



A Study on Left Ventricular Mass of Patients Having Hypertension in Women with Menopause

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Authors' contributions

This work was carried out in collaboration among all the authors. All authors read and approved the final manuscript.

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ABSTRACT

Increase in left-ventricular mass has become an important risk factor for cardiovascular morbidity and mortality. Although, there is an obvious change in the cardiac size with respect to age and the hypertrophic stimuli, it is very different in men and women. In men the left ventricular mass may remain constant with age, while in women it increases with age. These findings are even more pronounced in women more than 50 years of age who have attained menopause. This study is to show that even though left ventricular mass increases in menopausal women compared to younger women in the reproductive age group, it is more severe in women who have hypertension.

Keywords: Left ventricular mass; hypertension; diabetes; menopause.

1. INTRODUCTION

Premenopausal women have a lower risk of coronary heart disease than age-matched men, whereas after menopause the male-female ratio of coronary heart disease death declines. In the

overall population, there is a progressive age-related growth in myocardial mass in women that is not seen in their males. Premenopausal women with essential hypertension have thinner posterior left ventricular walls and better cardiac function than elder mens. Postmenopausal

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women with systolic hypertension or aortic stenosis have better preserved left ventricular systolic function than their male counterparts. Some studies report that the loss of the cardioprotective effect of estrogen after menopause may have a major role in the deterioration of left ventricular diastolic dysfunction in elderly women. The aim is to study the left ventricular mass of patients having both hypertension and diabetes in women who have attained menopause.

2. MATERIALS AND METHODOLOGY

2.1 Study Population

A total of 100 patients were included in the study, where 50 were control, 50 were only hypertensive. All patients were above the age of 30 years and had a minimum duration of illness of about 5 years.

2.2 Place of Study

This was a cross-sectional case-control study in Sree Balaji Medical College and Hospital, Chennai, Tamilnadu, India.

2.3 Parameters

Subjects were questioned about history of pregnancy, delivery, treatment of hypertension, diabetes and dyslipidemia.

2.4 Method

The M mode of echocardiography was used to find the left ventricular mass with the following formula (Penn formula). The measurements

included LV wall thickness (LVWT, defined as the sum of posterior wall thickness [PWT] and interventricular septal thickness [IVST]), internal diameter at end-diastole (LVIDD), and internal diameter at end-systole (LVIDS). Left ventricular mass was estimated by the modified formula: $LVM \text{ (in grams)} = 0.80 \times (1.04 \times (LVIDD + LVWT)^3 - (LVIDD)^3) + 0.6$.² SPSS software version 19 was used for all statistical analyses.

3. RESULTS

Among 50 patients in the systolic hypertension cases 28 were females and 22 were males. Among the control group 23 participants were females and 27 participants are males. In this current study there was high statistical correlation found for gender and the left ventricular mass. Among female gender and left ventricular mass among cases and control there was statistical significance with p value <0.000 and between male gender and left ventricular mass the p value was found to be statistically significant (p value <0.000). Females were at higher chances of having LVM compared to males on the basis of chi square value.

Among the female participants in this study with SHTN 12% attained menopause and 6.7% has regular cycles. In the control group 10% participant's attained menopause and 5.3% has regular cycles. Among patients with regular menstrual cycles 3.2% from SHTN group. Among women who attained menopause there were 20% of cases with severe LV mass in the SHTN group. The difference between menopause and LV mass was found to be statistically significant P value <0.005.

