

CLINICAL STUDY OF DERMATOLOGICAL MANIFESTATIONS IN OBESITY

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Abstract

Background and objectives. Obesity is a major concern in our era with many adolescents and adults being obese. Obese patients with metabolic syndrome are more prone for cardiovascular risk. Obese individuals have numerous physiological changes which predispose them to many dermatological conditions. This is of concern to us as many of these conditions can act as markers for obesity and impending systemic consequences of obesity. This study was done to find the common dermatoses associated in adults with a BMI of > 30 kg/m² who presented.

Methodology All adult patients, of both sexes, who have a BMI > 30.0 and/or waist circumference > 90cm in males and > 80cm in females were included in the study. A detailed history of the patients was taken Morphology of skin lesions, sites of involvement, number of lesions were noted. A complete systemic and dermatological examination was carried out in all patients.

Results The age range of patients in this study was 18-85 years and the mean age was 40± 12.50. Acanthosis nigricans and skin tags had a strong correlation with obesity and Metabolic syndrome. It was noted that in patients with acanthosis nigricans and skin tags, who were found to have metabolic syndrome, had elevated fasting plasma leptin levels but no elevation in fasting plasma Insulin levels.

Conclusion Obesity is a rising modern epidemic which can impact the normal physiology of skin leading to various dermatological conditions. Many of these dermatoses are so common among obese patients so they can be considered as a marker for obesity. Early identification of these conditions can be useful in preventing the deleterious effects of obesity on the body. Severity of obesity also determines the nature of lesions occurring in these patients. Lipid profile changes are also commonly seen in these patients. So treatment of lipid profile in addition to weight reduction can decrease the occurrence of these dermatoses.

Key words Obesity; skin tags; acanthosis nigricans; plantar hyperkeratosis; lipid profile.

INTRODUCTION

Obesity is recognized worldwide as a major health problem. Obesity is associated with an increased risk of multiple health problems including hypertension, Type 2 diabetes mellitus, Dyslipidemia, Degenerative joint diseases¹. Skin conditions such as Acrochordons, Acanthosis nigricans can be easily made out on inspection which are commonly associated

with obesity. Thus it is important for physicians to routinely identify, evaluate and treat patients for obesity and associated comorbid conditions. Acrochordons and pseudoacanthosis nigricans are some of the most common skin manifestations we are encountering in our dermatology OPD and most of them are found in obese patients². Dermatologists need to be aware of skin diseases related to obesity, so that they can advise the patients regarding early monitoring and treatment of symptoms and associated risk factors like diabetes and dyslipidemias^{3,4}. According to our knowledge only few studies have been published in indexed journals relating to this topic, hence we took up this Study. Hence this present study was planned to elucidate the various skin changes occurring in obese patients. The study also determined the frequency of the various skin changes occurring in the different obesity classes.

MATERIALS AND METHODS

SAMPLE AND SOURCE

The study comprised of 50 patients (25 male and 25 female patients) satisfying the inclusion criteria, who attended the outpatient department of D. V.L Vinayaka Mission's Medical College & Hospital, Karaikal from February 2021 to July 2022.

INCLUSION CRITERIA

All adult patients, of both sexes, who have a BMI > 30.0 and/or waist circumference > 90cm in males and > 80cm in females were included in the study.

EXCLUSION CRITERIA

Patients with obesity due to congenital syndromes and age less than 15 years (pediatric age group) and non consenting patients were excluded

TYPE OF STUDY: Cross sectional Descriptive study

METHODOLOGY

Patients included in the study were classified into three groups based on their BMI: class I with BMI 30.0-34.9, class 2 with BMI 35.0-39.9, class 3 with BMI >40. A detailed history of the patients were taken Morphology of skin lesions, sites of involvement, number of lesions were noted. A complete systemic and dermatological examination was carried out in all patients. Blood pressure was evaluated. Scraping for KOH mount, bacterial culture done when needed Height was recorded in centimeters. Weight was recorded in kilograms. Waist circumference was recorded in centimeters. Specific blood investigations were done apart from the routine investigations as follows: Blood sugar: fasting blood sugar, postprandial blood sugar. Fasting lipid profile, Fasting serum Insulin, Fasting serum Leptin^{5,6}.

Reading and Interpretation of Tests

Body mass index was calculated according to the formula weight in kg / height² in cm. BMI 30.0-34.9 was labeled as class 1 obesity, BMI 35.0-39.9 was labeled as class 2 obesity, BMI > 40 was labeled as class 3 obesity & Fasting Blood sugar levels > 100 mg/dl were taken as abnormal. Fasting serum Insulin levels were taken as normal if present between 2.6-24.9 mIU/ml. Fasting serum Leptin levels were determined by an enzyme immunoassay method using Leptin ELISA kit (manufactured by Diagnostics Biochem Canada Inc.) Reference range in Males is between 2.0-5.6 ng/ml and in females is between 3.7-11.1 ng/ml.

