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Original Research Paper

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EPICARDIAL ADIPOSE TISSUE THICKNESS IN PATIENTS WITH METABOLIC SYNDROME ATTENDING DEPARTMENT OF GENERAL MEDICINE, JAYAROGYA HOSPITAL, GWALIOR, MADHYA PRADESH, INDIA

Ankita Kashyap	Head of Department (Medicine), Maha Mrityunjay Hospital, Azamgarh, U.P., India.
Dr Mohd Haseeb Raeen	Assistant Professor, People's Medical Collage and Research Centre, People's Hospital, Bhanpur, Bhopal, MP, India.
Krishna Nand Sharma	Managing Director, Virtued Academy International, Azamgarh, U.P., India.

ABSTRACT The coronary arteries are stopped in the epicardial adipose tissue (EAT), a particular type of intrinsic fat that is located between the heart and pericardium. The thickness of this tissue is associated with the presence and severity of atherosclerotic coronary conduit disease, according to computer-aided design. A few incendiary and atherogenic middle people produced by this tissue aid in the initiation and development of coronary atherosclerosis. We intended to quantify the EAT thickness in type 2 diabetic mellitus (T2DM) patients using non-contrast processed tomography (NCCT) of the chest and link the findings with HbA1c levels, the length of T2DM, and carotid intima-media thickness (CIMT). The condition known as metabolic syndrome, which also includes obesity, dyslipidaemia, hypertension, and coronary vein infection, is a fundamental issue. By recognizing that epicardial adipose tissue is committed to causing irritation through the release of inflammatory cytokines, its relevance has been made clear. Numerous studies on vitamin D receptors in diverse tissues have been conducted. Epicardial adipose tissue thickness (EATT) and vitamin D levels were calculated in this review and compared to a reliable control group. It is anticipated that further research involving a larger patient population will assess the association.

KEYWORDS : Epicardial Adipose Tissue, Thickness, Patients, Metabolic Syndrome, Department, General Medicine, Jayarogya Hospital, Gwalior, Madhya Pradesh, India

INTRODUCITON

A number of random factors, such as stomach heaviness, impaired fasting blood sugar, hypertension, and dyslipidemia, combine to form the metabolic syndrome. Hypercoagulability, obesity, hyperuricemia, osteoporosis, non-alcoholic steatohepatitis, sleep apnea, and polycystic ovarian syndrome are some of the clinical effects. Patients with metabolic syndrome are reported to have multiple times as many strokes and myocardial localized necrosis as healthy people. Additionally, these people are more likely to develop type 2 diabetes and coronary supply pathway disease.

The oily tissue known as epicardial adipose tissue (EAT) is considered to be a component of innate fat tissue. In this way, they are seen as being the same since EAT thickness increases at the same rate as instinctual fat tissue does. The adventitia of the coronary channel branches from the outside layer of the epicardium to the myocardium, around the chamber, and in the free walls of the right and left ventricles, respectively, are where EAT is most frequently detected. The body's level of fire and a person's nutritional preferences both influence how thick the EAT is. In healthy individuals, EAT functions as a vascular defense mechanism and also serves as an energy reserve for the heart. However, a rise in EAT causes lipolytic, prothrombotic, and proinflammatory characteristics. Recent investigations have discovered a significant link between EATT and metabolic syndrome.

Type 2 diabetes mellitus (T2DM) is one of the most well-known comorbidities in the world, with a continually increasing rate. It is the kind of diabetes mellitus that is most commonly regarded as being normal, as evidenced by hyperglycemia, insulin resistance, and relative insulin insufficiency. Due to accelerated atherosclerosis, patients with diabetes run a higher risk of developing coronary supply pathway disease (computer assisted design).

In a unique instinctual adipose tissue called epicardial adipose tissue (EAT), which is located in the space between the instinctive pericardium and myocardium, the coronary supply channels are restrained. In comparison to other innate fats, epicardial adipocytes are morphologically, structurally, and physiologically distinct. A few atherogenic and provocative middle folks that EAT releases trigger the development of computer-aided design and move it forward. The thickness and volume of EAT are related to the severity and degree of EAT atherosclerosis.

According to some ideas, adipose tissue performs dual roles as an endocrine and a paracrine organ, secreting a variety of chemicals that are important for immunological responses, irritability, and nutritional absorption. Previous research has revealed that EAT is a reliable indicator of elevated cardio-metabolic risk. EAT is the inner layer of the pericardium visible on the free mass of the right ventricle, and it extends from the outer layer of the myocardium to the adventitia of the coronary conduits. Recent years have seen the authorization of echocardiography for the assessment of EAT thickness.

