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Original Research Article

Clinical and epidemiological characteristics and hormonal profile of adult females with acne vulgaris: a cross-sectional study from a tertiary care hospital

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ABSTRACT

Background: To study clinical and epidemiological characteristics and hormonal profile of adult females with acne
Methods: Adult female patients of >25 years of age with acne were enrolled. Demographic profile, habits, location of acne lesions, associated disease and acne flare association with menstrual cycle were noted. Prevalence of abnormalities in testosterone, dihydroepiandrosterone-sulfate (DHEAS), prolactin, luteinizing hormone (LH), follicle stimulating hormone (FSH), LH:FSH ratio, anti-mullerian hormone (AMH), and serum insulin were noted. Ultrasound (abdomen and pelvis) was performed for screening the presence of any abnormality.
Results: Fifty one patients [mean (SD) age 30.96 (4.93) years] were included in the study. Thirty six (70.59%) patients had persistent type of acne. Grade 2 acne was present in 40 (78.43%) patients. Oily skin was seen in 27 (52.94%) patients. Hirsuitism and menstrual irregularity was present in 24 (47.06%) and 13 (25.49%) patients respectively. Pigmentation and scarring was present in 27 (52.94%) and 35 (68.63%) patients respectively. Acne lesions were seen on cheeks in 36 (70.59%) patients. Eight (15.69%) patients had elevated testosterone. DHEAS and prolactin levels were normal in all patients. Elevation of LH and decreased FSH levels were seen in five (9.80%) and three (5.88%) patients respectively. Five (9.80%) patients had elevated LH:FSH level. Raised insulin level was seen in 8 (15.69%) patients.
Conclusions: Derangement of hormonal profile is not very common among adult female patients with acne. However, in some patients laboratory markers of hyperandrogenism are seen.

Keywords: Acne vulgaris, Hyperandrogenism, Laboratory markers, Profile

INTRODUCTION

Acne vulgaris caused by Propionibacterium acnes is one of the prevalent skin conditions in adolescents and young adults.[1-3] It can persist even in adults.[1,2] Similarly, even neonates and children can have acne.[4] The disease is characterised by excessive production of sebum. Patients with acne vulgaris can present with varied skin lesion ranging from comendons, papules, pustules or mixed pattern and some patients scars may be seen.[3,5] Several factors including inflammatory mediators and hormones are involved in the pathogenesis of acne. Skin is an important target tissue for testosterone, an important androgen.[6] It is also reported that high sensitivity of sebaceous to androgens may result in acne. Moreover, androgens also play role in the development of

hyperkeratinisation.[7] Hyperandrogenism can also result in hirsutism.[6]

The lesions are typically seen on the face, chest and back.[4] Involvement of face with acne vulgaris can cause cosmetic concerns in patients, especially females. The untreated or suboptimal response to treatment in patients with acne can cause adverse implications on the quality of life of affected patients.[2,8]

Several medications are available for the treatment of acne which include prescription drugs as well as over the counter medicines.[9] Considering the role of androgen in the pathogenesis of acne vulgaris, anti-androgens may be initiated early in patients resistant to initial therapy.[10] However, treatment of acne in adult females may be also associated with challenges because of their child bearing age and breast feeding after delivery.[2,11] Considering this, treatment of patients with acne vulgaris needs to be individualized.[2] Understanding the correlation between clinical profile with hormonal changes may be useful for counselling as well as treatment of female patients.

Objective

The objective of this study was to perform analysis of laboratory markers in adult females with acne vulgaris.

METHODS

A cross-sectional study was conducted among adult female patients more than 25 years of age with signs and symptoms of acne vulgaris presented to the outpatient department of dermatology in a tertiary care centre. Patients with drug-induced and other acneiform eruptions were not included.

After detailed history and clinical examination, demographic profile, habits, location of acne lesions, other skin lesions, associated disease and acne flare association with menstrual cycle were noted. Prevalence of abnormalities in testosterone, dihydroepiandrosterone-sulfate (DHEAS), prolactin, luteinizing hormone (LH), follicle stimulating hormone (FSH), LH:FSH ratio, anti-mullerian hormone (AMH), and serum insulin were calculated. LH: FSH ratio of >2:1 was considered abnormal. Ultrasound of abdomen and pelvis was also performed to screen for the presence of any abnormality. The study was conducted from February 2018 to February 2019. The study was approved by the institutional ethics committee.

