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Clinic-morphological indicators to diagnose hypertriglycedemia the importance of mid abdominal circumference as a screening tool

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Abstract: ***Objective:*** *To find a cut off level of mid abdominal circumference in North Indian subjects to use as a predictive tool for diagnosing individuals with raised serum triglyceride levels.*
Methods: *This was a cross-sectional hospital based study conducted over a period of three years at Vivekananda Polyclinic and Institute of Medical Sciences, Lucknow, India. Not known cases of dyslipedimia were included in this study attending in the out-patient clinic of the hospital. The subjects were screened for overnight fasting (for 8 to 12 hrs) levels of triglycerides after asking them to be on a normal diet for three days. A total of 857 subjects were included in the study.*
Results: *One forth (25%) of the subjects were in the age group 40-49 years. The mean age was 54.57 years. More than half (53.3%) of the subjects were males and were vegetarian (63%). Less than one third (28.6%) of the subjects were alcoholic and 39% were smokers. The mean abdominal girth was 106.25 (±11.07) cms and height was 161.46 (±6.68). However, average weight was 69.38 (±9.66) kg and TG level was 205.08 (±55.80). Linear regression analysis showed that the cut off of 92 cms was obtained for male and 93 cms for females. Above this abdominal girth, an increased TG levels will be with a high rate of sensitivity and specificity for both the sexes.*
Key words: *Mid abdominal circumference/girth, Hypertriglycedemia, Biometric tool*

I. Introduction

Hyperlipidemia in the form of hypertriglyceridemia or chylomicronemia, although less frequent, is one of the well-accepted underlying causes of acute pancreatitis in 7% of the cases - the most common after gall stones and alcohol[1]. Typically hypertriglyceridemia-induced pancreatitis occurs in a patient with a pre-existing lipid abnormality, along with the presence of a secondary precipitating factor. High TG levels are a major contributory factor to developing atherogenic / Ischaemic Heart Diseases (IHD)[2]. The higher incidence of younger Indians suffering from IHD is a very worrying aspect of the health scenario of our country. Perez et al[3] and Tutcato et al[4] documented that the increased waist circumference is one of the major risk factor. Misra et al[5] used for the first time the waist circumference cut off points for Asian Indians and suggested action level depending on these values. Kanjilal et al[2] associated the atheroembolic phenotypes of Indian Asian population with premature coronary heart diseases—a postulate as to why younger and younger Indians are suffering from IHD, a worth noting finding was the truncal obesity. Chopra et al[6] too in their study labeled the "Pot belly" as the most powerful predictor of Metabolic Syndrome and premature mortality and morbidity. Gogia et al[7] worked on Metabolic Syndrome and attributed similar findings. Vajufdar et al[8] did a study on the anthropometry, lipid profile and dietary pattern in patients of Chronic IHD. By developing an easy to use, sensitive tool which would be able to screen the high risk population one hopes that these individuals can be screened easily and adequate steps be taken to prevent IHD or Atherogenic Diseases. If screened and diagnosed early, it would go a long way in improving the quality of life, minimize health cost and reduce mortality and morbidity.

The present cross-sectional study was planned to find a cut off level of mid abdominal circumference in North Indian subjects to use as a predictive tool for diagnosing individuals with raised serum triglyceride levels.

II. Methodology

Study design

This was a cross-sectional hospital based study conducted over a period of three years at Vivekananda Polyclinic and Institute of Medical Sciences, Lucknow, India. The study was approved by the Ethical committee of the Institute. The informed consent was taken from each of the subjects before including in the study.

Study subjects

Not known cases of dyslipedimia were included in this study attending in the out-patient clinic of the hospital. The subjects were screened for overnight fasting (for 8 to 12 hrs) levels of triglycerides after asking them to be on a normal diet for three days. A total of 857 subjects were included in the study.

Measurements

A detailed history was taken on pre-designed proforma. The anthropometric parameters such as height, weight, mid abdominal circumference were measured. Mid abdominal circumference was measured in supine position at the level of the umbilicus as mid sagital abdominal circumference (mid abdominal girth). They were then asked to report after three days of normal dietary intake in a overnight fasting state (8 to 12 hours) and a fasting blood sample was taken to measure their fasting TG levels.

Analysis

Statistical package STATA 9.2 developed by College Station Texas USA was used to analyze the data.

III. Results

Table-1 depicts the basic characteristics of the study subjects. One forth (25%) of the subjects were in the age group 40-49 years. The mean age was 54.57 years. More than half (53.3%) of the subjects were males and were vegetarian (63%). Less than one third (28.6%) of the subjects were alcoholic and 39% were smokers. The mean abdominal girth was 106.25 (±11.07) cms and height was 161.46 (±6.68). However, average weight was 69.38 (±9.66) kg and TG level was 205.08 (±55.80) (Table-2).

As evident from Fig.1, linear regression analysis showed that the cut off of 92 cms was obtained for male and 93 cms for females. Above this abdominal girth, an increased TG levels will be with a high rate of sensitivity and specificity for both the sexes.

