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Medicine

# EPICARDIAL ADIPOSE TISSUE THICKNESS A NOVEL CARDIOMETABOLIC RISK IN HYPERTENSIVE OBESE ADULTS

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**ABSTRACT**

**INTRODUCTION :-** Obesity is a independent risk factor for DM, HTN, OSA, stroke, MI, Arrhythmias etc. Epicardial Adipose Tissue (EAT) is a lipid-storing depot (an endocrine organ) secreting cytokines & chemokines So it could play roles in the pathogenesis of coronary atherosclerosis & cardiomyopathy

**AIM/OBJECTIVE:-** Study Epicardial Adipose Tissue (EAT) as an independent prognostic marker in hypertensive obese adult as recent cardiovascular risk marker and its comparison with Body mass index (BMI).

**MATERIAL & METHOD:-** All adults patient attending the Medicine OPD in two year duration were enrolled in the study. Anthropometric data collection :-Weight(Kg), Height(cm), Waist Circumference(cm), Hip Circumference(cm). Echocardiography was performed after anthropometric measurements. Two dimensional targeted M-mode measurement of EAT as recommended by American Society of echocardiography(ASE).

**RESULT:-** The BMI was found higher in the experimental group 42.48(+/-7.35)than control group 21.69(+/-3.32). BSA & WHR both were significantly higher in experimental than control group. EAT are significantly higher in experimental group than control group.

**CONCLUSION:-** Reduction in BMI , marker of Obesity will lead to improvement of epicardial adipose tissue thickness & will likely to prevent further cardiovascular morbidity & mortality"

**KEYWORDS :** EAT, BMI, coronary atherosclerosis

## INTRODUCTION :-

The global epidemic of overweight and obesity- is rapidly becoming a major public health problem in many part of the world. Obesity is now becoming an independent risk factor for many chronic vascular diseases like hypertension, Coronary artery disease, Arrhythmias, Stroke, Atherosclerosis[1]

Echocardiographic evaluation of Epicardial Adipose Tissue (EAT) thickness is a new cardiometabolic risk factor as it secrets various inflammatory cytokines & chemokines , which plays significant role in the pathogenesis of coronary atherosclerosis & cardiomyopathy[2,3,4]

## AIM/OBJECTIVE:-

To Study Epicardial Adipose Tissue (EAT) as an independent prognostic marker in hypertensive obese adult as recent cardiovascular risk marker and its comparison with Body mass index( BMI).

### Inclusion Criteria

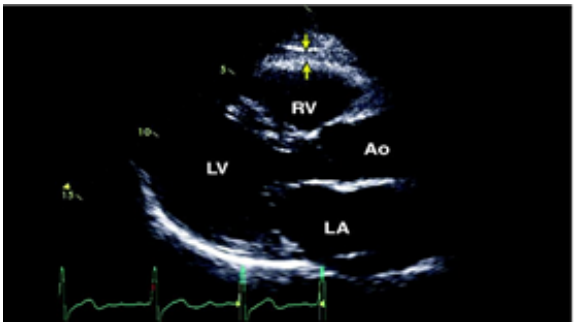
1. Consent was taken from all patient included in study
2. All patient with age between 20years to 60years
3. Obese as Cases with BMI ≥30kg/m²
4. Non Obese as Controls - with BMI 18.5kg/m² to 24.9kg/m²

### Exclusion criteria

1. Who are not willing to give consent
2. All Diabetic Subjects
3. Patients with history of heart disease
4. All Patient who are overweight - with BMI of 25.0kg/m² to 29.9kg/m²
5. Women with pregnancy

## MATERIAL & METHOD:-

All adults patient attending the Medicine OPD of Sri Aurobindo Medical College and Post graduate, Indore in two year duration were enrolled in the study. Total of 200 patients were included in study, out of them 100 hypertensive obese adults as cases and 100 normal adult were enrolled as control group. Anthropometric data collection was done for all cases and controls as Weight in Kg, Height in cm to calculate BMI, Waist Circumference in cm and Hip Circumference in cm, three readings were taken for each and mean of these readings was taken. Epicardial Adipose Tissue was measured by M-mode 2D-echocardiography as recommended by American Society of echocardiography (ASE). EAT was identified as an echo-free space in the pericardial layers on 2-dimensional echo & its thickness measured perpendicularly on the free wall of the right ventricle at end diastole for three cardiac cycles and mean values were taken. American Society of echocardiography (ASE). EAT was identified as an echo-free space in the pericardial layers on 2-dimensional echo & its thickness measured perpendicularly on the free wall of the right ventricle at end diastole for three cardiac cycles and mean values were taken.




