STUDY OF CORRELATION AND EVALUATION OF EPICARDIAL FAT THICKNESS WITH ABDOMINAL VISCERAL FAT THICKNESS IN OBESE AND NON-OBESE TYPE 2 DIABETES SUBJECTS

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Abstract

Method: FBS/PPBS done by GOD POD method IN Vitros "S", FS machine. HBA1C Done by HPLC plus ion exchange resin. Lipid profile after overnight fasting of 12 hours blood collected in the morning about 5 ml and the serum centrifuged and kept for analysis. Serum cholesterol estimation: The CHOD-PAP method, enzymatic colorimetric test was used in Vitros "S", FS machine.

Result: After applying Levene's test for equality of variance, t test between mean of epicardial fat thickness and visceral fat thickness between obese and non-obese groups, shows statistically significant ($p < 0.05$) association. Obese patients (11.88 ± 1.40) had significantly more epicardial fat thickness as compared to non-obese type 2 diabetes patients (10.19 ± 1.37), $t(148) = -7.39$, ($p < 0.05$). Obese patients (58.85 ± 10.89) had significantly more visceral fat thickness as compared to non-obese type 2 diabetes patients (46.23 ± 9.79), $t(148) = -7.34$, ($p < 0.05$).

Conclusion: Diabetes mellitus (DM) refers to a group of common metabolic disorders lead to phenotype of hyperglycemia and caused by a complex interaction of genetics and environmental factors. We concluded that EFT and VAT were significantly correlated among obese diabetics as compare to non-obese diabetic suggesting, Obesity is an independent risk factor for visceral adipose tissue deposition both in abdomen as well as in epicardial surface.

Keywords: Epicardial, Fat Thickness, Abdominal, DM, & Obese.

Introduction

Diabetes mellitus (DM) refers to a group of common metabolic disorders lead to phenotype of hyperglycemia. Several types of DM are caused by a complex interaction of genetics and environmental factors. (1)

Hyperglycemia is results of inadequate production of insulin and inability of the body to respond completely to the insulin is termed as insulin resistance.

Obesity is one of the modern epidemics with exponential rise which make millions at risk for obesity-related morbidity and mortality one of the significant diseases is coronary artery disease (CAD). Obesity show several features which overlap with metabolic syndrome (MetS) and are associated with known risk factors for cardiovascular disease (CVD)(2) like glucose and lipid metabolism impairment, endothelial dysfunction and atherosclerosis, leading to increased risk of cardiovascular events (3).

Epicardial adipose tissue (EAT) is referred as the adipose tissue found between the myocardium and the visceral layer of the pericardium (4). EAT is present over the right ventricle along with the coronary arteries, atrioventricular and interventricular grooves (IVGs). Because of its anatomical contiguity to the heart, epicardial fat can locally modulate the myocardium and coronary arteries (5)

Material & Method

- FBS/PPBS done by GOD POD method IN Vitros "S", FS machine.
 - HBA1C Done by HPLC plus ion exchange resin
 - Lipid profile:- After overnight fasting of 12 hours blood collected in the morning about 5 ml and the serum centrifuged and kept for analysis.
- Serum cholesterol estimation: The CHOD-PAP method, enzymatic colorimetric test was used in Vitros "S", FS machine

Inclusion Criteria

1. Patients with body mass index (BMI) > 25 For obese and 18.5-24.9 for non-obese.
2. Age between 18 -65 years of both sexes were studied
3. Patient with type 2DM in obese and non-obese subject...

Exclusion Criteria

1. Type 1DM
2. Subjects with BMI < 18 .
3. Patients < 18 year of age
4. Patients on any lipid lowering therapy.
5. Hypothyroidism.
6. Ascites.
7. Pregnancy.
8. Patients not willing for the study.

9. Patients with h/o previous cardiac, abdominal surgeries and presence of scar in areas.

Sample Size:-According to MRD data 100 cases of Type 2 DM presented in SAIMS in previous year. Therefore sample size of 150 cases studied during my period of study. . Therefore sample size of 150 cases were divided in to two group

Group A: Obese Diabetics (50%).

Group B: Non obese Diabetics (50%).

Data Collection and Methods:-

• The data will be collected with the help of appropriate predesigned proforma

• Detail history of patient and the investigation chosen for the study.