CRITERIA FOR METABOLIC SYNDROME:

According to the new IDF definition, for a person to be defined as having the metabolic syndrome they must have Central obesity ie. waist circumference (in south Asians) in males ≥ 90 cm and in females ≥ 80 cm, plus any two of the following four factors:

1. raised triglycerides > 150 mg/dl
2. reduced HDL, in men < 40 mg/dl

in women < 50 mg/dl

3. raised blood pressure > 130/85 mmHg

4. raised FBS \geq 100 mg/dl

STATISTICAL METHODS

Compilation of Data:

Data was entered simultaneously into Microsoft excel worksheets designed and coded properly.

Analysis of Data:

The Data collected was analyzed using appropriate statistical tests, with the help of Epi-info version 3.5.1 and SPSS version 17.

Chi-square and fisher exact tests have been used to test the significant association between the study parameters.

P value (P) :<0.05 was considered to be statistically significant.

OBSERVATIONS AND RESULTS

Fifty patients aged 18 years and above satisfying the inclusion criteria were drawn from the outpatient department and wards of dermatology of Vinayaka Mission's Medical College & Hospital. 50% were males and 50% were females, majority of them in their third and fourth decade. By occupation, the male patients were small scale businessmen and agricultural farmers and most of the female patients were house wives. Diabetes mellitus was the most common systemic illness. 19 patients had elevated elevated fasting blood sugar (38%). 17 patients had elevated postprandial blood sugar (40%). 15 patients had both elevated fasting and post prandial blood sugar levels (34%). Systemic hypertension was seen in 17 patients (34%).

A and shows that about 48% of the male patients had grade I obesity, 36% had grade II obesity and 16% had grade III obesity. Among the female patients, 60% had grade I obesity, 20% had grade II obesity and 20% had grade. III obesity.

In our study we found that Acanthosis nigricans was the most prevalent skin change in obese patients (84%). This finding is in accordance with results of study done by Hud et al⁵⁴, who found that 74% of obese population exhibited Acanthosis nigricans. The association between the various obesity classes and Acanthosis nigricans was a statistically significant. (P value: 0.017). As BMI increases, probability of patients with Acanthosis nigricans also significantly increases (P value:0.02167).

There was no statistically significant association between Acanthosisnigricans and sex of patients. (P = 0.247).

Skin tags was seen in 76% of study patients. Most of them had numerous, mixed colour, small sized skin tags. There was a statistically significant association between Skin tags and BMI (P= 0.010). As BMI increases, probability of the patient to have skin tags also increases.

Theassociation between sex and Skin tag was not statistically significant.(P=0.508).

Dermatophyte infections (tinea corporis) was present in 28% patients. There was a statistically significant association between dermatophyte infection and BMI (P = 0.021).

Though association between BMI and dermatophyte infection is significant, probability of patients to have dermatophyte infection may not increase with BMI. (Chi-square test for linear trend P. value = 0.16044). There was a statistically significant association between dermatophyte infection and sex (P = 0.0012) with more female preponderance in our study

Psoriasis was seen in 26% of the study patients. The association between the various obesity classes and Psoriasis was statistically significant (P value: 0.000). As BMI increases, probability of patients to have Psoriasis also significantly increases (P value: 0.00014). There

was no statistically significant association between Psoriasis and sex of patients in our study. ($P = 0.333$). Striae distensae was seen in 26% of study patients. The association between the various obesity classes and striae distensae was a statistically significant. (P value: 0.019). As BMI increases, probability of patients with striae distensae also significantly increases (P value: 0.01026). There was no statistically significant association between striae distensae and sex of patients. ($P = 0.333$).

Fissure feet were seen in 26% of study patients. The association between the various obesity classes and fissure feet was a statistically significant. (P value: 0.023). As BMI increases, probability of patients to have fissure feet may not significantly increase (Chi-square test for linear trend p value: 0.08252). pyoderma was seen in 22% of study patients. The association between the various obesity classes and pyoderma was statistically insignificant. (P value: 0.762). As BMI increases, probability of patients to have pyoderma doesn't significantly increase (Chi-square test for linear trend value: 0.83966). There was a statistically significant association between pyoderma and sex of patients. ($P = 0.017$), seen more in males than females in our study.

Intertrigo was seen in 20% of study patients. In our study the association between the various obesity classes and intertrigo was a statistically insignificant. (P value: 0.226). As BMI increases, probability of patients to have intertrigo may not significantly increase (Chi-square test for linear trend P value: 0.15806). There was no statistically significant association between intertrigo and sex of patients. ($P = 0.157$).

Varicose veins was seen in 14% of study patients. The association between the various obesity classes and varicose veins was a statistically significant. (P value: 0.000). As BMI increases, probability of patients to have varicose veins significantly increase (Chi-square test

for linear trend p value:0.00003). There was no statistically significant association between varicose veins and sex of patients. (P = 1.000).