IV. Discussion

There are some misconceptions regarding the optimal waist circumference (WC) values and methods of assessing this in some Asian populations[9,10]. A recent Joint Interim Statement on metabolic syndrome proposes that WC ≥80 cm and ≥90 cm are diagnostic for abdominal obesity in Asian women and men respectively[11]. However such generalization may be wrong due to possible heterogeneities among Asian populations.

Perez et al[3] and Tutcato et al[4] documented that the increased waist circumference is one of the major risk factors In the present study a strong correlation was found with the levels of TG in blood and increasing abdominal girth (Fig.1). Misra et al[5] and Jennifer et al[12] used for the first time waist circumference cut off points for Asian Indians and suggested action levels depending on these values. In the present study, a cut off point of mid abdominal circumference of 92 cms was found for males and 93 cm for females above which there seems to be a significant correlation of raised TG levels. Our findings are similar to the study by Vajufdar et al[8] who did a study on the anthropometry, lipid profile and dietary pattern in patients of chronic IHD.

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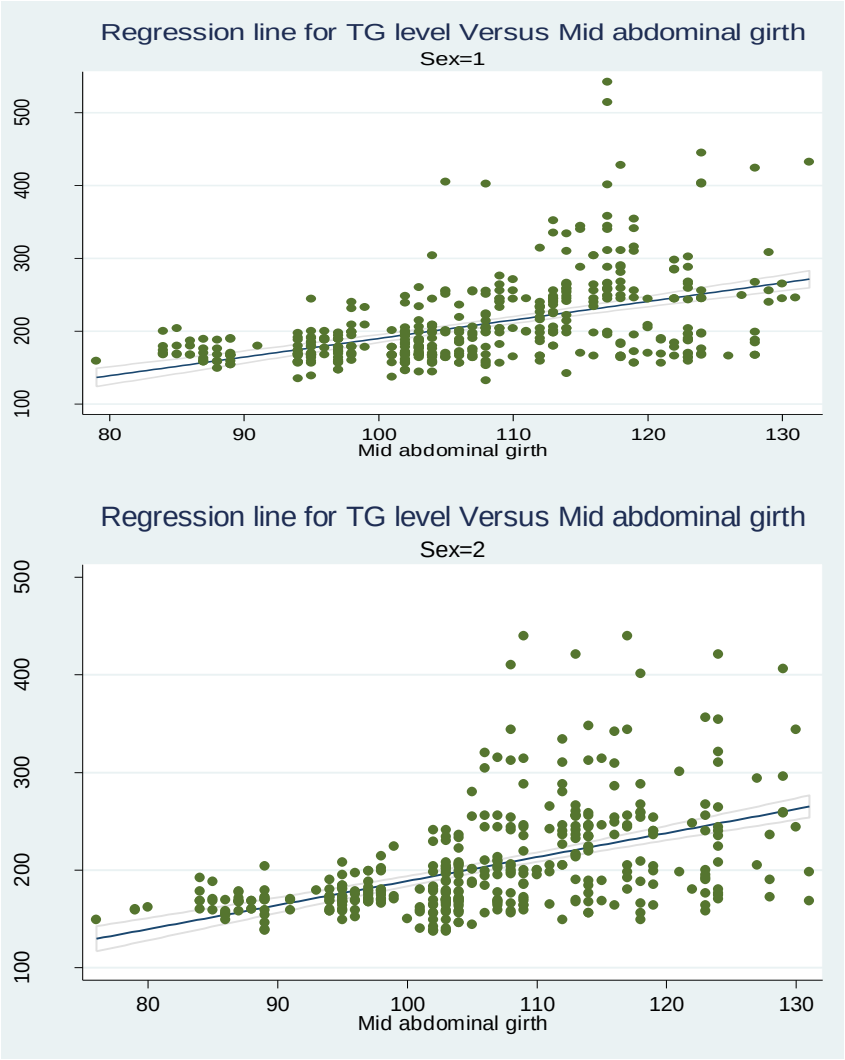
Table-1: Basic profile of the study subjects

Basic profile	**No. (n=857)**	**%**
30-39	120	14.0
40-49	214	25.0
50-59	197	23.0
60-69	185	21.6
70—79	124	14.5
≥ 80	17	1.9
Mean±sd	54.57±13.2	
Gender		
Male	457	53.3
Female	400	46.7
Dietary habit		
Vegetarian	540	63.0
Non-vegetarian	317	37.0
Alcohol		
Yes	245	28.6
No	612	71.4
Smoking		
Yes	334	39.0
No	523	61.0

Table-2: Distribution of subjects by anthropometric parameters and TG levels

Anthropometric parameters	**No. (n=857)**
Mid Abdominal Girth in cms	106.25±11.07
Height in cms	161.46±6.68
Weight in kg	69.38±9.66
TG level mg/dl	205.08±55.80



Regression equation: TG = -58.5 – 1.8*Sex (Male=1, Female=0) + 2.5*abdominal girth

Fig.1: Scatter plot depicting the cut off value of abdominal girth for TG