

TO EVALUATE THE USEFULNESS OF EPICARDIAL FAT THICKNESS AS A PARAMETER OF ABDOMINAL VISCERAL ADIPOSITY IN OBESE & NON-OBESE TYPE 2 DIABETES PATIENTS

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Abstract

Background & Method: This study was done at Department of Endocrinology/General Medicine, Index Medical College Hospital & Research Centre, Indore, M.P. with an aim to Evaluate the Usefulness of Epicardial Fat Thickness as a parameter of Abdominal Visceral Adiposity in Obese & Non-Obese Type 2 Diabetes Patients. 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: In our study, out of 150 patients maximum patients were in the age group of 51-60 years i.e. 65 (43.3%) with mean epicardial fat thickness and visceral fat thickness was 11.177 mm and 52.585mm, followed by 37 (24.7%) patients in 41-50 years of age group with mean epicardial fat thickness and visceral fat thickness 11.52 mm and 54.216 mm, followed by 35 patient (23.3) in 61-70 with mean epicardial fat thickness and visceral fat thickness 11.249 mm and 53.971mm and 13 patient (8.7) in 31-40 age group with mean epicardial fat thickness and visceral fat thickness 10.862 mm and 53.862 mm respectively.

Conclusion: Obesity is an independent risk factor for visceral adipose tissue deposition both in abdomen as well as in epicardial surface. It can be assumed that epicardial fat reflects the more rapid and massive visceral fat loss occur after a low calorie diet program and help to reduce cardio-metabolic risk and the development of metabolic syndrome and thus contribute to reduction in morbidity and mortality in type 2 diabetic obese and non-obese patient.

Keywords: Evaluate, EFT, Visceral & Adiposity.

Introduction

Epicardial adipose tissue (EAT) is referred as the adipose tissue found between the myocardium and the visceral layer of the pericardium. EAT is present over the right ventricle and along the coronary arteries, atrioventricular and interventricular grooves (IVGs).^[1]

Epicardial adipose tissue (EAT) is a visceral fat found in the body and share common embryo genetic origin with intra-abdominal fat and evolves from brown adipose tissue during embryogenesis.^[2] 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.^[3]

There are two major types of adipose tissue, each with different physiological roles. White adipose tissue is predominantly located within the subcutaneous layers (SAT) and around the major organs (VAT). Its primary function is to serve as a storage organ for triglycerides and

free fatty acids during fasting, starvation or exercise. Brown adipose tissue on the other hand is located in clusters around the clavicles, scapulae and heart. It contains numerous mitochondria that confer to thermogenic capability and metabolically active fat depot. Epicardial adipose tissue is brown adipose tissue and is located between the myocardium and the visceral pericardium.^[4]

Material & Method

This study was done at Department of Endocrinology/General Medicine, Index Medical College Hospital & Research Centre, Indore, M.P. All patients admitted with malaria during the study period May 2020 to April 2021 were taken for the study after considering the inclusion and exclusion criteria.

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 was divided in to two groups.

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 type 2 diabetes patients according to obese category

Sr. No	Patient's category	Frequency	Percent
1	Non-obese	65	43.3
2	Obese I	48	32.0
3	Obese II	33	22.0
4	Obese III	4	2.7
	Total	150	100.0

In our study, out of 150 diabetes patients 85 were obese in which 32% (48) were obese I, 22% (33) were obese II and 3% (4) were obese III, 43% (65) were non obese respectively.

Table 2: Distribution of mean of EFT and VFT in various age groups

Age group	Mean of Epicardial Fat	Mean of Visceral Fat
	Thickness(mm)	Thickness(mm)
31-40	10.862	53.462
41-50	11.122	54.216
51-60	11.177	52.585
61-70	11.249	53.971
Total	11.153	53.387

In our study, out of 150 patients maximum patients were in the age group of 51-60 years i.e. 65 (43.3%) with mean epicardial fat thickness and visceral fat thickness was 11.177 mm and 52.585mm, followed by 37 (24.7%) patients in 41-50 years of age group with mean epicardial fat thickness and visceral fat thickness 11.52 mm and 54.216 mm, followed by 35 patient (23.3) in 61-70 with mean epicardial fat thickness and visceral fat thickness 11.249 mm and 53.971mm and 13 patient (8.7) in 31-40 age group with mean epicardial fat thickness and visceral fat thickness 10.862 mm and 53.862 mm respectively.

Table 3: Association between obesity, epicardial fat thickness and visceral fat thickness.

Group Statistics							
	Obesity category	Number of patients	Mean	Std. Deviation	Std. Error Mean		
Epicardial Fat Thickness(mm)	Non-obese patients	65	8.05	1.3791	.1711		
	Obese patients	85	11.888	1.4044	.1523		
Visceral Fat Thickness(mm)	Non-obese patients	65	46.234	9.7930	1.2147		
	Obese patients	85	58.856	10.8961	1.1819		
Independent Samples Test							
t-test for Equality of Means							
	t value	df	Sig.(2-tailed) (p value)	Mean Difference	Std. Error Mean	95% Confidence Interval of the Difference	
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

Epicardial adipose tissue is the adipose tissue found between the myocardium and the visceral layer of the pericardium. [5] 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]

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.

The mean of visceral fat thickness in non-obese was found to be 46.23 mm while in obese patients it was found to be 58.86 mm. In our study we got 68.25 mm in obese III, 61.70 mm in obese II, and 56.12 mm in obese I group with mean of visceral fat thickness is 51.76 mm in females and

55.45 mm in males. [9] We found that obese patient had significantly more visceral fat thickness than non-obese ($p < 0.05$).

Conclusion

Obesity is an independent risk factor for visceral adipose tissue deposition both in abdomen as well as in epicardial surface. It can be assumed that epicardial fat reflects the more rapid and massive visceral fat loss occur after a low calorie diet program and help to reduce cardio-metabolic risk and the development of metabolic syndrome and thus contribute to reduction in morbidity and mortality in type 2 diabetic obese and non-obese patient.

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