient of correlation SPSS-10. For data feeding the computer package Microsoft Excel was used. Only P-value (<0.05) are considered significant.

Inclusion Criteria: Non obese, non hypertensive and non hysterectomized women who were experiencing menopause, were included in our study. All the subjects were having normal electrocardiographs, fasting blood sugar under normal limits and heamoglobin ≥ 11 g/dl. Overall , they were apparently healthy subjects.

Exclusion Criteria: With history of smoking, any malignancy or psychiatric disorder, were not included in this study. Subjects on hormone replacement therapy and known cardiac patients, were also excluded from this study.

RESULTS

Table 1 shows the comparison of age, height and weight between normal age menopause and early age menopause women.

Age was significantly higher in early age menopause (42.08±0.36 years) than the normal age menopause (53.52±0.44 years) women, whereas height and weight show no statistical difference.

Table 2 shows that the mean diastolic blood pressure was significantly higher with a P value of <0.001 in early age menopause (74.08±1.53 mmHg) than in normal age menopause (89.32±1.35 mmHg) women.

Table 3 shows that the mean systolic blood pressure remained insignificant on both sides . Mean serum cholesterol was significantly higher in EA group (178.82±8.95 mg/dl) than in MA group (149.82±8.85 mg/dl) with a P-value of <0.05. The mean FSH was significant in early age menopause (77.22±5.16 µlU/ml) as well as to the mean value in normal age menopause (61.93±4.15 µlU/ml).There was no statistical difference as far as the mean LH values concerned as they remained non significant on both sides.

Table No.1: Comparison of age, height and weight in normal age menopause and early age menopause. (Values are expressed as Mean ± SEM)

Variables	Normal Age Menopause	Early Age Menopause
Age(years)	53.52±0.44	42.08±0.36*
Height(Meters)	1.55±0.007	1.56±0.008
Weight(kg)	63.52±1.36	64.30±1.51

*showing a significant difference at P-value<0.05

Table No.2: Comparison of diastolic blood pressures in normal age menopause and early age menopause. (Values are expressed as Mean ± SEM)

Variable	Normal Age Menopause	Early Age Menopause
Diastolic Blood Pressure mmHg	89.32±1.35	74.08±1.53**

**showing highly significant difference at P-value <0.001

Table No.3: Comparison of systolic blood pressures, total serum cholesterol, follicle stimulating hormone (fsh) and leutinizing hormone(lh) between normal age menopause and early age menopause (Values are expressed as Mean ± SEM)

Variables	Normal Age Menopause	Early Age Menopause
Systolic Blood Pressure (BP) mmHg	124.62±2.35	124.38±1.98
Total Serum Cholesterol	149.82±8.85*	178.82±8.95*
FSH(µlU/ml)	61.93±4.15*	77.22±5.16*
LH(µlU/ml)	54.74±3.31	55.36±4.50

**showing highly significant difference at P-value <0.001

*showing significant difference at P-value<0.05

DISCUSSION

Christensen et al., assessed various data show that not all the subjects with the same elevation in SBP have the same CHD risk ; those with lower DBP and therefore wider PP, have greater CHD risk, possibly due to great pulsatile stress (Christensen, 1991).[14]

High systolic blood pressure (SBP) increases vascular beds, a determinant of left ventricular (LV) geometry, whereas low DBP may reduce coronary perfusion pressure. [15]

According to Glynn et al.(2000), after having adjusted for systolic blood pressures and confounding variables (like pulse pressure), the apparent increased risk of cardiovascular disease, is associated with low diastolic blood pressure.[16]

In the study of Protogerou et al. (2007) , the first prospective investigation in an elderly population was performed, in which pressure wave reflections, arterial stiffness, cardiac function, and TPR were measured to investigate the potential pathophysiological association of low DBP and mortality. They showed that, in this very aged population, a J-curved association between DBP and mortality (all-cause or CV) was present. [3]

Under these circumstances, the current study was performed to analyze and compare the difference of blood pressure as well as other variables, in two different age groups of menopause women.

First group i-e normal age menopause group had females with a history of at least two years of amenorrhea or post menopause and ages between 50-58 years taken as control group, and the second group consisted of females of early age menopause with a history of at least two years of amenorrhea or post menopause and ages between 40-45 years of age.

Our study shows the incidence of low diastolic blood pressure as a sign of elderly and cardiovascular morbidity in the early age menopause group, is in accordance with second tertile of the study done by Protogerou et al. (2007) as well as with the study of Glynn et al.(2000).[3,16]

The results of our study suggest that the cardiovascular risk factors were increased with the women who underwent early or premature ovarian failure i-e the early age menopause group as compared to the women with the normal age menopause group. These findings were in agreement of the studies done by Fioretti et al .(2000) and Atsma et al .(2006).[17,18]

According to Kok et al.(2006), blood vessel stiffness increases over time whereas diastolic blood pressure tend to decrease. The women with decreasing diastolic blood pressure level probably had some degree of hardening of arteries". This is like an explanation for the fact that "beneficial" changes in diastolic blood pressure did not result in a statistically significant increase in menopausal age. This observation is also in agreement with our study.[19]

In our study, follicular stimulating hormone and leutinizing hormones levels were significantly higher in both menopausal groups showing an apparent menopausal status in them whereas these levels were decreased in the reproductive or control group, and these observations are in accordance with the findings of the study done by Barnett et al.(2004).[20]

Our group of early age menopause also had as a significant increase in the serum cholesterol in accordance with the findings of the study done by Knauff et al.(2008).[21]

CONCLUSION

Regarding this comparative and cross-sectional study, we conclude that the decreased values for diastolic blood pressure in the early age post menopause group, show the sign of elderly as a cardiovascular risk factor for the early age post menopause women than the naturally occurring normal age post menopause women.

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