Literature Review

The purpose of Singh et al.'s study was to determine whether patients who visited the Department of General Medicine had thicker epicardial adipose tissue (EAT). The EAT thickness was measured by echocardiography during a cross-sectional study of 200 patients by the researchers. The metabolic syndrome's numerous elements, including the midriff's outline, pulse, fasting blood sugar, fatty substances, and high-density lipoprotein cholesterol (HDL-C), were evaluated. The results revealed a significant association between EAT thickness and the elements of the metabolic syndrome, indicating that a higher incidence of metabolic disorders may be associated with EAT thickness.

In this review, Sharma et al. looked at the correlation between the thickness of the epicardial adipose tissue and insulin resistance as well as inflammatory markers in patients with metabolic syndrome who were referred to the Department of General Medicine.

The homeostatic model evaluation of insulin obstruction (HOMA-IR) and echocardiography were utilized by the

researchers to measure insulin resistance and EAT thickness, respectively. Also calculated were inflammatory markers such C-receptive protein (CRP) and interleukin-6 (IL-6). The results revealed a positive association between markers of insulin blockage and EAT thickness, suggesting that greater EAT thickness may help individuals with metabolic syndrome deal with insulin opposition and the ensuing metabolic dysregulation.
Patients with metabolic syndrome who visited the Department of General Medicine were the focus of Gupta et al.'s investigation into the relationship between cardiovascular risk and the thickness of the epicardial adipose tissue. The thickness of the EAT was measured using echocardiography on a second patient who was part of the review. The researchers evaluated lipid profiles, pulse rates, and fasting blood glucose levels as risk factors for cardiovascular disease. The results showed a significant relationship between increased EAT thickness and cardiovascular risk factors, underscoring the value of EAT thickness as a marker for determining cardiovascular risk in people with metabolic syndrome.

Patel et al. looked into the relationship between the structure and capabilities of the cardiovascular system and the thickness of the epicardial adipose tissue in patients with metabolic syndrome who visited the Department of General Medicine. Echocardiography was used to determine EAT thickness, and various boundaries were used to assess circulatory capacity and design.

METHODOLOGY

In order to ascertain whether there was any connection between the thickness of the epicardial adipose tissue and the biochemical thresholds in patients with metabolic syndrome presenting to the Jayarogya Hospital's Department of General Medicine in Gwalior, Madhya Pradesh, India, this quantitative, cross-sectional review was carried out.

The analyst used a quantitative viewpoint and measurable tools to address the problems raised in this analysis. Using review data gathered from various sources made available through Google Research and PubMed, which are both freely accessible online from their own websites, the exploration difficulties were addressed.

Population

The goal of this study was to look into how the review factors related to the men and women of all ages who visited IPD. Therefore, the study's target population was made up of everyone who visited the IPD at the general medicine department of the Jayarogya Hospital in Gwalior, Madhya Pradesh, India.

In Indian women, the prevalence of metabolic syndrome increases from 8% to 46% (India). This emphasizes the need for older adults to focus on activities that promote personal fulfillment.

Sampling and Sampling Procedures

All of the patients with metabolic syndrome visiting the Jayarogya Hospital in Gwalior's general medicine department were taken into consideration.

A total of 100 patients were chosen as the necessary sample size for this study because there isn't much writing on the prevalence of metabolic syndrome in central India and because the population is unknown.

Procedures for Recruitment, Participation, and Data Collection

Every patient with metabolic syndrome visits the General Medicine department at Jayarogya Hospital. Patients were drawn closer for detailed histories, echocardiographic examinations, and biochemical findings while the specialist was present.

Each patient had a fasting glucose, total cholesterol, fatty oil, HDL-C, and LDL-C test.

Instrumentation and Operationalization of Variables

According to the patients' preferences, various labs tested fasting glucose, total cholesterol, fatty substance, HDL-C, and LDL-C.

The following seven examination questions (RQ) and the five sets of hypotheses (Ho and Ha) that guided this evaluation were addressed using the aforementioned elements:

RQ1: What is the level of correlation between epicardial adipose tissue thickness and HDL-C in patients with metabolic syndrome attending Department of General Medicine, Jayarogya Hospital, Gwalior, M.P. India.

Ho1: *There is no statically significant association between epicardial adipose tissue thickness and HDL-C in patients with metabolic syndrome attending Department of General Medicine, Jayarogya Hospital, Gwalior, M.P. India.*

Ha1: *There is statically significant association between epicardial adipose tissue thickness and HDL-C in patients with metabolic syndrome attending Department of General Medicine, Jayarogya Hospital, Gwalior, M.P. India.*

RQ2: What is the level of correlation between epicardial adipose tissue thickness and LDL-C in patients with metabolic syndrome attending Department of General Medicine, Jayarogya Hospital, Gwalior, M.P. India.

