STUDY ON EPICARDIAL ADIPOSE TISSUE ASSOCIATED WITH CVD RISK

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ABSTRACT

Whereas accumulation of abdominal visceral adipose tissue (VAT) is associated with increased prevalence of coronary artery disease (CAD). However, it is worth noting that a very limited studies conducted in earlier days among younger population. In this proximity the present study attempts to correlate the echocardiography assessment of epicardial fat and anthropometric measurement of patients attending OPD at PMSSY Superspeciality Hospital, Victoria, Bowring & Lady Curzon Hospitals, attached to BMC&RI. Epicardial fat thickness $\geq$ 5 mm is related with CVD morphological abnormalities on echocardiography. Further studies could be needed for evaluation of epicardial fat $>$ 5mm and ensure the standardization of EAT predicting factors.

KEYWORDS: CVD Risk, Epicardial Fat Thickness, Echocardiography, Abdominal Subcutaneous Tissue

INTRODUCTION

The body fatness proliferatly distributed in related to antherogogenesis. In the advent of adiposity exhibits an independent antiatherogenic effect. In order to this accumulation of abdominal fat faintly affect the visceral adipose tissue VAT and will be associated with increase of coronary artery diseases. Whereas the amelioration of body weight gain evidence shows that the excessive development of other specific adipose depot such as cardiac, abdominal subcutaneous tissue (SAT) or the accumulation of lipids outside the adipose tissue is also associated with metabolic and cardiovascular complications. Epicardial adipose tissue is situated between the visceral layer of the pericardium and the myocardium. Both EAT and adjacent myocardium are supplied by same coronary arteries and are not separated. Recent studies have been suggested that increased EAT could be an important risk factor for cardio vascular diseases. EAT is correlated with diastolic blood pressure and in obese patients with index of insulin resistance and glucose intolerance. EAT could be involved in pathogenesis of CVD through an increased ventricular stiffness or through secretion of various locally acting inflammatory markers such as MCP-1, interleukin IL-1 beta, IL-6, or tumor necrosis factor -alpha mRNA (TNF$\alpha$). It is worth noting that a very limited studies conducted in earlier days among younger population. In this proximity the present study attempts to correlate the echocardiographic assessment of epicardial fat and anthropometric measurement of patients attending OPD at PMSSY Superspeciality hospital, Victoria, Bowring & Lady Curzon Hospitals, attached to BMC&RI.

METHODOLOGY

A prospective cross sectional study conducted at PMSSY Superspeciality hospital, Victoria, Bowring & Lady Curzon Hospitals, attached to BMC&RI, Bangalore during the accrual period of (2013-2014). The patients
were randomly considered for the study with written consent obtained from the patient / care taker. Inclusion and exclusion criteria was considered for the study viz., inclusion; the age between 18-42 years, BMI > 18.50 kg/m² and Exclusion criteria; Cancer, chronically ill patients, diabetes mellitus, hypertension and recently operated patients. Clinical assessment was done for all patients such as anthropometric measurements, weight, height, BMI, waist circumference, waist hip ratio was measured on standard protocol. Primary investigation was done at the same hospital premises. Echocardiographic assessment of epicardial adipose tissue was done for all patients. Epicardial adipose tissue is usually seen as an echo-free space, if it is massive seen as hyper-echoic space. Collected data was analyzed by SAS-16.50 version. Univariate and logistic regression analysis was employed to test the hypothesis

RESULTS

Figure 1: Radiological Images of Epicardial Fat Accumulated (MRI Scanning)

Figure 2: Lateral View or Appearance of Epicardial Fat Distributed on the Surface
Figure 3: Age Distribution of the Patients

