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Comparing Echocardiographic Findings with HbA1C, TSH and Lipid Levels in Postmenopausal Women: A Single Centre Study from Gwalior

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Abstract **Original Research Article**

Background: Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in women. Oestrogen deficiency after spontaneous or medically induced menopause is an important risk factor for CVD. Obesity, abnormal lipid profile, hypertension, diabetes mellitus, cigarette smoking, sedentary lifestyle are common risk factors for CVD development. ***Aims and Objectives:*** To study the ECHO findings and correlate with symptoms, HbA1c, TSH and lipid levels in postmenopausal women. ***Materials and Methods:*** Sixty postmenopausal women (40-50 years) were studied between January 2016 to September 2017 at Department of Medicine, J.A. Group of Hospitals, G.R. Medical College, and Gwalior. Postmenopausal symptoms, age, blood sugar, HbA1C and ECHO were done in all patients. Lipid abnormality and TSH were performed in all subjects. Data were analyzed using IBM SPSS ver. 20 software. P value of <0.05 is considered as significant. ***Results:*** Mean age at menopause was 46.7 year. Majority of the women were illiterate and had sedentary life style. Eighteen women were overweight and 4 women were obese. Among the women with Hot Flushes (N=14) and who showed weight gain (N=4), one in each had abnormal ECHO. Majority of the patients had SBP ≤120 mmH (n=59) g and DBP≤80 mmHg (n=59).In patients with HbA1c <6.5, 6.5-8.4 and >8.5%, 1, 0 and 1 patients had abnormal ECHO respectively. In patients with BMI 18.5-24.9, 25-29.9 and >30 kg/m2, 2, 0 and 0 patients had abnormal ECHO respectively. In patients with TG≥150, HDL<50, LDL≥100 and VLDL≥30 mg/dl, 0, 1, 1, 0 and 1 patients had abnormal ECHO respectively. ***Conclusion:*** ECHO findings revealed that risk of CVD development may increase among post-menopausal women who were overweight, had hot flushes and abnormal lipid profile.

Keywords: Abnormal lipid, echocardiography, obesity, glycated hemoglobin.

INTRODUCTION

Menopause is defined retrospectively as the time of the final menstrual period followed by 12 months of amenorrhea. Post menopause describes the period following the final menses [1]. It is a natural event that normally occurs between the ages of 45-50 years. The symptoms of menopause are caused by changes in estrogen and progesterone levels.

The menopause transition is experienced by 1.5 million women each year and often involves troublesome symptoms, including vasomotor symptoms, vaginal dryness, decreased libido, insomnia, fatigue, and joint pain [2].

Cardiovascular disease (CVD) is one of the leading causes of death among women [3]. The key risk factors that need to be controlled in the perimenopausal woman are hypertension, dyslipidemia, obesity, and other components of the metabolic syndrome, with the careful control of diabetes. Hypertension is a particularly powerful risk factor and lowering of blood pressure is pivotal. Hormone replacement therapy (HRT) is acknowledged as the gold standard for the alleviation of the distressing vasomotor symptoms of the menopause, but the findings of the Women's Health Initiative (WHI) study generated concern for the detrimental effect on cardiovascular events. Thus, HRT cannot be recommended for the prevention of CVD.

Women with lower oestrogen levels after menopause are at increased risk to develop premature CHD [4]. Young women with endogenous oestrogen deficiency have a sevenfold increase in coronary artery sclerosis [5].

An understanding of the risk factors, clinical presentation, and management of these common

menopausal symptoms allows for improved patient care and health outcomes for older female patients [6]. Cardiovascular risk assessment should be done at time of menopause and at regular intervals to detect cardiovascular disorders at the earliest. In present study we tried to compare the ECHO findings with risk factors of CVD.

MATERIALS AND METHODS

A cross sectional study was performed in the Department of Medicine, J.A. Group of Hospitals, G.R. Medical College, Gwalior (M.P), between January 2016 to September 2017, including 60 postmenopausal women.

Women of age group between40-50 years with diagnosis of menopause (>12 months amenorrhea /diagnosed by gynecologist) and with nonspecific symptoms were included. Women<40 years and >50 years of age, known case of coronary heart disease, hypertensive on drugs, women with surgical and medically induced menopause, osteoarthritis, low backache, women with known gynaecological disorders like malignancy, per vaginal bleeding etc. and any other condition were excluded from the present study.

Approval from ethical committee and informed consent was taken from all enrolled patients after detailed counseling. The contents of the consent were read out to the patient in his/her language. Blood sugar, HbA1C, lipid parameters and TSH was done in all patients. Echocardiography was also performed in all subjects.

All the data analysis was done using IBM SPSS ver. 20 software. Continuous data was presented as mean. Categorical data is expressed as percentage and numbers.

RESULTS

Mean age at menopause was 46.7 years, Mean duration since menopause was 4.6 years, and most of the subjects were illiterate, had sedentary life style and were vegetarian. Most of the cases belonged to BMI group of 18.5-24.9kg/m2 (normal) (n=38) followed by 25-29.9 (Over weight) (n=18) and ≥ 30 (Obese) (n=4). Majority of the patients had SBP ≤120 mmH (n=59) g and DBP≤80 mmHg (n=59).