Investigation Details:

1. FBS/PPBS.
2. HBA1C.
3. LIPID PROFILE
4. 2D ECHO
5. USG (WHOLE ABDOMEN)

Results

Table 1: Distribution of age category

Sr. No	Age category	Number of patients	Percent
1	31-40 yrs.	13	8.7
2	41-50 yrs.	37	24.7
3	51-60 yrs.	65	43.3
4	61-70 yrs.	35	23.3
	Total	150	100.0

Table 2: Distribution of EFT and VFT according to sex

Row Labels	Mean of Epicardial Fat	Average of Visceral Fat
	Thickness(mm)	Thickness(mm)
Female	11.19	51.76
Male	11.10	55.45

In our study, the mean of EFT were 11.19 mm in female and 11.10 mm in male, and VFT were 51.76 mm in female and 55.45 mm in male.

Table 3: Distribution of mean of EFT and VFT in obese category

Obesity Category	Average of Epicardial Fat Thickness(mm)	Average of Visceral Fat Thickness(mm)
Non Obese	8.05	46.23
Obese I	11.57	56.12
Obese II	12.17	61.70
Obese III	13.38	68.25

Comparison of mean of epicardial and visceral fat thickness in obese categories, In our study, the mean of EFT in non-obese is 8.05 mm, obese I is 11.57 mm, obese II is 12.17mm and obese III is 13.38 mm respectively, and the mean of VAT is 46.23 mm in non-obese, 56.12 mm in obese I, 61.70mm in obese II, 68.25 mm in obese III respectively.

Table 4: Association between obesity, epicardial fat thickness and visceral fat thickness.

Group Statistics					
	Obesity category	Number of patients	Mean	Std. Deviation	Error Mean
Epicardial Fat Thickness(mm)	Non-obese patients	65	8.05	1.3791	0.1711
	Obese patients	85	11.888	1.4044	0.1523
Visceral Fat Thickness(mm)	Non-obese patients	65	46.234	9.7930	1.2147
	Obese patients	85	58.856	10.8961	1.1819

Table 5: Independent Samples Test

t-test for Equality of Means							
	t value	df	Sig.(2-tailed) (p value)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Epicardial Fat Thickness(mm)	-7.393	148	0.000	-1.6975	0.2296	-2.1512	-1.2437
Visceral Fat Thickness (mm)	-7.342	148	0.000	-12.6226	1.7191	-16.0198	-9.2254

1. After applying Levene's test for equality of variance, t test between mean of epicardial fat thickness and visceral fat thickness between obese and non-obese groups, shows statistically significant ($p < 0.05$) association.

2. Obese patients (11.88 ± 1.40) had significantly more epicardial fat thickness as compared to non-obese type 2 diabetes patients (10.19 ± 1.37), $t(148) = -7.39$, ($p < 0.05$).

3. Obese patients (58.85 ± 10.89) had significantly more visceral fat thickness as compared to non-obese type 2 diabetes patients (46.23 ± 9.79), $t(148) = -7.34$, ($p < 0.05$).

Discussion

Comparison of Epicardial adipose tissue with obesity distribution

Epicardial adipose tissue is the adipose tissue found between the myocardium and the visceral layer of the pericardium. EAT is located between myocardium and visceral layer of pericardium and covers 80% of the heart's surface and constitutes 20% of the total heart weight shares the same microcirculation with myocardium. (6)

In our study the mean of EFT in obese III is 13.38 mm, obese II is 12.17, obese I is 11.57 and in non-obese is 8.05 mm with mean of epicardial fat thickness is 11.19 mm in female and 11.10 mm in male which was statistically significant ($p < 0.05$), i.e. obese patients had more epicardial fat thickness than non-obese patients. (7)

Visceral fat thickness

Premanath M et al (8) quoted that visceral obesity is considered as an important risk factor for the development of insulin resistance. Contribution of genetic and environmental factor leads to more insulin resistance despite of truncal or generalized obesity in Asian Indian population.

Conclusion

Diabetes mellitus (DM) refers to a group of common metabolic disorders lead to phenotype of hyperglycemia and caused by a complex interaction of genetics and environmental factors. We concluded that EFT and VAT were significantly correlated among obese diabetics as compare to non-obese diabetic suggesting, Obesity is an

independent risk factor for visceral adipose tissue deposition both in abdomen as well as in epicardial surface.

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