Seborrheic dermatitis was seen in 10% of study patients. The association between the various obesity classes and seborrheic dermatitis was a statistically insignificant. (P value: 0.402). As BMI increases, probability of patients to have SD doesn't significantly increase (chi-square test for linear trend P value: 0.10107).

There was no statistically significant association between varicose veins and sex of patients. (P = 1.000). Hand and feet eczema was seen in 8% of study patients. The association between the various obesity classes and hand and feet eczema was a statistically insignificant. (P value: 0.930). As BMI increases, probability of patients to have hand and feet eczema may not significantly increase (Chi-square test for linear trend P value: 0.96786. There was no statistically significant association between varicose veins and sex of patients. (P = 0.609).

Osteoarthritis was seen in 8% patients. The association between the various obesity classes and osteoarthritis was a statistically insignificant. (P value: 0.006). As BMI increases, probability of patients to have hand and osteoarthritis significantly increase (Chi-square test for linear trend value: 0.00814). There was no statistically significant association between osteoarthritis and sex of patients. (P = 0.110). Melasma was seen in 8% patients. Waist band eczema was seen in 6%. Stasis eczema seen in 6%. Acne vulgaris seen in 4%. Seborrheic keratosis seen in 2%. lichen planus seen in 2%. 8% had osteo-arthritis. Out of 30 patients with both Acanthosis nigricans & Skin tags, 19 had Metabolic syndrome. Out of these 19 patients, Fasting leptin levels were elevated in 17 patients. Though more number of patients with Acanthosis nigricans & Skin tags with Metabolic syndrome had elevated fasting leptin levels, the statistical association was found to be insignificant due to small sample size. Chi-square test p. value = 0.236. The association was analyzed between patients with Acanthosis

nigricans & Skin tags with Metabolic syndrome and fasting Insulin levels. There was no statistically significant association between these two. Chi-Square Tests: p value: 0.25

Table A: Distribution of patients based on Sex and Class of Obesity

Sex	Class 1	Class II	Class III	Total
Male	12	9	4	25
Female	15	5	5	25
Total	27	14	9	50

Figure 1: Acanthosis Nigricans in an Obese Male

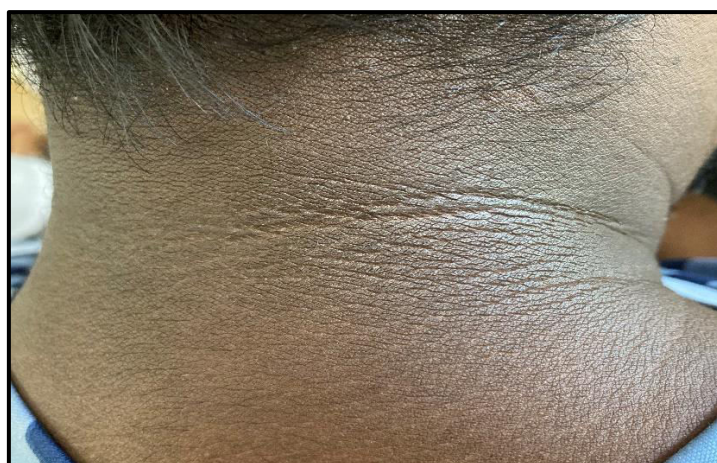


Figure 2 :Multiple Acrochordons in an Obese Male



Figure 3: Seborrheic Keratosis in an Obese Female



Figure 4: Melasma in Obese Female



Figure 5 :Extensive Tinea Corporis in an Obese Male .



Figure 6 :Striae distensae in an Obese Male



Figure 7: Extensive Tinea Corporis in an Obese Female



Discussion

The age range of patients in this study was 18-85 years and the mean age was 40 ± 12.50 . Acanthosis nigricans and skin tags had a strong correlation with obesity. Acanthosis nigricans and skin tags presence had a strong correlation to presence of metabolic syndrome. It was noted that in patients with acanthosis nigricans and skin tags, who were found to have metabolic syndrome, had elevated fasting plasma leptin levels but no elevation in fasting plasma Insulin levels^{7,8,9}. Though hyperleptinemia was found in these patients, we couldn't find a statistically significant correlation between fasting leptin levels and metabolic syndrome, may be due to small sample size or should be studied further. It was noted that patients with elevated fasting blood sugar levels didn't have elevated fasting insulin levels. We

couldn't find a Statistically significant correlation between fasting insulin levels and metabolic syndrome in patients with skin tag and acanthosis nigricans, may be due to small sample size. Obese patients with metabolic syndrome are more prone for cardiovascular risk^{10,11}.

Conclusion

Lifestyle modifications like avoidance of smoking and alcohol, and consumption of a well balanced diet, regular exercise, along with monitoring of blood sugars and lipid profiles at regular intervals and,early diagnosis of hyperlipidemia and hyperglycemia and corresponding treatment,timely follow-ups, decreases the risk of cardiovascular and cerebrovascular accidents in obese individuals and it is advisable to monitor leptin levels in obese patients

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