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NECK CIRCUMFERENCE IS NOT A PREDICTOR OF INSULIN RESISTANCE IN THE CASE OF POLYCYSTIC OVARY SYNDROME

Obstetrics & Gynecology

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ABSTRACT

Background: Neck circumference may likely be a very convenient and valid alternative measure of obesity and may be a better marker of metabolic risk compared to Body mass index and waist circumference, claimed by some studies.

Aims and Objectives: Correlation of neck circumference of PCOS cases with metabolic parameters like insulin resistance (HOMA- IR).

Methods. PCOS cases with BMI 18-30 kg/m2(n=50) and age between 20-35 years were taken into study. Fasting blood sugar and insulin were measured and HOMA-IR was calculated to assess insulin resistance. Neck circumference were also measured. Correlation between Neck circumference and BMI and HOMA-IR (homeostasis model assessment -estimated insulin resistance) calculated.

Results: Neck circumference was weakly correlated with BMI ($r= 0.267$, $p<0.01$). Neck circumference(NC) was not significantly correlated with HOMA-IR ($r= 0.017$, $p>0.01$).

Conclusion: The results of this study appear not to strongly support the use of NC measurement as a useful screening tool for BMI and insulin resistance in cases of PCOS

KEYWORDS

PCOS, Neck circumference and HOMA-IR

INTRODUCTION:

Polycystic Ovary Syndrome is one of the most common endocrinopathy affecting Women affecting women of reproductive age. The exact prevalence of PCOS is not known as the syndrome is not defined precisely. The estimated prevalence in women of reproductive age is 5-10%. Under the new criteria (Rotterdam-2003), the prevalence among the general female population will raise up to10% ([1]**.** PCOS is associated with obesity**.** Obesity is rising to a great proportion and is an important risk factors for cardio metabolic disease, including diabetes, hypertension, dyslipidemia and coronary heart diseae.[2-5]. Overweight and obesity are defined by BMI, depicting weight higher than what is generally considered healthy for a given height , although the location of fat may modify the health implications of BMI, and central obesity is generally considered to be a stronger risk factor for cardiometabolic risk than overall obesity . BMI has been adopted by most health professionals for obesity surveys, however it does not depict the true body composition. However, visceral obesity which closely relates to cholesterol levels is better defined by measuring waist circumference[6]. Several anthropometric measures are used to assess overall obesity and also to assess specific aspects such as central or abdominal obesity, visceral fat, or subcutaneous fat. Anthropometric measures such as weight ,height, BMI, waist circumference (WC), waist to hip ratio (WHR) are relatively low-burden standard and valid surrogate measures for abdominal adiposity[7-9]. Overweight and obesity may be associated with fat deposition in the neck, resulting in higher neck circumference. Neck circumference may likely be a very convenient and valid alternative measure of obesity and may be a better marker of metabolic risk compared to Body mass index and waist circumference. Neck circumference is a simple, convenient but less used anthropometric measure, which is correlated with waist circumference and BMI, and has been associated with components of metabolic syndrome in cross-sectional and cohort studies in different populations [14, 18]. Measurement of neck circumference (NC) has recently been used to identify obesity and is observed to have good correlation with age, weight, waist and hip circumference and BMI for both gender [7]. Besides, NC is considered an index of upper body obesity and correlates positively with changes in blood pressures and other component of metabolic syndrome.[8] As, obesity, insulin resistance (IR), and metabolic syndrome are common in polycystic ovary syndrome (PCOS), which is fairly common disorder of women in the reproductive age, it demands to find whether there is any relation exists between insulin resistance and neck circumference in PCOS population. There are battery of tests exists to evaluate the metabolic features and complication in PCOS, but measurement of neck circumference might be a easier and very convenient clinical way to find any correlation of obesity and metabolic complications, such as IR in PCOS.[9-13] Objectives of this study is : Correlation of neck circumference of PCOS cases with metabolic parameters like insulin resistance (HOMA- IR).

MATERIALS AND METHODS

Study Design

A community-based cross-sectional study was carried out among women aged 20–35 years who were permanent residents of West Bengal.

Study settings

PCOS obese patients recruited from out patient's department of gynecology and obstetrics at Institute of Post graduate medical education and research.

Study Methods

PCOS cases with BMI 18-30 kg/m2(n=50) and age between 20-35 years were taken into study.Study population were not taking oral contraceptive pills nor were they pregnant and taking any medication to affect endocrine parameter at least 3 months before entering the study. They are all engaged moderate physical activity.They are all non- smoker.