Statistical analysis

Continuous variables are presented as mean and standard deviation whereas categorical variables are presented as count and percentages. Chi-square test was used to analyse categorical data. P value of less than 0.05 was considered statistically significant.

RESULTS

A total of 147 female patients aged above 25 years were selected for inclusion in the study. Out of them only 51 (34.7%) agreed to participate in the study. The mean (SD) age of study participants was 30.96 (4.93) years. The mean (SD) body mass index was 24.52 (3.80) kg/m^2. A total of 27 (52.94%) females were homemakers whereas 18 (35.29%) were office workers (Table 1).

Table 1: Demographic profile of adult female patients with acne (n=51).

Parameter	Result
Mean (SD) age in years	30.96 (4.93)
Mean (SD) body mass index (BMI) kg/m^2	24.52 (3.80)
Occupation n (%)	
Homemaker	27 (52.94%)
Office worker	18 (35.29%)
Student	5 (9.80%)
Cook	1 (1.96%)
Excessive sun exposure n (%)	2 (3.92%)
Family history of acne n (%)	22 (43.14%)

Family history was reported by 22 (43.14%) patients whereas work profile was associated with excessive sun exposure in two (3.92%) patients. Table 2 shows acne characteristics and its correlates in the study participants. The mean (SD) age of acne onset in study participants was 23.10 (6.51) years. The mean (SD) duration of acne was 7.90 (4.67) years. A total of 36 (70.59%) patients had persistent type of acne whereas 15 (29.41%) had late onset acne. Grade one, two, three and four acne was present in two (3.92%), 40 (78.43%), five (9.80%) and four (7.84%) patients respectively. A total of 19 (37.35%) patients had normal skin type. Oily and dry skin was seen in 27 (52.94%) and five (9.80%) patients respectively.

Hyperseborrhea, hirsuitism and androgenic alopecia was present in 11 (21.57%), 24 (47.06%) and six (11.76%) patients respectively. Menstrual cycle was irregular in 13 (25.49%) patients. A total of 13 (25.49%) and one (1.96%) patients reported seasonal variation associated with acne in summer and winter respectively. History of stress was present in 16 (31.37%) patients. Consumption of oily and dairy food was reported by 20 (39.22%) and 19 (37.25%) patients respectively. Use of cosmetic, smoking, application of oil and acne lesion manipulation was reported by 12 (23.53%), three (5.88%), 11 (21.57%) and 12 (23.53%) patients respectively. Pigmentation and scarring was present in 27 (52.94%) and 35 (68.63%) patients respectively.

Acne lesions were seen on cheeks, mandibular area, forehead, chin and nose in 36 (70.59%), 28 (54.90%), 13 (25.49%), 13 (25.49%) and 6 (11.76%) patients respectively. Truncal acne was present in 12 (23.53%) patients (Figure 1).

Table 2: Acne characteristics and its correlates in adult female patients.

Parameter	Result
Mean (SD) age of onset in years	23.10 (6.51)
Mean (SD) duration of acne in years	7.90 (4.67)
Acne type n (%)	
Late onset	15 (29.41%)
Persistent	36 (70.59%)
Grade of acne n (%)	
1	2 (3.92%)
2	40 (78.43%)
3	5 (9.80%)
4	4 (7.84%)
Skin type n (%)	
Normal	19 (37.35%)
Oily	27 (52.94%)
Dry	5 (9.80%)
Hyperseborrhea n (%)	11 (21.57%)
Hirsutism n (%)	24 (47.06%)
Androgenic alopecia n (%)	6 (11.76%)
Menstrual cycles n (%)	
Regular	38 (74.51%)
Irregular	13 (25.49%)
Menstrual flare n (%)	
Yes	38 (74.51%)
No	13 (25.49%)
Seasonal variation n (%)	
No	37(72.55%)
Summer	13 (25.49%)
Winter	1 (1.96%)
Stress n (%)	16 (31.37%)
Habits n (%)	
Oily food consumption	20 (39.22%)
Dairy food consumption	19 (37.25%)
Use of cosmetics	12 (23.53%)
Smoking	3 (5.88%)
Application of oil	11 (21.57%)
Manipulation	12 (23.53%)
Pigmentation n (%)	27 (52.94%)
Scarring n (%)	35 (68.63%)

Out of 35 patients with scar, boxcar scars, icepick scars, keloidal scars and rolling scars were present in one (2.86%), 25 (71.43%), one (2.86%) and eight (22.86%) respectively (Figure 2).

