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Study of neck circumference as an important risk factor for metabolic syndrome

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Abstract
Introduction: *Metabolic syndrome is an emerging disease worldwide, it is a significant cause of increased morbidity and mortality in patients. Metabolic syndrome leads to diabetes mellitus, hypertension, dyslipidemia and obesity; together all this forms the leading cause for cardiovascular disease as well. So we study neck circumference as a simple, quick and comfortable method for early detection of metabolic syndrome.*
Results: *Neck circumference was seen in 37 patient of metabolic syndrome. Neck circumference in male was significant, mean of39.27 cm, while in female it was mean of 28.3cm. Thus neck circumference should be considered as significant indicator of metabolic syndrome in population.*

Introduction

Metabolic syndrome is an emerging disease worldwide. Obesity is rising to pandemic proportions[1] and is an important risk factor for cardiometabolic diseases, including diabetes, hypertension, dyslipidemia, and coronary heart disease (CHD)[2]. An upper body distribution of fat, especially with increased visceral adipose tissue, is considered predictive of cardiometabolic conditions[3].

Overweight and obesity may be associated with fat deposition in the neck[4], resulting in higher neck 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.

The association between neck fat and metabolic syndrome and its components may be attributed to an excess release of free fatty acids into plasma from the upper body subcutaneous fat[5]. Neck circumference is rarely evaluated in clinical practice and research, although it is more practical and likely better measure, which can be specifically useful in special populations like metabolic syndrome.

Material and Methods

Material: The study was an observational study of patients suspected with metabolic syndrome attending the OPD, and the patients admitted in department of medicine NSCB Medical College, Jabalpur(M.P).

Inclusion Criteria

All patients with metabolic syndrome according to ATP III criteria presenting in OPD or admitted and who are willing to be a part of study were included.

Exclusion Criteria

*Local neck swelling
*Goiter patients
*Patients not willing to be a part of study

Cases were included in the study according to 2001 NCEP ATPIII criteria, which was widely adapted since they are simple to use in clinical practice. American heart association updated the ATPIII criteria with minor modifications. Thus metabolic syndrome is defined as presence of three or more of the following components

*Abdominal obesity (waist circumference >102 cm in men and >88 cm in female)
*Elevated triglycerides (>150mg/dl or on drug treatment for the elevated triglycerides).
*Hypertension (SBP >130 mmhg or DBP>85 mmhg or on a antihypertensive drug treatment)
*Reduced HDL-C level (<40 mg/dl in men and<50mg/dl in female or on a drug treatment for reduced HDL-C)
*Impaired fasting blood glucose (100-125mg/dl or on antidiabetic drug treatment).

Results

In our study out of 75 cases registered 37 came out to be of metabolic syndrome according to NCEP ATP III criteria. Maximum patients were male in study that is 27, and female were 10 with metabolic syndrome. In most of metabolic syndrome patients HDL-C cholesterol was found out to be low.

Neck circumferences in male patient were of mean 39.27 with standard deviation of 4.8, which is found out to be very significant. In female neck circumference mean was 28.3 with standard deviation of 2.1

Table 1: Clinical and biochemical profile of metabolic syndrome patients:-

Variables	mean	Standard deviation
SBP (mmhg)	142.3	15
DBP (mmhg)	88.7	6.8
Fasting sugar(mg/dl)	131.6	49.5
Triglycerides(mg/dl)	196.1	83.9
HDL(mg/dl)	33.7	6.0
Waist circumference(cm)	93.8	7.9

Table 2: Neck circumference in metabolic syndrome:

Sex	Neck circumference mean	Standard deviation
Male(27)	39.27	4.8
Female(10)	28.3	2.1

Discussion

The present study shows that neck circumference was significantly associated with metabolic syndrome. As we found in our study HDL-C was found significantly low in 80% of patients.

Waist circumference is a widely used anthropometric measure reflecting central obesity, a major risk factor for cardiometabolic conditions. However this measurement requires training for it to be reliable. On the other hand neck circumference is a simpler and more practical anthropometric parameter, not impended by clothing or last meal. Neck circumference is also associated with prediabetes, dyslipidemia, hypertension and coronary heart disease.

It has been hypothesized that fat in the neck, more similar to visceral fat, produces and releases substances that cause cardiometabolic abnormalities[7]. However, given the significant and consistent associations in our study and other populations, neck circumference shows promise as an alternative marker for the risk associated with central and visceral obesity.

Conclusion

This study tells us that neck circumference may be an important marker of central obesity and perhaps of visceral adiposity and an important risk

indicator of metabolic syndrome. Neck circumference may be an important measure to consider for routine assessment in primary care clinics and other health care settings as well as for research studies, when the use of expensive and sophisticated machines is neither easy nor justifiable. Neck circumference is especially useful among pregnant women, and in persons with flabby/muscular abdomen due to various medical and surgical causes.

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