Original Article

Incidence of coronary artery disease in asymptomatic obese individuals

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Abstract

Aims: To find out evidence of coronary artery disease in asymptomatic obese individuals by treadmill stress test - modified bruce protocol. To study left ventricular function in these individuals by 2D Echocardiography Obesity being one of the major risk factor for coronary artery disease present study was undertaken to find out evidence of coronary artery disease in asymptomatic obese individuals. 50 asymptomatic obese individuals were studied both males and females having Body Mass Index more than 30. Treadmill stress test was performed in each case by using modified Bruce protocol. Test was positive in 22% individuals. Left ventricular hypertrophy was found in 32% and diastolic dysfunction in 10% individuals. Thus there is rise in cardiovascular risk like hypertension and incidence of coronary artery disease as BMI increases.

Key Words: Asymptomatic obese treadmill stress test, coronary artery disease.

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INTRODUCTION

Coronary artery disease is one of the leading cause of death in developing countries. It is assuming serious dimensions and major hospital admissions. Obesity is one of the important risk factor for cardiovascular diseases. Obesity increases adverse cardiac events in many ways. These may be indirectly mediated through risk associated with dislipidemia, hypertension and glucose intolerance. The present study was carried out in tertiary care hospital to find out incidence of coronary artery disease in asymptomatic obese individuals.

MATERIAL AND METHODS

50 asymptomatic obese individual (>18 yrs old), both males and females having BMI >30 were included in the study. Individuals with known ischaemic heart disease were excluded. Detailed history was taken and clinical examination was done in each case. Individuals were classified in 3 classes according to their BMI.

Class I: 30.0 to 34.9
Class II: 35 to 39.9
Class III: 40.0 and more

ECG, blood sugar and lipid profile were done. Treadmill stress test was performed by using modified Bruce protocol in each individual. Left ventricular function was assessed by 2D echocardiography.

RESULTS

Treadmill test was positive in 22% of study population. Left ventricular hypertrophy was found in 32% and diastolic dysfunction in 10%. 4% individuals showed left ventricular hypertrophy as well as diastolic dysfunction.

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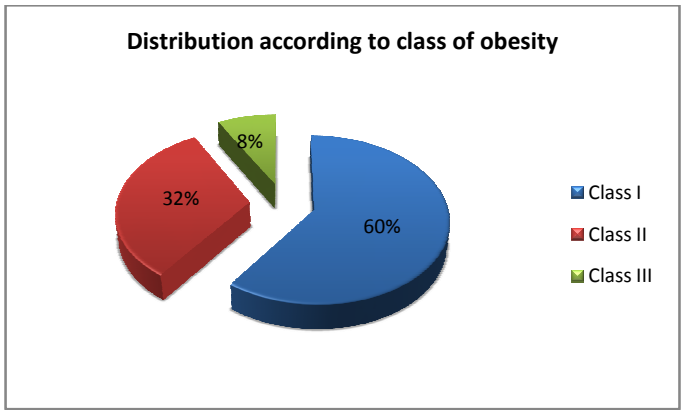


Figure 1: Distribution according to class of obesity

In our study out of 50 subjects maximum obese individuals 30 (60%) were in Class 1 obesity, 16 (32%) were in class 2 and 4 (8%) were in Class 3.

Table 1: ECG findings in obese individuals

Ecg Finding	No Of Patients	Percentage
Normal	18	36%
Low Voltage Complexes	10	20%
Left Ventricular Hypertrphy	8	16%
T Wave Inversion	6	12%
St –Flattening	4	8%
Left Axis Deviation	4	8%