A total of six (11.76%), two (3.92%), one (1.96%) and one (1.96%) patient had hypothyroidism, infertility, depression and vitiligo respectively. Ultrasound examination showed presence of polycystic ovarian disease in six (11.76%) patients (Table 3).

Table 3: Associated comorbidities in adult female patients with acne.

Comorbidity	N (%)
Hypothyroidism	6 (11.76%)
Infertility	2 (3.92%)
Polycystic ovarian disease	6 (11.76%)
Depression	1 (1.96%)
Vitiligo	1 (1.96%)

Table 4: Hormonal profile in adult female patients with acne.

Hormonal abnormality	N (%)
Elevated testosterone	8 (15.69%)
Normal DHEAS	51 (100%)
Normal prolactin level	51 (100%)
Elevated LH level	5 (9.80%)
Decreased FSH level	3 (5.88%)
Elevated LH:FSH level	5 (9.80%)
Elevated AMH level	1 (1.96%)
Increase in insulin level	8 (15.69%)

DHEAS: dihydroepiandrosterone-sulfate (DHEAS); LH: luteinizing hormone (LH); FSH: follicle stimulating hormone, AMH: anti-mullerian hormone.

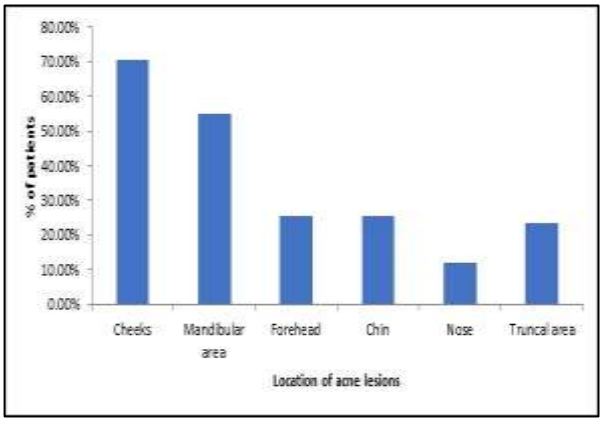

Figure 1: Location of acne lesions in adult female patients.

The mean (SD) serum testosterone level of the study population was 29.67 (11.23) ng/dl. A total of eight (15.69%) patients had elevated testosterone. The mean (SD) serum testosterone level of those with elevated levels was 50.72 (0.95) ng/dl. The mean (SD) LH level of study population was 5.88 (1.57) IU/L. Five (9.80%) patients had elevated LH levels and three (5.88%) had reduced FSH levels. DHEAS and prolactin levels were normal in all patients (Table 4).

A total of five (9.80%) patients had elevated LH: FSH level. Increase in AMH and insulin level was seen in one (1.96%) and eight (15.69%) patients respectively.

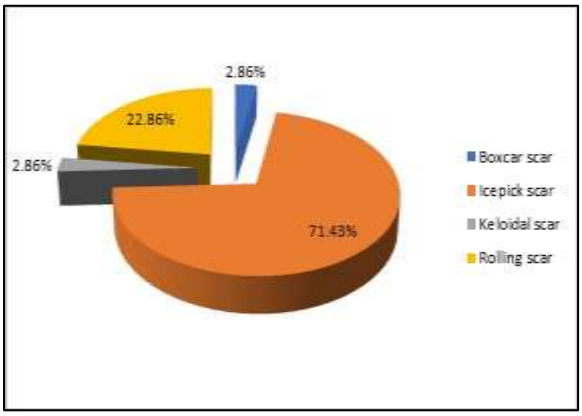

Figure 2: Types of scarring in adult female patients with acne.

