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Research Article

Impact of Prognostic Values of Waist Circumference on E Point Septal Separation Value & Triglyceride Level

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Abstract: Now a day's obesity is most common global epidemic disease either in developed or developing countries. if the obesity is more abdominally located like increase in waist girth then this follows many consequences like cardiovascular problems or precursor for this disease like increase in lipid levels in the blood. A total number of 40 male subjects were recruited for the study. They were divided on the basis of WC i.e. > 102 cm or < 102cm. twenty subjects in group 1 and group 2 respectively. Their BMI and W/H ratio, Lipid profile and echocardiography was done in all required medical precautions. The EPSS value was calculated from the echocardiogram. WC showing moderate correlation with EPSS in comparison with BMI. TG levels in the blood also varied with changing WC and the former one showing high positive correlation with EPSS values. The WC has high positive correlation with echocardiographic determinant like EPSS and the triglyceride levels may be worsening the condition. So WC can be preferred parameter or indicative tool for future studies.
Keywords: Abdominal obesity, Echocardiography, EPSS, Waist circumference.

INTRODUCTION

Obesity is major problem in society. Both developed and developing countries are facing this problem. Obesity leads to many complications which include cardiovascular problems most importantly and these all collectively leads to death. In WHO classification of obesity BMI is sole criteria. However, regional adiposity, visceral adiposity, subcutaneous fat and muscle mass can't be described under this heading. Specifically abdominal adiposity is better predictor of health care charges than the more widely used BMI [5]. Waist Circumference (WC) is an easy measurement that is highly correlated with abdominal or visceral adiposity [13]. Waist circumference increases above 102 cm in male considered as obese [18].

Several large multinational studies involving many thousands of people, such as IDEA [International Day for the Evaluation of Abdominal Obesity], INTERHEART, EPIC [European Prospective Investigation into Cancer and Nutrition] and the US Cancer Prevention Study II Nutrition Cohort, have confirmed that measurement of abdominal obesity and central fat accumulation is an important tool in assessing risk of heart disease, risk of developing type 2 diabetes and risk of death.

The European Prospective Investigation into Cancer and Nutrition (EPIC) has stated that those in the highest quintile for waist circumference were found to have doubled the risk of death from all causes compared to those within the lower waist circumference quintile over the 10 year period of follow up. For every 5cm of waist circumference the study demonstrated a 17% increased relative risk of death for men and 13% for women that was independent of BMI category [14].

Abdominal adiposity has been independently associated with coronary artery disease, cerebrovascular disease, insulin resistance and diabetes mellitus [6-13] as well as low high-density lipoprotein cholesterol and hyper-triglyceridemia [1-4].

The morphological and functional echocardiographic alterations usually found in normotensive obese patients closely correlate with the amount of intra-abdominal fat deposition [17]. EPSS stands for E Point Septal Separation specifically measured in mitral valve cusps. It is the angle between left border of inter-ventricular septum and anterior cusp of mitral valve. The EPSS is main indicator of any cardiac problems or increasing in value of EPSS predisposes many cardiac abnormality like decrease in Ejection Fraction (EF), diastolic dysfunction etc. The increased risk of LV diastolic dysfunction in both

overweight and obese persons may partially account for the increased risk of heart failure associated with both conditions [16]. It has been emphasized to measure both BMI and WC because patients with a high WC and low BMI are at high risk of death [15].

MATERIAL AND METHODS

Participants of this study were males (n= 40, age group 44-54 years) and classified in two groups on the basis of waist circumference (WC) ≤ 102 cm as Group 1 &≥ 102 cm as Group 2. Height and weight were measured and from this parameter obesity of all the subjects were calculated. Blood samples for lipid profile were collected after twelve hours (overnight) of fasting, total serum cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein (LDL) cholesterol, and triglycerides were measured. Arterial blood pressure, systolic and diastolic, was measured by mercury sphygmomanometer in mmHg. Echocardiography was performed on SONOS 5500 ultrasound machine (Hewlett Packard) with 2.5 to 3.5 MHz transducers on 2-D mode, M-mode and Doppler ultrasound.

