



ASSESSMENT OF CARDIOVASCULAR RISK IN PRE AND POST MENOPAUSAL HYPERTENSIVE WOMEN

Nimmy.N.John*, R.Mohan Kumar, M.P Narmadha
Swamy Vivekananda College of Pharmacy, Tiruchengode, Erode, India

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*Email: nimmydale@gmail.com

ABSTRACT

Hypertension is the silent killer which leads to adverse cardiovascular events like myocardial infarction, coronary artery disease and stroke. The increase in cardiovascular risk for women aged >50 years suggests that menopause marks the end of a period of relative protection compared with men. The study is based on the data collected from 70 patients who were pre and post menopausal women visiting the study site for the treatment of hypertension. A questionnaire was prepared as a tool for collection of data like demographic details, blood pressure, lipid profile, blood glucose level, Family history, number of children, age of menopause, past medication history. The cardiac risk for the next ten years was calculated using "Cardiac care risk assessment calculator" (www.johnmuirhealth.com/index/cardiac_care_risk). Out of 70 hypertensive patients, total cholesterol was on the border line in younger patients of age group 30-39 years, and it was well above the baseline in elderly women i.e. 201-226 mg/dl. With the increase of the age, total cholesterol is increasing and HDL also was found to be in the lower limit. Cardiac risk scale was found to be less in our study in the population of the age limit 30-35 years ranging from 2.6% to 18.3%. Maximum risk was found in age group of 56-60 years who also had highest systolic and diastolic BP and even highest Total cholesterol. Cardiac risk very much depends on total cholesterol value which is the strongest marker and indicator for high blood pressure.

KEY WORDS: Cardiovascular risk, Cholesterol, Menopause, Estrogen, Body Mass Index

INTRODUCTION

Hypertension is correlated with sex hormones, so the aim of the present study is to investigate the role of body mass index, blood pressure and lipid profile on cardiovascular risk in women, to calculate cardiac risk assessment in the next ten year period for pre and post menopause hypertensive women. Hypertension is the silent killer which leads to adverse cardiovascular events like myocardial infarction, coronary artery disease and stroke. The increase in cardiovascular risk for women aged >50 years suggests that menopause marks the end of a period of relative protection compared with men¹. Premenopausal women have lower blood pressure than age matched men. These findings suggests that sex hormones have a prominent role in hypertension².

An increased body weight particularly the central distribution of body fat is an independent predictor of cardiovascular disease in women. Circulating sex steroids can influence body fat distribution and a trend to a progressive increase in body weight is often observed throughout the climacteric period. Hypertension seems to increase with the degree of obesity^{3,4}. The hormonal changes associated with menopause like low plasma levels of estrogen and marked increase in leutinizing and follicle stimulating hormone levels exert a significant effect on the metabolism of plasma lipids and lipoproteins. The behavior of lipoproteins during the menopausal transition and their relationship with the sex hormones and body fat distribution is still unclear⁵.

Determinants of age at menopause are incompletely understood. A common polymorphism in the estrogen receptor alpha has been associated with earlier onset of menopause has the factor V Leiden mutation. Although it is clear that CHD incidence and prevalences are higher in postmenopausal compared with premenopausal women, the impact of menopause and loss of endogenous estrogen distinct from that of advancing age remains controversial^{6,7}. Cardiovascular risk factor changes occurring with menopause have considered as a biological mechanism.⁸ Deprivation of endogenous estrogen is assumed to be a crucial factor in the explanation of this change. During menopause, endothelial

dysfunction occurs which causes increase in sympathetic activation and leads to release of rennin ultimately increasing the blood pressure. The effects of risk factors on arterial diameter have been characterized in the carotid and brachial vessels^{9,10}.

MATERIAL AND METHODS

The protocol is a Cross sectional study conducted at a Private tertiary care hospital and is accepted by Institutional Ethics Committee. The study is based on the data collected from 70 patients who were pre and post menopausal women visiting the study site for the treatment of hypertension. A questionnaire was prepared as a tool for collection of data like demographic details, blood pressure, lipid profile, blood glucose level, Family history, number of children, age of menopause, past medication history. Parameters like BMI, Lean body mass, Body fat mass were calculated using formulas.

Lean mass = (1.07*weight in Kg)-(148*weight² / height²)

Fat Mass = 100% - Lean mass%

Atherogenic Index of Plasma (AIP) = LOG(TG/HDL- C)

The cardiac risk for the next ten years was calculated using "Cardiac care risk assessment calculator" (www.johnmuirhealth.com/index/cardiac_care_risk) from the age, total cholesterol, blood pressure and blood sugar level. A calculation of atherogenic estimates the value of atherogenic index of plasma Triglycerides and HDL cholesterol to reflect the balance of atherogenic and protective lipoproteins.

