

A STUDY OF CHANGES IN LIPID PROFILE IN OBESE AND NON-OBESE FEMALES WITH ACNE VULGARIS

Background: Acne vulgaris is a common dermatological condition and is known to be caused by many factors. Presence of obesity causes a number of changes in the skin barrier function as well as in lipid profile.

Aims & Objective: The objective of this study is to find out the relevance of lipids and lipoproteins levels in obese and non-obese acne patients and compare it with healthy controls.

Materials and Methods: 50 obese female subjects with acne (Group-A) along with 50 non-obese female subjects with acne (Group-B) were assessed for BMI (Body Mass Index), serum total cholesterol (TC), triglycerides (TG), low density lipoproteins (LDL) and high density lipoproteins (HDL). The results were compared with age matched healthy females who served as controls (Group-C).

Results: Highly significant elevations were observed in the values of BMI, TC, TG and LDL in both Group-A & Group-B as compared to group-C ($p < 0.001$). The elevations were more in Group-A as compared to Group-B. The levels of HDL were lower in Group-A and Group-B as compared to Group-C. These parameters were lower in Group-A than in Group-B.

Conclusion: Acne vulgaris is definitely associated with changes in lipid profile which are more marked in obese individuals (BMI > 27 kg/m² and waist-hip ratio > 0.8). The reduction in body weight need to be taken care of while treating acne patients.

Key Words: Acne Vulgaris; Body Mass Index; Serum Lipids

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INTRODUCTION

Acne vulgaris is a common disease in developed nations, one that has increased in frequency in the last half century, particularly among adult women.^[1] The precise mechanisms of the acne process is known to be characterized by sebum overproduction, follicular hyperkeratinization, oxidative stress and inflammation. Androgens, microbes and other pathogenetic influences are also at work in the development of acne.^[2] The presence of excess adipose tissue, which is maladaptive, could induce lipid peroxidation, which affects the inflammatory processes of innate immunity that are part of the response to acne vulgaris pathogenesis.^[3] An association between diet and acne has been postulated by some studies that indicate that diets high in carbohydrates and fat worsen acne.^[4] The events of acne vulgaris appears to be affected by obesity, hormonal and immune-mediated mechanisms that potentiate the inflammatory response, indicating that there is a relationship between obesity (BMI > 27). Reducing body weight decreases the facial lipolysis caused by bacteria and potentiates the treatment.^[5] The present study is an effort to evaluate the relationship of lipid profile with the incidence of acne vulgaris in obese and non-obese females, and compare it with healthy controls.

MATERIALS AND METHODS

The study was conducted on a total of 150 female subjects aged between 14-30 years. They were divided into three groups of 50 subjects each- group-A consisted of obese females with acne, group-B consisted of non-obese females with acne and group-C consisted of controls who were non-obese without acne. The nature of the test was explained to the subjects and consent taken.

Inclusion Criteria: The subjects chosen were those attending Dermatology OPD in Sri Guru Ram Das Institute of Medical Sciences & Research, Amritsar. The controls were selected from the general population as well as from the attendants of the patients with acne. Obesity was defined as a body mass index (BMI) > 27 kg/m² and a waist-hip ratio > 0.8.^[6,7]

Exclusion Criteria: The subjects selected were non-alcoholic, non-smokers. The subjects were not suffering from hypertension, diabetes, any liver or kidney diseases or any neuro-endocrinal disorder. Both the patients and controls had no history of any topical or systemic drug therapy including vitamins.

A detailed history including medical, personal, occupational, drug intake, socio economic status and

dietary intake was taken. Complete physical examination was done. Fasting blood samples were taken from all the subjects and lipid profile was done as follows: (i) Total serum cholesterol (CHOD-PAP Method); (ii) Serum triglycerides (GPO-Trinder Method); (iii) Serum High density lipoproteins (HDL) (Phosphotungstic Acid Method); (iv) Serum Low density lipoproteins (LDL) (Freidwald equation)

Statistical Analysis: Statistical analysis was carried out in SPSS version 11.0. Student t-test was used to compare the variables between controls. The difference was considered significant if the p-value was <0.05 & highly significant if the p-value was <0.001. The data was analysed and valid conclusions were drawn.

RESULTS

Our study included 150 subjects, out of which 50 were obese females with acne (Group-A), 50 were non-obese with acne (Group-B) and 50 were controls who were non-obese without acne (Group-C). Table 1 shows the mean values for all the parameters in the three groups. According to this table, the mean values for age did not vary much in all the three groups. Mean value for BMI for Group-A (35.50 ± 3.20) was more than Group-B (21.34 ± 2.37) & Group-C (21.32 ± 2.59). As shown in Tables 2 the increase in BMI was highly significant (p<0.001) between Group-A & Group-B and between Group-A & Group-C; it was not significant between Group-B & Group-C (p>0.05). Serum lipids also followed an almost similar pattern. The mean values for total cholesterol, triglycerides and LDL showed a marked increase in Group-A as compared to Group-B and Group-C. This increase was highly significant between Group-A & Group-B, between Group-B & Group-C and between Group-A & Group-C (p<0.001). Serum HDL values showed a fall in Group-A as compared to Group-B & Group-C. This decrease was highly significant between Group-A & Group-B, between Group-B & Group-C and between Group-A & Group-C (p<0.001). Correlation studies have shown positive correlation between BMI and serum cholesterol and triglycerides & a negative correlation between HDL and BMI in Group-A.