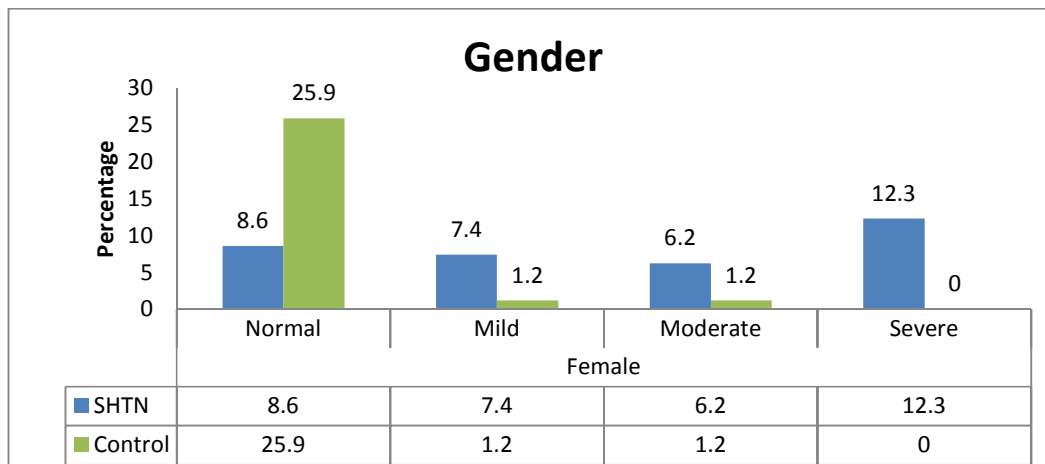


Fig. 1. LVM compared in female subjects

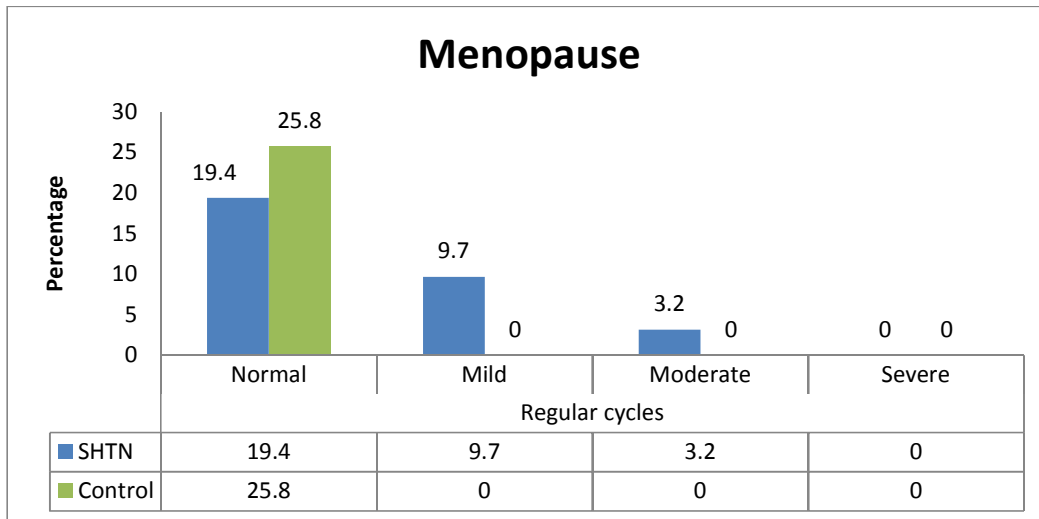


Fig. 2. Correlation between LVM and menopause

4. DISCUSSION

Menopause is associated with the cessation of the ovarian function which results in low oestrogen levels in the plasma which can in turn result in vasomotor disturbances, osteoporosis, hypertension and atherosclerosis. While in men, fall in testosterone and other androgen levels have been noted which have lead to severe coronary artery disease and osteoporosis in later life.

Androgens have anabolic effects on cardiac cells, and oestrogens have anti-proliferative properties. This could in Turn mean that during menopause due to the decrease in the plasma levels of oestrogen there is an increase in left ventricular mass.

Oestrogen receptor variants are understood to have a very important role in the normal vascular physiology. Animal studies have demonstrated about the importance of estrogen receptors in the cardiovascular functioning [1-5]. Estrogen may also have indirect influences on myocardial structure by altering the coronary vasculature, plasma lipid levels, and glucose metabolism [6-8].

5. CONCLUSION

It is generally recognized that both healthy men and women have increased body weight and blood pressure with advancing age [12]. Gender differences in the effects of these factors on LV diastolic function may be associated with a sharp

increase in LVDD in elderly women. However, hypertension and diabetes are risk factors for diastolic heart failure at the age of menopause.

CONSENT AND ETHICAL APPROVAL

As per university standard guideline, participant consent and ethical approval have been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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