Inclusion criteria

Diagnosis was made on the basis of the Rotterdam criteria (2003) and patients with either two of the following criteria were recruited (1) Chorionic anovulation characterised by either oligo menorrhoea (cycle lasting longer than 35 days) or amenorrhoea (less than 2 menstrual cycles in the past 6 months) (2) clinical signs of hyperandrogenism (hirsutism or obvious acne or alopecia and /or elevated testosterone (normal < 56ng/dl) (3) polycystic ovaries on USG -multiple small follicles > 10-12) and (2-9mm in diameter) tightly spaced along the periphery of the ovary or any ovary volume is greater than 10ml. Hirsutism was routinely graded by two physicians independently using the common modified Ferriman -Gallway (FG) score. If the FC score differed by more than 2, re-evaluation. by a third physician was done and median values were used. Nine areas were examined -upper lip, chin, chest, upper abdomen, lower abdomen, upper back, lower back, thighs, upper arms. Each area is scored 0-4, resulting maximum score 36. Hirsutism was diagnosed when a score above 5 was evaluated.

Exclusion criteria

Exclusion criteria included existence of thyroid disease, hyperprolactinemia, oligo - ovulation or anovulation is associated with oligo menorrhoea or amenorrhoea. If testosterone level - 200ng/dl,case could be ovarian tumour. So it was excluded from the

study. Inform consent was taken from all the patients and approved by institute ethical committee. Study was conducted in accordance with declaration of Helsinki.

Anthropometric measurements

Physical measurements, weight in kg, and height in cm. were taken. BMI was calculated by the formula BMI= Wt. in Kg. / ht.2 weight was taken on empty stomach and with minimum garments. The neck circumference (cm) was taken to the nearest 1 mm, using measuring tape. It was taken, at a point just below the larynx (thyroid cartilage) and perpendicular to the long axis of the neck in a plane as horizontal as possible. While taking this reading the subject was asked to look straight ahead, with shoulders down.

Biochemical Parameters

Blood should be drawn using standard veni-puncture techniques andserum separated from blood cells as soon as possible. Samples should be allowed to clot for one hour at room temperature, centrifuged for 10 minutes (4°C) and serum extracted. This kit is for use with serum samples without additives only. We avoid grossly hemolytic, lipidoic or turbid samples. Serum samples that were used within 24-48 hours stored at 2-8°C otherwise samples must be stored at -20°C to avoid loss. Serum fasting insulin and glucose were measured. HOMA-IR was calculated by the formula: fasting insulin (microU/L) x fasting glucose (nmol/L)/22.5. HOMA-IR has been widely utilized as insulin resistance index in clinical and epidemiological studies

Statistical analysis

The results are expressed as the mean ± SD in the text and Tables. Two variables were compared by Pearson's correlation test. A statistical software package was used to perform the analyses (XLSTAT 2018).

RESULTS

Table1. Basic characteristics and HOMA-IR of eighty PCOS cases

	Age years	BMI kg/m2	Homa-ir	Neck Circumference cm
MEAN	26.85	24.88	3.36	29.65
SD	4.6	4.46	1.51	5.9

Table 1 showed basic characteristics of 50 patients with PCOS in our study. Mean age was 26.85 ± 4.6 years with a range 20–36 years and BMI, 24.88 ±4.46 kg/m2 and with a range of BMI 18.5- 30 kg/m2.Neck circumferences was 29.65± 5.9 cm. HOMA- IR is 24.88± 4.6.

Table 2. Correlation between following parameters. (r, p value)

	BMI	HOMA-IR
NECK CIRCUMFERENCE	r = 0.267, p< 0.01	r = 0.017, p > 0.01

Correlation between neck circumference and BMI and HOMA-IR is shown in table 2. Neck circumference was weakly correlated with BMI ®= 0.267, p<0.01). Neck circumference was not significantly correlated with HOMA-IR (r= 0.017, p>0.01).

DISCUSSION

Several studies have examined the association of conventional anthropometric measures of obesity with NC.

[14-17]. In our study we found that no correlation was found between HOMA-IR and neck circumference though there was weakly correlation between BMI and neck circumference.

CONCLUSIONS

The results of this study appear not to strongly support the use of NC measurement as a useful screening tool for BMI and insulin resistance in cases of PCOS.

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of the paper.

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