## RESULTS:-

In this study we found that the BMI was higher in the experimental group with mean value 42.48(+/-7.35)than control group 21.69(+/-3.32) (table1).

Body surface area(BSA) was also significantly higher in experimental group with mean value 2.19(+/-0.22) than control group 1.68(+/-0.23) (z test 16.02 & p value 0.001) & Waist hip ratio(WHR) was also significantly higher in experimental group with mean value 0.97(+/-0.13) than control group 0.92 (+/-0.07) (z test 3.39 & p value 0.001) (table2).

In our study we also found EAT were significantly higher in experimental group with mean value 8.58(+/-1.26) than control group 6.78(+/-1.12) (z test 10.68 & p value 0.001) (table3).

**Table -1 MEAN BMI IN BOTH THE GROUPS**

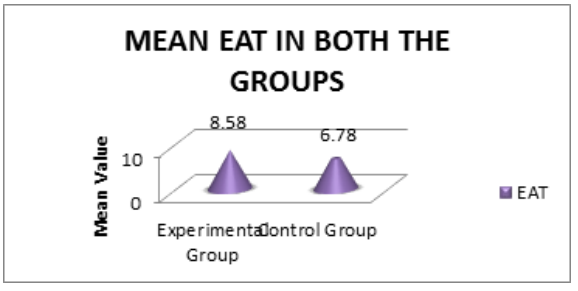
| Characteristic | Experimental Group (Mean ± SD) | Control Group (Mean ± SD) |
|---|---|---|
| BMI ($kg/m^2$) | 42.48 ± 7.35 | 21.69 ± 3.32 |

**Table-2 Mean Anthropometric data (WHR & BSA) of both the groups**

| Characteristic | Experimental Group (Mean ± SD) | Control Group (Mean ± SD) | 'Z' test | P value |
|---|---|---|---|---|
| WHR | 0.97 ± 0.13 | 0.92 ± 0.07 | 3.39 | 0.001*** |
| BSA (m2) | 2.19 ± 0.22 | 1.68 ± 0.23 | 16.02 | 0.001*** |

**Table-3 MEAN EAT IN BOTH THE GROUPS**

| Characteristic | Experimental Group (Mean ± SD) | Control Group (Mean ± SD | 'Z' test | P value |
|---|---|---|---|---|
| EAT | 8.58 ± 1.26 | 6.78 ± 1.12 | 10.68 | 0.001*** |




In our study we found that EAT in both the genders shows significant positive correlation with BMI and BSA, while is not correlated significantly with WHR. And among the three parameters of anthropometry highest correlation of EAT was seen with BMI ($r=0.544$) ($p<0.001$) in males & ($r=0.402$) ($p<0.001$) in females (table 4)

**Table- 4 Correlation between the measures of obesity and EAT in both the groups (Pooled Data N=200)**

| CHARACTERISTIC | MALE/FEMALE | BMI r value( P value) | WHR r value (p value) | BSA r value (p value) |
|---|---|---|---|---|
| EAT | Male | 0.544 (0.001***) | 0.151 (0.111) | 0.433 (0.001***) |
| | Female | 0.402 (0.001***) | -0.053 (0.624) | 0.381 (0.001***) |

**DISCUSSION :-**

In our study of 200 subjects we found that the BMI was significantly higher in the experimental group 42.48(+/-7.35)than control group 21.69(+/-3.32*)* and this was also supported by *Oliver J et al* in *2009* they also found BMI ($37.8 \pm 6.9$ kg/m$^2$) higher in cases than in controls (BMI $21.7 \pm 1.8$ kg/m$^2$) in their study. [5]

We also found BSA & WHR both were significantly higher in experimental than control group and this was also supported by *Okpara IC et al* in 2009 and they also found that BSA & WHR were significantly higher in the obese subjects than control group ($p<0.05$)[6].

In our study we also found that EAT is significantly higher in experimental group than control group. we found that EAT in both the genders shows significant positive correlation with BMI and BSA, while is not correlated significantly with WHR. And among the three parameters of anthropometry highest correlation of EAT was seen with BMI this was also supported by *Barbaro G et a*l in 2016 and they found positive correlation between EAT and *z*-BMI among overweight/obese children[7] and also by Iacobellis G et al in 2003 they also found positive correlation of EAT with BMI(8).

**CONCLUSION:-**

Higher values of EAT in both the genders shows positive correlation with BMI and BSA & shows no correlation with WHR. EAT is an indirect evidence of Visceral adiposities and has a strong correlation with Obesity . Thus Reduction in BMI , marker of Obesity will lead to improvement of epicardial adipose tissue thickness & will likely to prevent further cardiovascular morbidity & mortality.

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