SHORT   COMMUNICATION

METABOLIC SYNDROME – PREVALENCE AND SIGNIFICANCE OF ITS DETECTION IN SELECTED POPULATION IN PONDICHERRY

BISWAJIT MOHANTY*, ARUL S., R. R. KUMAR, MOHAN KUMAR AND RAMASWAMY S.[1]

Departments of Biochemistry and [1]Pharmacology,
Aarupadai Veedu Medical College and Hospital,
Pondicherry – 607 402

Abstract : Obesity by itself is not an immediate lethal disease, however, it is a significant risk factor associated with a range of serious non-communicable diseases. Our aim is to find out the prevalence of metabolic syndrome in interns coming from higher socioeconomic class. Sixty one interns participated in the study. BMI, WHR and blood chemistry were performed. EGIR criteria were considered to identify the metabolic syndrome. According to EGIR criteria, insulin resistance was found in 24.5% cases and metabolic syndrome exists in 14.7% of overweight/obese interns. Insulin resistance as per HOMA-IR was found in 6% of those having metabolic syndrome. High diastolic blood pressure, low HDLc are prone to develop metabolic syndrome by six times where as an increase in WHR (central obesity) particularly in male are eleven times more prone to develop metabolic syndrome.

Abbreviations :–EGIR – European Group for Insulin Resistance, HOMA-IR – Homeostasis model assessment for insulin resistance (HOMA-IR), WHR – waist hip ratio. HDLc–HDL cholesterol.

Key words : metabolic syndrome   insulin resistance   obesity

INTRODUCTION

Metabolic syndrome (MS) includes a cluster of risk factors like insulin resistance, central obesity, elevated blood pressure, and lipid abnormalities (elevated levels of triacylglycerol and low levels of high-density lipoprotein cholesterol). It has been estimated that MS soon is likely to be considered as the prime factor over cigarette smoking for cardiovascular disease (1). It is an even stronger predictor of risk for type 2 diabetes (2). Waist circumference appears to be a better predictor of cardiovascular risk than waist-to-hip ratio (3).

The prevalence of diabetes, coronary heart disease and other life style disorders

*Corresponding Author : Prof. Biswajit Mohanty, No. 8, 4th Cross, Tantai Perriyar Nagar, Pondicherry – 605 005; Ph.: No. 04132203527, 9443956482; E-mail : snehamohanty@sify.com

is increasing alarmingly in India, and is affecting much younger populations. A study conducted in Chennai by Ramachandran (4), et al. showed the prevalence of overweight (including obese) adolescents ranged from 22% in better off schools. In a Delhi school with tuition fees more than Rs. 2,500 per month, the prevalence of overweight was 31%, of which 7.5% were frankly obese (5).

In this study, we have attempted to evaluate the prevalence of MS in interns coming from higher socioeconomic class in whom overweight/obesity is much more observed using the parameters adopted by European Group for Insulin Resistance (EGIR, 1999).

MATERIAL AND METHODS

A total of 65 interns were approached and 61 gave consent to participate in the study. All there participants come from a higher socioeconomic group. The institutional ethical committee approved the study protocol. The exclusion criteria were :

- A known diabetic

- Individuals already taking steroid or thiazides known to cause secondary diabetes

- Individuals having kypho-scoliosis or any other physical ailment.

After taking a family and personal history, anthropometries measurements were taken to calculate body mass index (BMI) and waist hip ratio (WHR). BMI as per International Task Force for Obesity (WHO, IOTF) recommendation (6) for adult obesity

in Asia and India which is as follows : BMI between 18.5 to 23 is considered normal, BMI > 23 to 25 is overweight and BMI > 25 is obesity.

Fasting blood sample was taken to estimate blood glucose, lipid profile, blood uric acid, serum insulin. Fasting insulin was done by electrochemi-luminescence immunoassay (ECLIA) by Roche analyzer. Insulin resistance was calculated by HOMA-IR (7). A value equal to or more than 5 is considered as insulin resistance.

