Original Article

Rate of Metabolic Syndrome Among Patients with Facial Acanthosis Nigricans

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Abstract

Facial acanthosis nigricans (FAN) is an ignored dermatological entity. Nowadays it occurs more frequently than previous days may be due to changing economic and social status of our country. Aim of this study was to assess the rate of metabolic syndrome in cases of facial acanthosis nigricans. This observational study was conducted in the outpatient department (OPD) of dermatology and Venereology of Bangabandhu Sheikh Mujib Medical University (BSMMU) in the year 2017 among thirty clinically diagnosed cases of FAN. After taking their informed written consent; BMI, random plasma glucose, fasting lipid profile and serum insulin level was estimated in venous blood and recorded accordingly. To confirm metabolic syndrome we followed NCEP ATP III guideline (2005) where 3 of 5 positive criteria confirmed the diagnosis. All data was preserved in a secured computer device and was analyzed with SPSS program with appropriate statistical tools. Mean (±SD) age of patients was 35.63 ± 14.26 years and male to female ratio was 1:1.14. The mean BMI of cases was 33.73±3. We found 11 cases with hypertension, 8 with type II diabetes mellitus and 9 with dyslipidemia. Among the 30 cases of FAN 12 zygomatic type, 8 generalized type and 5 had band like pigmentation on the forehead. Twenty-three patients had acanthosis nigricans on both sides of body. According to our preset criteria we found 26.66% cases had metabolic syndrome. The rate of metabolic syndrome is higher in facial acanthosis nigricans patients. A further large scale study is recommended for strengthening this study findings.

Keywords: *Facial ancanthosis nigricans, Metabolic syndrome.*

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INTRODUCTION

Acanthosis nigricans (AN) is a simply identifiable dermatological condition characterized by velvety-dark coloured plaques appears on folds of skin, hands and feet, groin, armpits, umbilical area, knuckles, along the neck and even mucosal surface.[1] It presented as brown-to-black macular pigmentation with blurred ill-defined margins, commonly found on the zygomatic and malar areas with varying degrees of textural changes ranging from mild roughness to frank verrucous appearance of the affected areas.[2] Stimulation of tyrosine kinase growth factor receptor signaling pathways in epidermis is considered as common mechanism of AN.[3]

It is known for over hundred years, initially it thought to be a rare skin condition; but with the increasing rate of obesity and type-2 diabetes it is now a relatively common.[4] The rate of occurrence of AN among different ethnic groups varies from 7% to 49.2%.[5-7] AN is frequently associated with obesity, endocrine disorders (type 2 diabetes mellitus, isulin- resistance and hyperinsulinemia, hypothyroidism, hyperthyroidism and cushing syndrome), malignancy, genetic syndromes and the use of some drugs (glucocorticoids, niacin, insulin, oral contraceptives, and protease inhibitors), insulin injections (especially at the injection site).[8-11]

Facial AN is not a very common entity although some patients present with facial involvement. It is one of many causes of facial melanosis accounting 7.5%.[12] The initial common manifestation of facial acanthosis nigricans are cutaneous dryness, dark coloration and coarseness, which in affected area is of slate or black colored.[13] The pigmentation is followed by hypertrophy, accentuation of skin marking, and velvety texture.[13]

Table I: Definition of metabolic syndrome

	NCEP ATP (2005 revision)	WHO (1998)
Absolutely required	None	Insulin resistance
Criteria	Any three of the five criteria below	Insulin resistance or diabetes, plus two of the five criteria below
Obesity	Waist circumference: >40 inches in male and >35 inches in female	Waist/Hip ratio: >0.90 (M); >0.85 (F); or BMI > 30kg/m^2
Hyperglycemia	Fasting glucose ≥ 100 mg/dl	Insulin resistance required
Dyslipidemia	TG ≥ 150 mg/dl	TG ≥ 150 mg/dl or HDL: <39 mg/dl in male, <35 mg/dl in female
Dyslipidemia (second separate criteria)	HDL: <40 mg/dl (M); <50 mg/dl (F)	
Hypertension	>130 mm Hg systolic or >85 mmHg diastolic	≥ 140/90 mmHg
Other criteria		Microalbuminuria