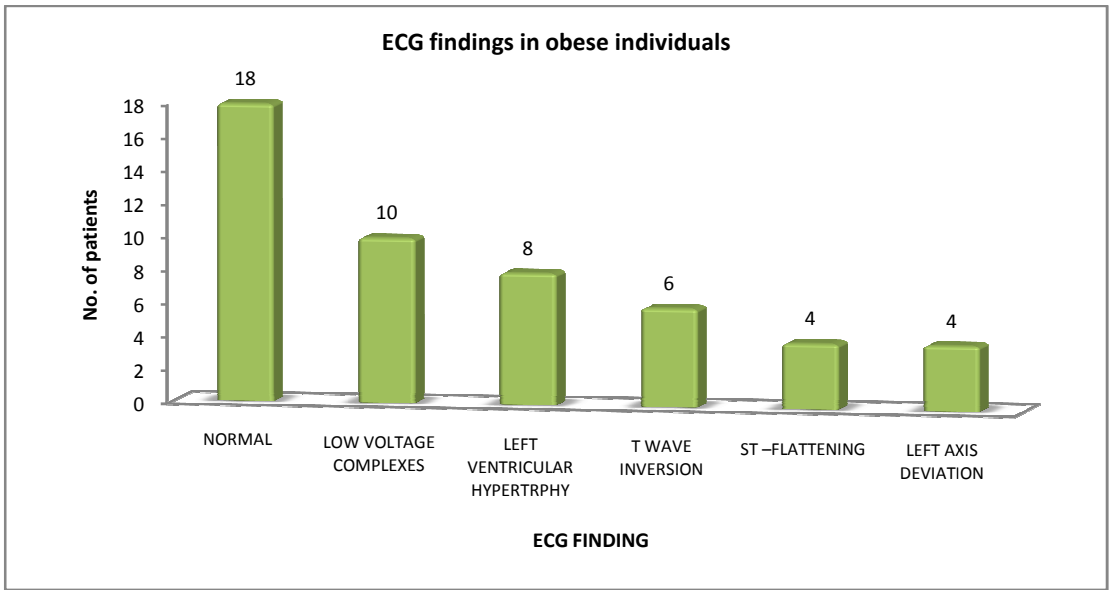


Figure 2

Table 2: Interpretation of Treadmill Tests

Interpretation	No of Obese Individuals	Percentage
Positive Treadmill Test	11	22%
Negative Treadmill Test	39	78%

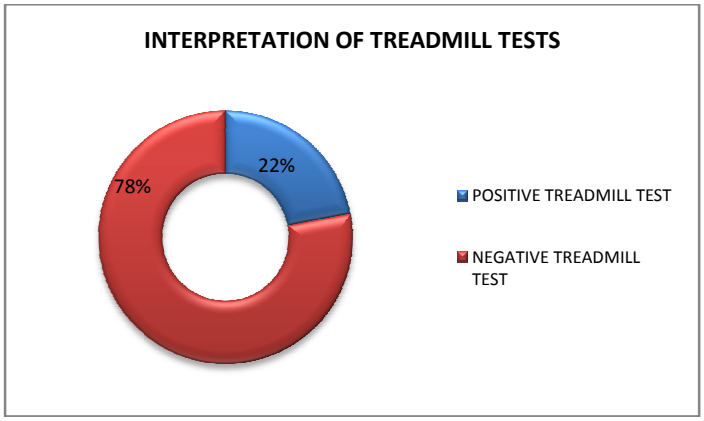


Figure 3

Table 3: Prevalence of hypertension with reference to BMI

BMI group	No of total subjects	Total no of hypertensives	Percentage
Class 1	30	8	26.66%
Class 2	16	12	75%
Class 3	4	3	75%

Chi square=11.29 D.F.=2 p value=0.003

Table 4: Prevalence of dyslipidemia with reference to BMI

BMI group	No of total subjects	Total no of patients with dyslipidemia.	Percentage
Class 1	30	9	30%
Class 2	16	11	68.75%
Class 3	4	4	100%