EGIR proposed a modified version of WHO 1999 criteria to be used for non-diabetics only where insulin resistance became the cornerstone of their definition. Insulin resistance (defined as hyperinsulinaemia – top 25% of fasting insulin values among the non-diabetic population) plus two of the following is considered as MS.

- Central obesity : waist circumference ≥ 94 cm (M), ≥ 80 cm (F).

- Raised TG (≥ 175 mg%) and/or low HDL-cholesterol (<39 mg%) or treatment.

- IFG, glucose ≥ 110 and <126 and IGT, glucose ≥ 140 mg% <200 mg%.

- Raised arterial pressure ($\geq 140/90$ mmHg) or treatment.

RESULTS AND DISCUSSION

Out of 61 participants 28 were female and 33 were male interns in the age range between 22 to 27 years. We divided the population into two, based on the BMI values

recommended for normal and overweight/ obesity category. In the study population, 46% were found to be in the normal range of BMI and 54% individuals are in the over weight/obese category. Male individual were more centrally obese than female according to WC. Family history of diabetes and obesity is present in almost equal percentage of both population groups.

In the present study, 15 interns had serum insulin level more than 13.01 µU/ml, cut off limit calculated as per EGIR criteria indicating 24.5% have insulin resistance. Out of these, MS was observed in 9 individuals (14.7%). The MS is more pronounced in overweight/obese group (27.3%). Insulin resistance as per HOMA-IR was found in 6% of those having MS. In the present study, MS was not found in interns with normal BMI. A study conducted in Chennai (8), reported a MS prevalence of 11.2% (using EGIR criteria), which was much closer to the prevalence rate reported in Jaipur (9) where it was found to be 13%. Interestingly in another study conducted in Chennai (10), the prevalence was found to be 41% however, the study criteria were different.

In a study conducted amongst adults in US the overall unadjusted and age-adjusted prevalence of the MS were 21.8% and 23.7%, respective (11). The prevalence of the MS
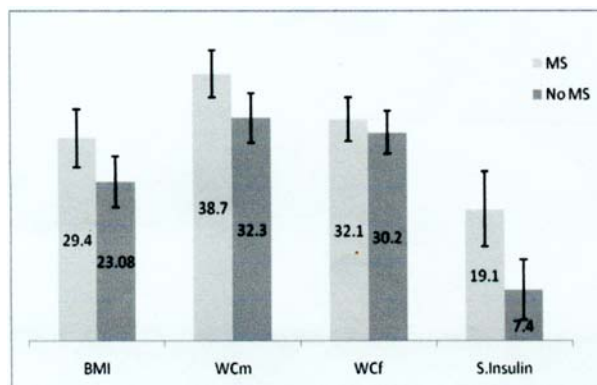
WCm – waist circumference in male and
WCf – waist circumference in female.

Fig. 1 : Body parameters and serum insulin, mean, ±SD in interns with and without MS.

varied significantly (P<0.001), being between 6% and 39% depending on the different definitions. Only 2% of the children fulfilled the criteria of the MS in all definitions (12).

The odds ratio was calculated to find out the various factors influencing the MS. Individuals with overweight/obesity having increased in diastolic BP beyond the cut off point defined by EGIR is six times more prone to develop MS similarly individuals having low HDLc are six and half times more prone to develop MS. Male with WC >37 inches are 11.5 times more prone to develop MS where as females with WC > 31.4 inches two and half time more prone to develop MS. This shows central obesity in males is predominantly related to MS.

TABLE I : Comparative analysis of blood parameters with and without MS.

Population	FBG	PPBS	TG	Chol.	HDLc	HOMA-IR	Uric acid
With out MS	79±7	83±16	107±29	156±26	38±7.3	1.4±0.8	3.9±1.9
With MS	80±8	104±24	100±42	143±34	34.6±6.8	3.7±1.2	5.7±1.3
P value	0.72	<0.01	0.6	0.28	0.17	<0.001	<0.001

P value was calculated by applying Z test. At 95% confidence level value of P less than 0.05 is considered significant. The P value was highly significant with parameters like PPBS, HOMA-IR and serum uric acid levels.

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