Table 1: Epicardial Fat Thickness with Significance Level of CVD Risk

<table>
<thead>
<tr>
<th>Sl</th>
<th>Epicardial Fat Thickness</th>
<th>No (%)</th>
<th>CI-95%</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>2mm</td>
<td>21(21.0%)</td>
<td>0.91-0.96</td>
<td>0.16ns</td>
</tr>
<tr>
<td>02</td>
<td>3 mm</td>
<td>21(21.0%)</td>
<td>0.82-0.83</td>
<td>0.18ns</td>
</tr>
<tr>
<td>03</td>
<td>4 mm</td>
<td>18(18.0%)</td>
<td>0.76-0.86</td>
<td>0.00**</td>
</tr>
<tr>
<td>04</td>
<td>5 mm</td>
<td>18(18.0%)</td>
<td>0.78-0.81</td>
<td>0.00**</td>
</tr>
<tr>
<td>05</td>
<td>6 mm</td>
<td>7(7.0%)</td>
<td>0.65-0.71</td>
<td>0.00**</td>
</tr>
<tr>
<td>06</td>
<td>7 mm</td>
<td>10(10.0%)</td>
<td>0.69-0.78</td>
<td>0.00**</td>
</tr>
<tr>
<td>07</td>
<td>8 mm</td>
<td>4(4.0%)</td>
<td>0.56-0.55</td>
<td>0.00**</td>
</tr>
<tr>
<td>08</td>
<td>9 mm</td>
<td>0(0.0%)</td>
<td>0.00 -</td>
<td>-</td>
</tr>
<tr>
<td>09</td>
<td>10 mm</td>
<td>1(1.0%)</td>
<td>0.32-0.25</td>
<td>0.98ns</td>
</tr>
</tbody>
</table>

**, Significant at 1% level (p<0.001), ns-nonsignificant

Table 2: Significance of Confounders of CVD Risk

<table>
<thead>
<tr>
<th>Confounders</th>
<th>Probit Odd Ratio</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.86</td>
<td>0.00**</td>
</tr>
<tr>
<td>Epicardial fat thickness &gt;6mm</td>
<td>0.92</td>
<td>0.00**</td>
</tr>
<tr>
<td>Elevated BMI</td>
<td>0.93</td>
<td>0.00**</td>
</tr>
<tr>
<td>Consumed high calorie food(Junk)</td>
<td>0.96</td>
<td>0.00**</td>
</tr>
<tr>
<td>Family history</td>
<td>0.78</td>
<td>0.16ns</td>
</tr>
<tr>
<td>Lack of awareness</td>
<td>0.68</td>
<td>0.22ns</td>
</tr>
<tr>
<td>Literacy</td>
<td>0.52</td>
<td>0.23ns</td>
</tr>
<tr>
<td>Gender(m/f)</td>
<td>0.87</td>
<td>0.00**</td>
</tr>
</tbody>
</table>

**, Significant at 1% level (p<0.001), ns-nonsignificant

The mean age of patients was 45.63 ± 3.58 years. The proportion of males was 70 %. EAT thickness > 5 mm was also significantly associated with older patients’ age (73.5 vs 60, P = <0.01). On the basis of the fact that the EAT thickness was not been affected to gender it is evident from the results the results were found to be no significant difference between males and females population in all measured characteristics studied, the EAT thickness > 5mm is statistically significant with enlargement of LA and LAVI (P<0.01). One more studies depicts and explores that the abnormal systolic functions demonstrated by higher E/a ratio. However higher epicordial ft thickness is severely affected in older age group population (p<0.01). Asper the analysis, the relationship of EAT thickness and LVMI,EF and E/A ratios were shown to be independent predictors of age irrespective of gender bias. EAT thickness >5mm was also associated with higher fasting glucose level and systolic hypertension and the lipid parameters of metabolic syndrome.
DISCUSSIONS

In summing of the results the present study explores the association between obesity and adaptive characteristic in cardiac morphology and function 19-21. Subsequently in the presence of visceral adiposity, even in clinically we would be seen in non obese patients possess to confer an increased risk of higher LV mass and diastolic dysfunction. Eagerly EAT has been found to be marker of the overall of VAT in the body and in addition has anatomical proximity to the heart. The present study has documented EAT to be closely associated with cardiac morphology and function in Indian perspective. One more similar study conducted in Canada the study has clearly depicts that parallel increase in LV mass with increasing EAT, which was noted to be strong indicator of ischemia. The release of adipokines and other inflammatory markers from the EAT can locally induce cardiac remodelling.[26].

CONCLUSIONS

The present study concludes that the obesity is a growing epidemic in worldwide and strongly associated with cardiovascular risk, with the advent of the metabolic syndrome, diabetes mellitus type-II and sleep apnea. The Visceral adiposity is biomarker of increased risks where as it is not readily assessed (cost effective). Epicordial fat thickness > 5mm is predictors with cardiac morphological abnormalities on echocardiography.

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