Chi square=10.99 D.F.=2 p value=0.004

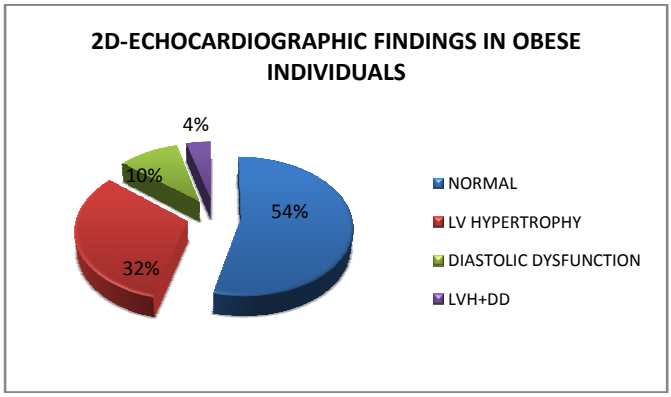
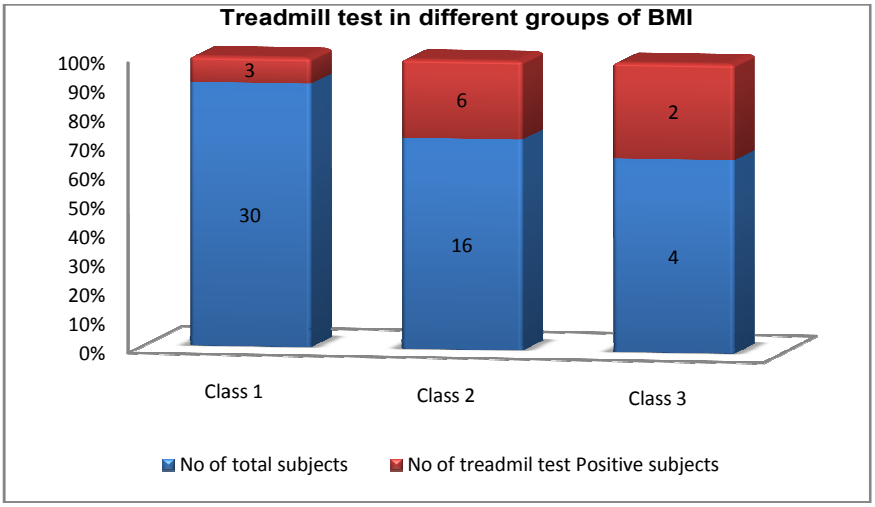


Figure 4

Table 5: Treadmill test in different groups of BMI

Bmi group	No of total subjects	No of treadmil test Positive subjects	Percentage
Class 1	30	3	10%
Class 2	16	6	37.5%
Class 3	4	2	50%

Chi square=6.585 D.F.=2 p value=0.03



DISCUSSION

Interpretation of Treadmill Test

In present study of 50 asymptomatic obese individuals 11 had positive treadmill test i.e. 22% had positive treadmill test. So incidence of coronary artery disease in our study was 22%. Ancel Keys *et al* (1972) studied the relationship between the relative weight and of skin fold thickness to the 5 years incidence (632) cases of coronary

heart disease. In this study men having Body mass index more than 27 were labeled as relatively heavy men. 22.3% individuals were in this category, out of them 29% from America and 23.1% from southern Europe developed coronary artery disease. In this study incidence of coronary artery disease was 29% in Americans and 23.1% in people of southern Europe.89

So incidence of coronary artery disease in our study is comparable to incidence in this study.

Endpoints of Treadmill Test

Out of 50 individuals 22 i.e.44% obese individuals achieved target heart rate. Treadmill test was terminated due to fatigue in 17 individuals.ST-depression was seen in 9 individuals and 2 individuals developed angina during test. 22 out of 50 achieved target heart rate. Treadmill test was terminated in 38 obese individuals. In 17 individuals treadmill test was terminated due to fatigue. These individuals achieved 80% or more of the target heart rate. ST depression developed in 9 out of 50 individuals during treadmill test.2 individuals developed typical angina during test and test was terminated in these individuals. So treadmill test was positive in 11 individuals. The relationship between BMI, other cardiovascular risk factors and the prevalence of coronary artery disease are complex. Obesity and/or an increased BMI are independently associated with greater risk of insulin resistance, diabetes, hypertension, and dislipidemia. Data suggests that the presence of these comorbidities may be more important markers of coronary artery disease risk than obesity alone. Further, there is increasing evidence of a relationship between obesity and systemic inflammation, including an increased production of inflammatory factors such as leptin, tumor necrosis factor-a, interleukin-6.

CONCLUSION

As BMI increases there is rise in cardiovascular risk factors like hypertension and dislipidemia hence it increases coronary artery disease. Thus regular screening of asymptomatic obese individuals for hypertension and dislipidemia is recommended. Treadmill stress test is recommended to find out latent coronary artery disease in these individuals.

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