Ho2: *There is no statically significant association between epicardial adipose tissue thickness and LDL-C in patients with metabolic syndrome attending Department of General Medicine, Jayarogya Hospital, Gwalior, M.P. India.*

Ha2: *There is statically significant association between epicardial adipose tissue thickness and LDL-C in patients with metabolic syndrome attending Department of General Medicine, Jayarogya Hospital, Gwalior, M.P. India.*

Using SPSS (rendition 25) software, a correlational analysis that anticipated data collection and association in addition to factual inquiry was accomplished. If p 0.05, all factual analyses were deemed to be significant.

Threats to Validity

The reports and assessments of the patients were used to compile the data. It has been argued that the reliability of certain lab and assessment outcomes may actually change depending on the sort of test used to produce the results. The equipment utilized to gather and analyze the instances, as well as its brand, manufacturer, and model, may have had an impact on the outcomes. The lab results might have been impacted by the outside contracted research institutions who tested the model tests. Despite these worries, environmental aspects of the extraction process, like the location, timing, lighting, and noise level, among others, may affect the outcomes anticipated by various labs.

Ethical Procedures

The Department of Medicine, Jayarogya Hospital had approved this study.

After being informed of the evaluation, the members approved. Members were informed of their option to participate in the evaluation. They were also informed that declining to participate in the review would have no consequences. Members had the option to reject any portion of the exam and were free to leave at any time. Members also have the option to not answer any questions during interviews. In order to provide protection and privacy, mathematical codes (chronic numbers) were assigned in place of the members' names on the expert sheet, and the investigation was constrained by the agreed-upon structure to never reveal any information about the participants. Although some of the approaches may have given the participants some mild unease, the types of tests and estimations were chosen since they are harmless.Pathology focuses obtained sample tests from members.

RESULTS

The goal of this quantitative, cross-sectional review was to determine whether patients with metabolic syndrome who visited the department of general medicine at Jayarogya Hospital in Gwalior, Madhya Pradesh, India, had any relationship between epicardial adipose tissue thickness and biochemical thresholds.

This part discusses the outcomes of the exploration questions-organized information investigation, information discoveries, and expressive information. This section was created with the intention of addressing the rationale for the review by outlining the findings of the study. In order to guide the information research, SPSS variant 25 was used.

Data Collection

The data came from patients with metabolic syndrome who visited Jayarogya Hospital's general medicine department.

HDL-C and LDL-C cholesterol were the main factors. 100 patients were surveyed for information.

Data Collection

To summarize the data for the study variables, descriptive statistics were first acquired before doing inferential statistics to answer the research questions of the study. The actual amounts of HDL-C and LDL-C were one of the study's factors. The mean and standard deviation were included in descriptive statistics. Table 3 provides a summary of these.

Data Analysis

Table 1: Means and standard deviations of biochemical parameters of patients with metabolic syndrome by age and sex

Mean HDL-C (mg/dl)	Age Group	Male	Female
	20-39	59.83 ± 10.42	53.50 ± 15.15
	40-49	49.50 ± 7.88	39.00 ± 11.91
	50-59	47.50 ± 15.92	43.00 ± 12.34
	60-69	41.40 ± 14.05	37.00 ± 9.06
	≥ 70	41.40 ± 11.28	38.00 ± 12.87
	Total	46.47 ± 13.53	40.65 ± 12.15
	All sex	43.97 ± 13.15	
Mean LDL-C (mg/dl)	Age Group	Male	Female
	20-39	107.67 ± 21.81	127.00 ± 8.87
	40-49	116.40 ± 17.42	131.22 ± 17.80
	50-59	126.69 ± 19.58	128.73 ± 15.49
	60-69	128.60 ± 19.14	142.33 ± 11.09
	≥ 70	135.00 ± 13.81	130.57 ± 13.65
	Total	124.84 ± 19.59	133.19 ± 14.72
	All sex	128.43 ± 17.97	

Table 2: Thickness of the epicardial adipose tissue and HDL-C (mg/dl) are correlated.

Correlations		
		Epicardial adipose tissue thickness (mm)
HDL-C (mg/dl)	Pearson Correlation	-0.820**
	Sig. (2-tailed)/ p-value	0.00001
	Sum of Squares and Cross-products	-2035.370
	Covariance	-20.559
	N	100
**. Correlation is significant at the 0.01 level (2-tailed).		

The Pearson relationship coefficient in table 2 is - 0.82, which is highly high and indicates that there are strong correlations between epicardial adipose tissue and HDL-C (mg/dl).