Table-1: Comparing postmenopausal symptoms with ECHO findings

Symptoms	ECHO findings	
	Abnormal	Normal
Hot Flushes (N=14)	1	13
Weight gain (N=4)	1	3

Table-2: Distribution of Echocardiography finding

ECHO finings	Grouping	Cases
Ejection fraction	>55 (Normal)	56
	45-55 (mild Dysfunction)	3
	35-45 (Moderate dysfunction)	1
	<30 (severe dysfunction)	0
Any dysfunction	No	58
	Mild systolic dysfunction	1
	Moderate systolic dysfunction	1

Table-3: Correlation of Echocardiography results with HbA1c, BMI, abnormal lipid and TSH level in post-menopausal women

Parameters		Normal	Abnormal
HbA1c (%)	<6.5	47	1
	6.5-8.4	5	0
	>8.4	6	1
BMI (kg/m2)	18.5-24.9	38	2
	25-29.9	18	0
	>30	4	0
Abnormal lipids (mg/dL)	TC ≥200	31	0
	TG ≥150	30	1
	HDL<50	33	1
	LDL≥100	37	0
	VLDL≥30	30	1
TSH	4.25-10	24	0
	11-50	0	0

DISCUSSION

Coronary artery disease (CAD) and peripheral vascular atherosclerosis is one of the most common causes of mortality in developing countries like India [7]. A recently observed and focused aspect of coronary artery disease is its silent and asymptomatic presentation. In post-menopausal women, there is a high risk of developing CAD and related disorders.

In present study, most common symptom was weakness/lethargy (60%) followed by hot flushes (23.33%), altered mood (21.66) and sleep disturbance (16.66). Singh *et al*. studied 252 postmenopausal women and reported that the most common complaints of postmenopausal women were sleep disturbances (62.7%), muscle or joint pain (59.1%), hot flushes (46.4%) and night sweats (45.6%) [8]. This finding is comparable to finding in the studies carried out by Madhukumar *et al*. and Nusrat *et al*. [9, 10].

In present study, 22 women were either overweight or obese and two showed abnormal ECHO. Nigam *et al*. also reported that the cases having BMI >30 kg/m2 had higher incidence of positive stress test (40.00%)[11]. The findings of present study are in comparison with the observation of Framingham Heart study which had confirmed obesity as one of the independent risk factors in the genesis of coronary artery disease [12]. Gupta *et al*. in 1995 studied 2212 adults of 20 years of more age, observed coronary risk factors in 11% of obese adults whose BMI was more or equal to 27 kg/m2[13]. Also the Ramchandran *et al*. in 1998 by studying 953 subjects showed that the prevalence of obesity as a risk factor of CAD was more as compared to hypertension [14]. Sharda *et al*. concluded that analysing BMI concluded that higher value of BMI (≥30) may be a significant contributory risk factor (P value 0.0318) in the development of CAD in diabetic cases [15].

In present study, out of 12 women who had HbA1c of >6.5%, one (8.33%) showed abnormal ECHO. Hyperglycemia and impaired glucose tolerance is a known risk factor which can directly lead to coronary heart disease. In agreement with present study Liu Yao *et al*. concluded that HbA1c level is an independent predictor of total mortality in CAD patients without but not in patients with diabetes [16] Saydah *et al*. reported that patients with HbA1c >8% has 15% increased risk of death from heart disease[17]. The lower percentage reported in present study may be due to small sample size.

In patients with TG≥150, HDL<50, LDL≥100 and VLDL≥30 mg/dl, 0, 1, 1, 0 and 1 patients had abnormal ECHO respectively. Study by Sharma *et al*. also demonstrated that patients with subclinical hypothyroidism had significantly higher levels of serum hs-CRP, Lp (a), total cholesterol, and LDL-C when compared to same parameters of controls [18]. Roos *et al*. had done bicycle ergometry and dobutamine stress echocardiography of 51 cardiac asymptomatic hypothyroid patients and was found that HDL cholesterol was lower and triglyceride were higher but he did not get any positive result for bicycle ergometry[19]. According to Giral *et al*. a positive exercise electrocardiogram is not infrequent occurrence in asymptomatic hypercholesterolemic patients, but the number of false positive tests may be relatively high (50%)[20].

In present study we did not find any women having abnormal ECHO finding in hypothyroid group. However previous studies have reported hypothyroidism a significant risk factors for the development of osteoporosis and CVD. Previous studies have recommended toscreen thyroid dysfunction in asymptomatic women [21]. However, it is always difficult to differentiate between Menopause and hypothyroidism because of similar symptoms [22].

Cross sectional nature and small sample size were the main limitations of the present study. We recommend performing a large randomized clinical trial to strengthen the present study findings.

CONCLUSION

Echocardiography has contributed to the early recognition of several distinct cardiac diseases in post-menopausal women. Though small number but ECHO findings revealed that risk of CVD development may increase among post-menopausal women who were overweight, had hot flushes and abnormal lipid profile. We did not find any women who were hypothyroid with abnormal ECHO.

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