RESULTS

In this cross sectional study, Out of 70 hypertensive women 30 (42%) were below the age of 50 and 58% were in the age range of 51-75 years.

Average body weight was 63.5 kg in hypertensive women with mean BMI greater in post menopausal women than in premenopausal women.(26.72 vs 24.27). In our hypertensive patients those who were of BMI greater than 24 were found to have elevated systolic and diastolic blood pressure.(Table 1)

The mean systolic blood pressure among different age groups in hypertensive women was found to be in the range of 150 to

172 mm/Hg. Where as it was 123 to 142 mmHg in the non-hypertensive women. (Table 1)

Out of 70 hypertensive patients, total cholesterol was on the border line in younger patients of age group 30-39 years, and it was well above the baseline in elderly women i.e. 201-226 mg/dl. With the increase of the age, total cholesterol is increasing and HDL also was found to be in the lower limit.

Cardiac risk scale was found to be less in our study in the population of the age limit 30-35 years ranging from 2.6% to 18.3%. Maximum risk was found in age group of 56-60 years

who also had highest systolic and diastolic BP and even highest Total cholesterol. Cardiac risk very much depends on total cholesterol value which is the strongest marker and indicator for high blood pressure.

The serum sample of lipid profile for pre and post menopausal women was carried out using atherogenic index formula. The mean atherogenic index 0.33 ± 0.89 and 0.2822 ± 0.08 was extremely significant. In case of HDL level lower in postmenopausal women, No significant difference was observed. Here P value is <0.001 .

TABLE 1: Atherogenic index and Lipid profile of Pre and post menopausal women

Subjects	TC	TG	HDL	LDL	VLDL	Atherogenic Index
Pre menopausal N=25	200.64±19.585	185.8±79.441	39.44±10.630	94.48±33.276	60.52±34.166	0.33104±0.089
Post menopausal N=45	209.875±38.006	179±81.15	47.3±9.4	112.38±39.055	51±31.25	0.2822±0.082
P Value	P<0.001	P<0.001	P<0.001	P<0.001	P<0.001	P<0.001

TABLE 2

Sl.No:	Age in years	No. of HTN patients	BMI(kg/m2)	Total cholesterol(mg/dl)	Blood pressure(mm/Hg)		Cardiac risk Score%
					Systolic	Diastolic	
1	35-39	5	24.708±1.52	194.6±15.52	152±21.67,86±5.47		2.6±1.342
2	40-45	12	23.283±3.33	201.2±18.433	161.66±18.0,90.83±5.2		6.6±3.08
3	46-50	13	24.409±1.83	199.46±26.008	154.6±15.607,92.3±7.2		11±5.54
4	51-55	11	24.44±2.187	195.08±35.2	154.54±15.607,92.3±7.25		12.7±3.8
5	56-60	14	28.08±7.73	226.14±43.4	172.85±16.3,94.78±8.5		18.3±7.9
6	61-65	7	28.41±3.322	212.14±31.3	155.71±16.183,95.71±7.86		15.4±8.101
7	66-70	5	27.01±1.303	186.2±30.7	150±14.14,96±8.9		15.4±9.53
8	71-75	3	23.24±4.41	222.3±13.28	153.33±11.5,96.6±5.7		15±0.00

DISCUSSION

Menopause is associated with reduction in estradiol and a decrease in estrogen to testosterone ratio which would result in endothelial dysfunction and increase in body weight causing an increase in sympathetic activation, which is common in post menopausal women. Sympathetic activation can result in increased rennin release and increase in angiotensin –II, which results in hypertension.

In this cross sectional study of pre and post menopausal women visiting hospital for hypertension treatment, 30 (42%) were below the age of 50 years and 58% were in the age range of 51-75 years.

Over weight has a strong impact on hypertension in premenopausal women. Our result go along with this fact, with a mean body weight of 61.21 kg in hypertensive pre menopause women and 54.5 kg in non hypertensive women. The mechanism by which obesity is associated with hypertension includes increase in sympathetic overactivity that appears closely associated with abdominal visceral fat. Increased visceral fat is associated with increased oxidative stress and decreased vasodilation.

Total cholesterol was higher in post menopausal women than in pre menopausal women. LDL was found to be higher in post menopausal women. Atherogenic index in post menopausal women was greater than premenopausal.

Cardiac risk score in ten years was calculated. Cardiac risk score was less(2.6 to 11%) in women of age 35-50 years and the risk was 12.7-18.3% in elderly women of age 51-75 years. Also Cardiac risk score was 6.88% in pre menopausal women and it was 15.6% in post menopausal women.

CONCLUSION

The findings of the present study revealed that variations in BMI, Lean body mass, lean fat mass, cardiac risk percentage

and atherogenic index between pre and post menopausal women are the major risk factors for cardiac diseases. Maintaining a healthy diet with adequate physical activities helps to keep the body away from all Cardiac ailments.

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