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Prevalence of Left Ventricular Hypertrophy in Obesity

Authors

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Introduction

Obesity is becoming a global epidemic^{1,2},.It is a complex multifactorial chronic disorder that develops from an interaction of genotype and the environment³. Changing lifestyle has led to a increase growth in overweight and obesity. Overweight and obesity must be regarded as serious medical problems in our time since obesity is associated with reduced life expectancy. It is apparent that a variety of adaptation and alteration occur in cardiac structure and function due to accumulation of excessive adipose tissue, even in absence of systemic hypertension or underlying organic heart disease. Hence this study was undertaken to study the prevalence of left ventricular hypertrophy in young individuals and its correlation with obesity.

Materials and method

In this comparative cross-sectional study,50 obese males (BMI>23) and 50 non-obese males (BMI<22.9) in the age group of 18-28 years were selected from the general population of Dibrugarh randomly. The ethical committee clearance and an informed consent of the subjects were taken. Subjects less than 18 years and more than 28 years and young obese with overt cardiovascular disease, respiratory disease, electrolyte abnormalities, renal failure, hypertension, diabetes mellitus and with other serious co-morbid conditions, obese involved in competitive sports or trained athletes or on medication which can affect B.P.,ECG changes and not consenting for ECG were excluded from the study.

Anthropometric parameters like height (in cm), weight (in Kg) were recorded and body mass index(BMI) was derived by Quetelet's index.

BMI=weight (kg)/height (m2).

After 20 mins of rest in supine position ECG were recorded. Presence or absence of LVH was determined by using **Sokolow-Lyon criteria**^{4,5} According to this criteria for the ECG diagnosis of LVH involve measurement of -

S in V₁ + R in V₅ or V₆ (whichever is larger) \geq 35 mm

Results and Observation

The 50 obese individuals were divided into two groups as shown in table 1. Prevalence of LVH in ECG as determined by using Sokolow-Lyon

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criteria is shown in table 2 and figure 1.It was maximum in Obese individuals with $BMI \ge 30$ and was minimum in control group. The association of LVH with increasing obesity was

also very highly significant(p<0.001). Overall, it was found that obesity had an increased risk of having LVH(Odds Ratio=4.636, C.I.=1.553-13.840, p<0.05).

Table 1: Distribution of cases according to their BMI

GROUPS	BMI	No of individuals	% of individuals
Obese I	25.0-29.9	31	62
Obese II	≥ 30.0	19	38

Table 2: Distribution of LVH from ECG

GROUPS	PRESENT	ABSENT
	Number (percentage)	Number (percentage)
CONTROL (n=50)	5(10%)	45(90%)
OBESE I (n=31)	6(19.4%)	25(80.6%)
OBESE II (n= 19)	11(57.9%)	8(42.1%)





Discussion

The results of present study showed that the prevalence of left ventricular hypertrophy increased with increased BMI, similar results were observed by Soteriades ES et al⁶, M. A. Fraley et al⁷ and Okin PM⁸. To meet increase metabolic needs in obesity circulating blood volume, plasma volume and cardiac output increases. The increase in blood volume in turn increases the venous

return to right and left ventricle, eventually producing dilatation of these cavities, increasing the wall tension. This leads to LVH, which is accompanied by decrease in diastolic chamber compliance, eventually resulting in an increase in left ventricular filling pressure and progressive ventricular enlargement.

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Conclusion

Obesity, produces a variety of hemodynamic changes that may predispose to alterations in cardiac morphology and ventricular function. Therfore obesity must be regarded as a serious health problem which must be prevented at the earliest.

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