RESULTS

The participants of this study (n= 40, mean age 45.3±6.5 years) without clinically evident of hepatomegaly, splenomegaly, cardiovascular, respiratory, neurological disorders or under any sort of medical treatment were classified in two groups on the basis of waist circumference ≤ 102 cm &≥ 102 cm.

Mean values of the anthropometric measures like Age, weight, height, BMI, BSA, waist circumference, hip circumference & waist to hip ratio are For group-1 & group -2 are given in Table-1.The given data provide a basic concept about the general influence of increase in WC or abdominal fat in subjects. The mean values of Triglyceride of group I & II were 149.5 ± 75.83 mg/dl and 205 ± 91.6 mg/dl respectively and showed statistically significant rise in group-II (Fig- 1). The echocardiographic parameter like E point of septal separation group-I & II were analyzed. Higher statistical significant values of E point septal separation in group-II subjects (6.2 ± 2.12 mm) were observed when compared with group-I.

Table 1: Anthropometric parameters of study population

Parameter	Group 1		Group 2	
	Mean	**±SD**	Mean	**±SD**
Age(yrs)	46.32	6.18	44.43	6.93
Weight	64	5.88	92.19	12.4
Height	1.64	0.06	1.66	0.06
BMI	23.82	2.56	33.45	4.08
WC	87.27	9.36	110.2	8.13
Hip	93.85	9.72	112.7	6.37
W/H	0.93	0.08	0.98	0.04
BSA	1.71	0.08	2.06	0.16