DISCUSSION

In this study, we included adult women patients with acne. Participants with grade 2 acne were maximum in our study and this finding is similar to another study.[12]

In our study, patients with persistent acne were much higher in number as compared to those with late onset acne. Our observations are in accordance with study conducted by Khunger and Kumar.[13] This study involved male as well as female patients, but females outnumbered male patients (82.1% versus 17.9%).[13] Similar finding was observed in another study from India which involved only female patients.[14] However, in another study involving only adult female patients, the difference between two types was not considerable (late onset acne 56% vs persistent acne 43%).[15]

In females, acne lesions are more commonly seen on the lower part of the face, especially chin and jawline.[16] However, in many adult female patients this presentation may not be seen. In our study, cheeks were the most commonly involved area. Second most common area for acne lesions was the mandibular area. Lesions on chin were observed in about one quarter of the patients whereas nose was the least common place for acne lesions. In a study from Nepal, perioral area was most commonly involved.[12] reported involvement of perioral area in 41% female patients. In the same study, upper face was involved in 39.7% patients. Neck and trunk involvement was seen in 19.2% patients.

Acne in the female patients can be triggered by several factors including diet, stress and use of cosmetics.[17] In our study, 31.37% patients reported stress similarly number of females with history of oily and dairy food consumption was also high. Use of cosmetics was reported by 23.53%.

A study reported premenstrual flare in 11.7% of female patients.[13] In our study, number of female reporting menstrual flare of acne was very high (almost three forth). Prevalence of hirsuitism and alopecia in our study was also higher than that reported by Khunger and Kumar.[13] In a study by Borgia et al, hirsutism was present in 19.38% patients whereas oligomenorrhea was reported by 15.5% patients.[18] In our study, menstrual cycles were regular in about one quarter of patients.

Acne can cause pigmentation and scarring of the skin.[1] In our study, 52.94% patients had pigmentation whereas scarring was seen in even more number of patients.

Acne in adult females with age beyond 25 years is commonly associated with hormonal disturbances. A study from Nepal reported hormonal changes in 37.2% female patients and reported several hormonal changes.[12]

A study from New Delhi, India reported clinical hyperandrogenism in 71.67% adult females with acne. However, biochemical hyperandrogenaemia was found only in 18.33% cases.[15] In another study, hyperandrogenism was reported in 17.9% females with acne.[12] In our study, the elevated testosterone was seen in 15.69% patients.

In a case control study, Rahman et al have reported significant association between serum testosterone and acne vulgaris.[6]

DHEA-S is an important hormone in the pathogenesis of adult-onset acne. A study by Seirafi et al reported that its measurement in those with adult-onset acne can be useful.[19] We measured the levels in patients in our study. All patients had normal levels of DHEAS. Our findings related to DHEAS and LH:FSH ratio alterations were similar to the study by Shrestha.[12] In a study by Shrestha, DHEAS level was abnormal in 1.3% patients whereas in our study, it was normal in all patients.[12] Similarly, LH:FSH ratio (>2:1) was observed in 10.2% in that study versus 9.80% in our study.

Murthy et al also reported higher serum levels of testosterone and DHEAS in patients with acne vulgaris as compared to control group. However, their study included both male as well as female patients.[5] We did not include male patients with acne vulgaris. In another study, involving females with acne 54.56% patients had hyperandrogenism and DHEA elevation was the most common.[20]

Hormonal abnormalities in females may be associated with polycystic ovaries. A study reported higher prevalence of polycystic ovaries in females with acne than without acne (28.8% versus 9.3%).[21] In our study, ultrasound examination showed polycystic ovaries in 11.76%. The rate was lower than reported by Abdullah and colleagues. In the same study, 36% females' patients with acne had increased levels of at least one of the parameters i.e., LH, LH/FSH ratio, or testosterone.[21] This rate was higher than observed in our study. In our study the

maximum number of patients had raised testosterone levels (15.69%) followed by elevated LH (9.80%) levels. One study showed low levels of serum estradiol in female patients with acne as compared control group.[22] We did not evaluate the levels of estradiol.

Our study has some limitations. It was a cross sectional study with small number of patients from a single centre. Not all patients who were requested laboratory examination did the laboratory investigations due to unwillingness and non-affordability. Larger, multi-centre studies are required for confirmation of our observations.

CONCLUSION

Acne is one of the most common skin diseases in dermatological practice and is the easiest skin condition to diagnose. The cases in which hormonal evaluation was performed, we found deranged parameters in only some patients who also showed clinical signs of hyperandrogenism. So, other etiological factors might contribute for adult acne in addition to hyperandrogenism.

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