Table I summarizes two commonly used definitions of metabolic syndrome. National Cholesterol Education Program (NCEP) Adult Treatment Panel-III(ATP-III)2005 was set five criteria for define metabolic syndrome. Obesity, hyperglycemia, dyslipidemia, hypertension any three of that five points will confirm metabolic syndrome. The World Health Organization (WHO) first developed its definition in 1998. Because insulin resistance was felt to be central to the pathophysiology of metabolic syndrome, evidence for insulin resistance is an absolute requirement in the WHO definition. In addition to this absolute requirement for insulin resistance, two additional criteria have to be met. These include obesity, dyslipidemia, hypertension and microalbuminuria.

MATERIALS AND METHODS

Clinically confirmed cases of facial acanthosis nigricans (FAN) who fulfilled our inclusion and exclusion criteria was enlisted as our case. Written consent was taken before taking personal and clinical information. Weight and height of patients was taken with a weight machine and abdominal circumference was measured with a plastic measuring tape. Blood pressure was measured with a sphygmomanometer and stethoscope. Patient's venous blood (5 cc) was drawn with aseptic measures and was sent for biochemical test of fasting lipid profile and fasting blood glucose.We defined metabolic syndrome according to National Cholesterol Education Program (NCEP) Adult Treatment Panel-III (ATP-III)2005 criteria. Where obesity was established when waist circumference of a male was more than 40 inches and that of female was more than 35 inches. When systemic blood pressure >130/85 mm Hg we defined that as hypertension. Other points of NCEP ATP III (2005) criteria for diagnosis of metabolic syndrome was fasting blood glucose ≥ 100 mg/dl, serum tritglycerides level ≥150 mg/dl and HDL cholesterol <40 mg/dl in male and <50 mg/dl in case of female patients. When three of above five criteria was positive we listed them as metabolic syndrome case. All data was recorded in a preformed data collection sheet. Data was preserved in a secured computer device and analyzed them with SPSS program version 20.

RESULTS

Out of 30 patients with facial acanthosis nigricans 14 (46.67%) were male and 16 (53.33%) were female mean age of cases was 35.63 years and their minimum age was 16 years and maximum age was 62 years. Regarding facial acanthosis nigricans we found 5 types of pigmentation like generalized, zygomatic, periorbital, band like on forehead and darkening over sulcus alaris nasi and sulcus mentolabialis. In our study zygomatic pigmentation was more common 40% than generalized (26.66%) and band like ogumentation on forehead type (16.66%).

We defined metabolic syndrome according to NCEP ATP III. We found waist circumference was high in (43.33%) cases, systemic hypertension was found in 36.66% cases, hyperglycemia in 26.66%, hypertriglyceridaemia in 30% cases and low HDL level in 26.7% cases. We found 8 (26.7%) patients with metabolic syndrome, who fulfilled at least three of above mentioned five criteria. Of them 16.66% was male and 10% was female respondent.

Table: II Demographic and clinical characteristics of cases (N=30)