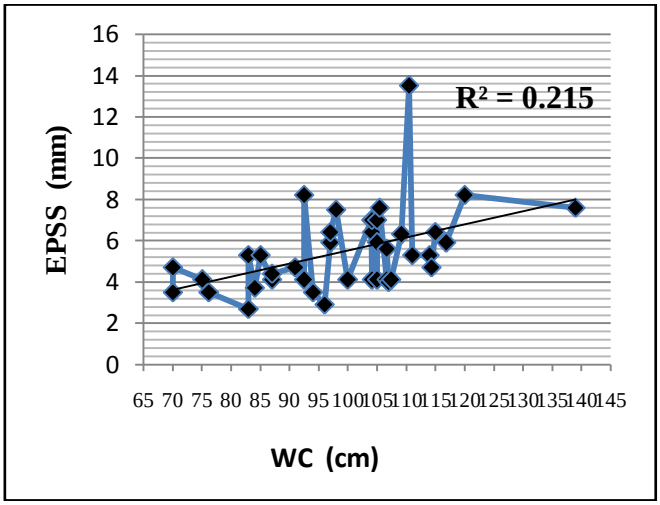

Fig-1: comparison of WC & EPSS

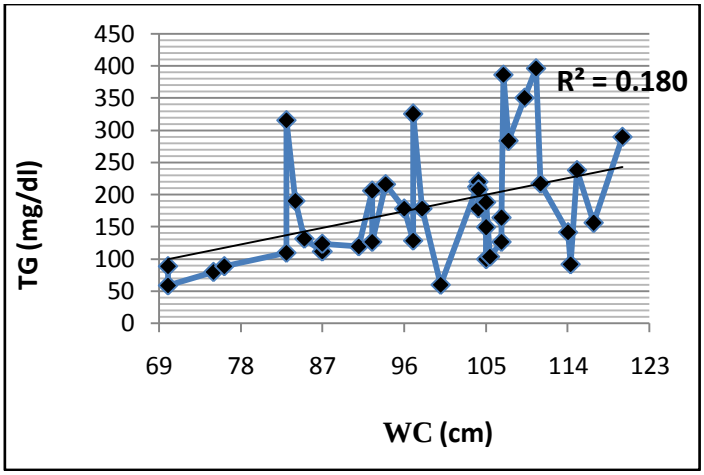

Fig- 2: Comparison of WC & Triglyceride

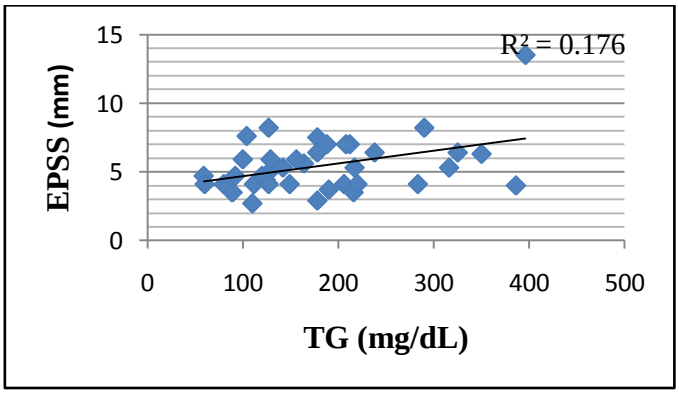

Fig-3: Comparison of Triglyceride level in the blood and EPSS

DISCUSSION

Participants of this study (n= 40, mean age 45.3±6.5 years men) were classified in two groups on the basis of waist circumference (WC)≤ 102 cm as Group 1 & ≥ 102 cm as Group 2. A large portion of high waist circumference was driven by gain in body weight but the increase observed is larger than that can be predicted from increase in BMI alone. Increase in waist circumference was seen with aging in absence of weight gain. This increase in waist circumference with age had high risk of many chronic diseases. An evaluation of the need for age specific waist cut points in adult can be required to consider disease risk. Jennifer L Kuk *et al.;* [15] proved that there are significant sex differences in Total abdominal adipose tissue (TAAT), Visceral adipose tissue (VAT), Abdominal subcutaneous adipose tissue (ASAT) for a given waist circumference. Furthermore, the relation between waist circumference and VAT is substantially influenced by age.

In this study, the group 1 subjects had triglyceride level 149.5±75.83 mg/dl and the group 2 had triglyceride level 204.97±91.6 mg/dl. The results (Fig-1) of this study were showing high significant value ($p < 0.0471$) and positive correlation ($r = 0.3$). WHO MONICA project was carried out by Misra A *et al.*[19]*;* which stated that waist circumference is useful indicator of abdominal obesity. On the basis of this study, other studies stated that increase in waist circumference and increase in abdominal obesity along with an increase in total plasma cholesterol concentration, low High density lipoprotein concentration had an association with high risk of chronic disease. Rosenthal GL et al stated that increase in triglyceride level may cause deposition of epicardial fat. Paul Cullen *et al.;* [20] have done a multivariate analysis of 8 years follow up data to found hyper triglyceride to be an independent risk factor for major coronary events. If hyper triglyceridemia combines with high LDL and low HDL levels, risk of chronic heart disease increases by six fold. Takatoshi Kasai *et al.*[21]*;* states that hyper tri glyceridemia was associated with an increase in cardiac mortality over a 10 year period after complete coronary revascularization.

Echocardiographic parameters of group 1 and group 2 showed EPSS (mitral valve E point septal separation) 4.7±1.5mm& 6.2±2.12mm. When both the groups were compared there was high a level of significance ($p= 0.0025$) and high positive correlation ($r= 0.47$). Though the mean value of EPSS in Group-2 was 6.2±2.12 mm but there were some subjects having EPSS greater than 6.2mm that was range from 7 to 13.5 mm look very high irrespective of the mean values. Though these high values were not reflected in mean

but showing high significance with lipid profile parameters and waist circumference of those subjects. The echocardiograms of these subjects showing diastolic dysfunction as they were suffering from prolonged hypertension, hyper tri glyceridemia, low HDL value and high LDL level with obvious advancement of age as well.

The increase in level of TG in the blood showing increasing EPSS value (Fig-3), this may be because of deposition epicardial fat as stated earlier.

CONCLUSION

High positive correlation between waist circumference, EPSS value and triglyceride levels were concluded from this study. It is very obvious that increase in waist circumference increasing fat deposition on the visceral organs and this will affect the closing and opening of the valves in the heart. This difficulty are seen in echo as change in EPSS. Increase in body fat showing high triglyceride levels in the blood and also adversely affect the functioning of the heart and may lead to myocardial infarction and/or diastolic dysfunctioning.

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