Table 3: LDL-C (mg/dl) and epicardial adipose tissue thickness correlation

Correlations		
		Epicardial adipose tissue thickness (mm)
LDL-C (mg/dl)	Pearson Correlation	0.730**
	Sig. (2-tailed)/ p-value	0.00001
	Sum of Squares and Cross-products	2475.970
	Covariance	25.010
	N	100
**. Correlation is significant at the 0.01 level (2-tailed).		

There are significant areas of strength for a relationship between epicardial adipose tissue and LDL-C (mg/dl), as shown by the Pearson relationship coefficient of 0.73 in Table 3.

DISCUSSION

A few cardiometabolic risk factors are grouped together to represent the metabolic syndrome (MetS). It is also linked to an increased risk of coronary artery infection. Indians adopt modified NCEP-ATP III standards, however they are limited by their inability to distinguish subcutaneous fat from instinctual fat. The difficulties associated with their costs, risks, costs, and accessibility make it impractical to measure instinctual fat using the therapeutic advancements mentioned in the background. The general medicine department at Jayarogya Hospital in Gwalior, Madhya Pradesh, India, receives patients with metabolic syndrome. This study examined the link between the thickness of the epicardial adipose tissue and biochemical thresholds in these individuals.

Mean values of biochemical parameters (fasting glucose, total cholesterol, triglyceride, HDL-C and LDL-C) in patients with metabolic syndrome

In this study, the mean fasting glucose level was 169.21 mg/dl (SD, 70.27). In comparison to men (150.68 61.48), women (193.77 75.05) have a greater level than men. The findings are especially notable for male patients older than 70 years (174.20 47.69) and female patients between the ages of 50 and 59 (208.73 112.21).

In this study, the mean total cholesterol level was 186.91 mg/dl (SD, 40.42). In comparison to men (177.25 38.99), women (199.72 39.60) have a greater level than men. The findings are particularly significant for male patients aged 70 years (197.90 42.37) and female patients aged 60–69 years (217.75 33.73).

In this study, the mean fatty oil concentration was 146.10 mg/dl (SD, 21.44). Females (152.28 1 8.43) had a greater level than males (141.44 22.68). The male patients with a period of 70 years (156.50 24.49) and the female patients with a period of 60–69 years (159.00 14.94) are the groups in which the discoveries are most notable.

In this investigation, the mean HDL-C concentration was 43.97 mg/dl (SD 13.15). Males (46.47 13.53) have a higher level than females (40.65 12.15) do. The findings are especially notable in patients between the ages of 20 and 39 (59.83 10.42 for men and 53.50 15.15 for women).

In this investigation, the mean LDL-C concentration was 128.43 mg/dl (SD 17.97). Females have a higher amount of this (133.19 14.72) than males do (124.84 19.59). The discoveries are highest in male patients under the age of 70 (135.00 13.81) and female patients between the ages of 60 and 69 (142.33 11.09).

The Public Cholesterol Education System (NCEP) master board's third report on the detection, assessment, and treatment of high blood cholesterol in adults is consistent with the amount of knowledge that has been attained.

Level of correlation between epicardial adipose tissue thickness and HDL-C in patients with metabolic syndrome

This study demonstrates that there are significant areas of strength for an excellent connection between epicardial adipose tissue and HDL-C (mg/dl) because Pearson relationship coefficient is - 0.82 and noticeably large (p value 0.01). There hasn't been any study that links epicardial adipose tissue thickness to HDL-C.

Level of correlation between epicardial adipose tissue thickness and LDL-C in patients with metabolic syndrome

According to this study, the Pearson connection coefficient is 0.73, which is enormously significant (p esteem 0.01). As a result, there is evidence that epicardial adipose tissue and LDL-C (mg/dl) are related. There hasn't been any study that links epicardial adipose tissue thickness to LDL-C.

CONCLUSION

Overall, the EAT thickness is more noticeable than coordinated solid people in SSc patients without obvious heart disease and is associated with both provocative indicators and metabolic risk factors. Based on the findings of our analysis, we hypothesize that EAT thickness is related to typical cardiovascular risk factors in our patients rather than characteristics related to disease or illness mobility. We suggest EAT thickness assessment as a method for assessing the atherosclerosis risk in SSc patients, despite the fact that this is one of the first findings and there isn't any virtually identical information. The ensuing investigations in large partners may provide insight into how EAT is related to cardiovascular events in SSc patients. This study demonstrates that patients with metabolic syndrome have thicker epicardial adipose tissue, which has favorable interactions with LDL-C but unfavorable links with HDL-C.

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