Sample characteristics		
Age (year)		
mean ±SD	35.63 ± 14.26	
Range	46	
Min-Max	16-62	
Sex		
Male	14(46.7%)	
Female	16(53.3%)	
Male: Female (Ratio)	1:1.14	
Weight (KG)		
Mean ± SD	71.53 ± 9.5	
Range	37	
Min-Max	65-102	
BMI		
Mean ± SD	32.73 ± 3.4	
Range 12		
Min-Max	26-38	
Duration of disease (Year)		
Mean± SD	2.97 ± 1.3	
Range	5	
Min-Max	1-6	
Pigmentation type		
I. Generalized	8	26.7%
II. Zygomatic	12	40%
III. Band like on forehead	5	16.7%
IV. Peri- orbital pigmentation	3	10%
V. Sulcus of alaris nasi and or sulcus mentolabialis	2	6.7%
Presence of AN on other site	23	76.7%
Presence of acne	8	26.7%
Presence of acrochordon	4	13.7%
Only pigmentation present	11	36.7%
Both pigmentation and thickening present	19	63.7%
Components of metabolic syndrome		
i. **Obesity**		
Waist circumference (>40 inches in male and >35 inches in female)		
At or above obese level	13	43.3%
ii. **Hypertension (BP ≥130/≥85 mmHg)**	11	36.7%
iii. **Hyperglycemia (FBS≥110mg/dl)**	8	26.7%
iv. **Hypertrygliceridaemia (TG >150 mg/dl)**	9	30%
v. **Low HDL cholesterol level (<40 mg/dl in male and <50 mg/dl in female)**	8	26.7%
PCOS	5	16.7%
Atopy present	2	6.7%
FH of HTN positive	5	16.7%
FH of DM Positive	7	23.3%
Metabolic syndrome positive	8	26.7%

DISCUSSION

An observational study conducted on 30 diagnosed cases of facial acanthosis nigricans (FAN). The mean (±SD) age of patients was 35.63 years. Age range was 46 (16-62) years and mean duration of disease was 2.9 years. Male to female ratio was 1 : 1.14.

In a similar study conducted on 139 FAN patients found mean (±SD) age was 38.8 ±8.6 years and age range was 39 (22-61) years.[15] Verma et. al found age range 42 (16-58) years in 102 FAN patients. Above two studies was similar with our findings.[16]

Regarding sexpanda et. al found male to female ratio was 4.4 : 1 and Verma et. al found that ratio was 2.9 : 1. This result is dissimilar with our findings where female out numbered male.

Mean (±SD) weight of cases was 71.5 SD±9.6 kg and mean (±SD) BMI was 32.7SD±3.4.We found 5 types of pigmentation in face due to FAN. Common type was zygomatic (40%), generalized type was second common type (26.7%). others type was band like on forehead (16.7%), periorbital (10%), sulcus of alarisnasi and sulcus of mentolabialis (6.7%). Only pigmentary change was in 11(36.7%) cases and both pigmentary and texture change was in 19 (63.3%) cases. Panda et. al. found the involvement at fore head and temporal region was 69.1%, 57.7% was at zygomatic region and 14.6% was periocular and perioral involvement. Another study 59.8% involvement was found in forehead, 17.6% was with periorbital darkening, 12.7% was with perioral darkening and in 9.8% cases the darkening was generalized.[17] That finding was more or less near to our findings. In our study 5 (16.7%) cases were with positive family history with hypertension and 7 (23.3%) patients were with positive family history of diabetes mellitus.[18]

In 76.7% cases acanthosis nigricans was found in body other than face most likely on axillae, back of neck and body creases. 8(26.7%) patients were presented with acne, 4 (13.3%) patients were with acrochordon and 5 female patients with PCOD. Panda et.al found acanthosis nigricans on 81.3% on neck and 49.6% on axilla. 43.1% patients were presented with acrochordon.[19]

According to NCEP ATP III guideline we defined metabolic syndrome with 5 clinical and/or biochemical points. We looked for abdominal obesity while waist circumference became >40 inches in male and > 35 inches in case of female it was defined as obesity level. In our study 13 (43.3%) was positive for central obesity.[21] Hypertension was found in 11 (36.7%) cases, hyperglycemia was found in 8 (26.7%) cases, hypertriglyceridemia was found in 9 (30%) cases and low HDL level was found in 8 (26.7%) cases. Panda et al. found obesity in 39.84% cases, hypertension 22.8% case and dyslipidaemia in 39.0% cases. Outcome of that study was similar to our findings.

Panda et.al. found that obese patient classified as per BMI were increased chance to develop FAN two times than normal. In our study we found 26.7% cases with FAN developed metabolic syndrome.

CONCLUSIONS

In our study we found rate of metabolic syndrome is more in patients with FAN in our community. We suggest a large scale study to support and verify our study out comes.

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