Table-1: Mean values of all parameters

Parameters	Group-A	Group-B	Group-C
	(n=50)	(n=50)	(n=50)
	Mean ± SD	Mean ± SD	Mean ± SD
Age (years)	20.24 ± 3.46	20.44 ± 2.92	19.88 ± 2.73
BMI (kg/m ²)	35.50 ± 3.20	21.34 ± 2.37	21.32 ± 2.59
Total Cholesterol (mg/dl)	272.28 ± 14.86	225.82 ± 31.25	153.24 ± 7.87
Triglycerides (mg/dl)	193.24 ± 13.40	173.14 ± 5.75	135.54 ± 7.73
LDL (mg/dl)	146.44 ± 9.54	126.36 ± 6.16	90.80 ± 8.45
HDL (mg/dl)	41.56 ± 3.56	44.54 ± 3.66	50.46 ± 6.26

Table-2: Comparison between Groups

Parameters	Group A & B		Group B & C		Group A & C	
	t-value	p-value	t-value	p-value	t-value	p-value
Age (years)	-0.312	0.75	0.98	0.32	0.57	0.56
BMI (kg/m ²)	25.1	0.000	0.04	0.96	25.10	0.000
Total Cholesterol (mg/dl)	9.49	0.000	15.92	0.000	9.49	0.000
Triglycerides (mg/dl)	9.74	0.000	27.60	0.000	9.74	0.000
LDL (mg/dl)	12.49	0.000	24.02	0.000	12.49	0.000
HDL (mg/dl)	-4.125	0.000	-5.77	0.000	-4.12	0.000

p > 0.05: not significant; p < 0.05: significant; p < 0.001: highly significant

DISCUSSION

Acne vulgaris is a common dermatological condition characterized by hormonally-mediated sebum overproduction, follicular hyperkeratinization, and chronic inflammation of the pilosebaceous unit. Microbes, genetic susceptibilities, and various environmental factors have been linked to the pathogenesis of the condition.^[8]

According to a study in acne patients, serum HDL levels showed a decrease proportional to the severity of the acne, triglycerides levels were also increased significantly as compared to normal healthy adults, with an insignificant rise in total cholesterol.^[9] Another study in acne patients resulted in significant elevations in total cholesterol, triglycerides, LDL, HDL, VLDL along with MDA as compared to controls.^[10] In patients of severe acne vulgaris, total cholesterol (TC), LDL-C, testosterone, and progesterone levels were higher in patients. Estrogen and HDL-C levels were decreased in patients.^[11]

Increased fat content leads to increased lipoperoxidation and hence the generation of ROS which cause oxidative damage in acne patients. In our study higher BMI values were observed in obese acne females (Group-A) as compared to non-obese acne patients (Group-B) & controls (Group-C). This falls in agreement with a study which found out a positive correlation between acne and obesity (BMI>27).^[5] Obesity is responsible for a variety of changes in skin physiology and is implicated in a wide spectrum of dermatologic diseases.^[12] Acne is exacerbated by obesity-associated disorders, such as hyperandrogenism and hirsutism. Androgens, insulin, growth hormone, and insulin like growth factors are frequently elevated in obese patients and have been demonstrated to activate sebaceous glands and influence acne severity.^[13,14] Obese patients with polycystic ovary syndrome demonstrated significant improvement in acne when treated with pioglitazone, an insulin-sensitizing agent.^[15]

In our study, lipid profile in acne patients showed an altered picture. The mean values for total cholesterol, triglycerides and LDL showed a marked increase in Group-A as compared to Group-B and Group-C. This increase was highly significant between Group-A & Group-B, between Group-B & Group-C and between Group-A & Group-C. Serum HDL values showed a fall in Group-A as compared to Group-B & Group-C. This decrease was highly significant between Group-A & Group-B, between Group-B & Group-C and between Group-A & Group-C. Similar results were observed in a study in acne patients where significant elevations were seen in total cholesterol, triglycerides, LDL, HDL, VLDL along with MDA as compared to controls.^[10] Also supporting our findings is a study by Vergani & Finzi and et al who showed a significant reduction in HDL & Apoprotein A1 in female patients suffering from severe cystic acne.^[16] Another study in female acne patients during three consecutive menstrual cycles during luteal phase (19th to 21st day) demonstrated that total cholesterol (TC), LDL-C, testosterone, and progesterone levels were higher while Estrogen and HDL-C levels were decreased in such patients.^[11]

An association between diet and acne has been postulated by some studies that indicate that diets high in carbohydrates and fat worsen acne.^[4] Hyperinsulinemic diets were also thought to be an environmental factor in the development of acne since they influence follicular epithelial growth, keratinization and androgen-mediated sebum secretion.^[17] Ox-LDL (oxidized low density lipoprotein, a confirmed marker for oxidative stress) concentrations were positively associated with specific lipid biomarkers (total cholesterol, LDL-c and total cholesterol-to-HDL-c ratio), GPx activity and uric acid concentration.^[18] Obese individuals, according to another study demonstrated a fundamentally altered epidermal barrier.^[19]

The events of acne vulgaris appear to be affected by obesity, hormonal and immune-mediated mechanisms that potentiate the inflammatory response. Reducing body weight decreases the facial lipolysis caused by bacteria and potentiates the treatment.^[5]

CONCLUSION

Acne patients have some abnormality in the lipid profile, which definitely is correlated to the BMI of the subjects as

is evident from our study. The causes can be multifactorial which need to be taken care of while treating such patients. The obese individuals need to reduce weight as a part of the treatment.

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