HORMONAL ASSESSMENT IN ACNE VULGARIS IN WOMEN

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ABSTRACT

BACKGROUND

Acne vulgaris is a chronic inflammatory disease of the pilosebaceous unit characterised clinically by non-inflammatory lesions, open and closed comedones and papules or pustules and nodules of varying degree of inflammation and depth, distributed predominantly over face, back and chest. There are various aetiopathogenetic mechanisms and the major pathogenic factors involved are hyperkeratinisation, obstruction of sebaceous follicle resulting from abnormal keratinisation of the infundibular epithelium, stimulation of sebaceous gland secretion by androgens and various hormones and microbial colonisation of pilosebaceous units by *P. acnes* which promotes perifollicular inflammation. Of note, hormonal therapies are indicated in severe, resistant-to-treatment cases and in those with monthly flare-ups and when standard therapeutic options are inappropriate. So based on grading of acne and duration of lesions and time of presentation, hormonal assessment plays an important role in the management of acne vulgaris.

MATERIALS AND METHODS

Hormonal evaluation is not mandatory for those who experience short bouts of onset and offset or those who respond well to standard treatments. However, in the more resistant cases and for those who fail to respond to conventional therapies and based on the grading endocrinal evaluation along with investigations- lipid profile, thyroid profile and ultrasound abdomen are important tools in the management of acne vulgaris. However, in our study, 25 female patients aged between 16 - 35 years who failed to respond to novel conventional treatments of acne were selected and subjected to hormonal assessment.

Study Design- This is a descriptive study by assessing various hormonal levels in selected patients.

Study Setting- DVL Department, Andhra Medical College affiliated to King George Hospital, Visakhapatnam, Andhra Pradesh, India.

RESULTS

Out of 25 patients, 12 patients (48%) were in the age group between 15 - 20 years with moderate degree of acne with PCOS, 8 patients (32%) were in the age group between 21 - 25 years, 3 patients (12%) were in the age group between 26 - 30 years and 8% were between 31 - 35 years, and in our study out of 25 patients 56% had hypertriglyceridaemia, 20% with increased free testosterone levels and very few patients with obesity and features of virilisation.

CONCLUSION

Thus, Hormonal evaluation should not be the last option in treating acne vulgaris and is mandatory not only for more resistant acne cases and for those who fail to respond to conventional therapies, but it also should be done in the beginning even in mild degrees of acne to prevent acne scarring.

KEYWORDS

DHEA (Dehydroepiandrosterone), Propionibacterium Acnes, PCOS (Polycystic Ovarian Syndrome), Acne Vulgaris.

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BACKGROUND

Acne vulgaris is a chronic inflammatory disease of the pilosebaceous unit characterised clinically by

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non-inflammatory lesions, open and closed comedones and papules or pustules and nodules of varying degree of inflammation and depth distributed predominantly over face, back and chest. There are various aetiopathogenetic mechanisms. Acne is a follicular unit disease. It involves pathologically overproduction of serum, abnormal follicular keratinisation, formation of *P. acnes* biofilms and colonies, and finally the release of pro-inflammatory mediators to the skin.^{1,2,3,4} Acne-prone individuals have larger sized sebaceous glands that are stimulated at the time of puberty. Several pathways and hormones beside androgens regulate the activity of sebocytes.

A number of agents are secreted by *P. acnes* and include the enzymes lipase and protease that manage to disrupt and degrade the follicular wall and initiate a cascade of inflammatory events and release of chemotactic factors.^{5,6} The pilosebaceous unit is capable of metabolising and producing pro-vitamin D in the skin. Vitamin D deficiency may be linked to the pathogenesis of insulin resistance and the metabolic syndrome in polycystic ovary syndrome (PCOS).

Various Hormones Implicated in the Pathogenesis of Acne Vulgaris

Androgens

Individuals with genetic deficiency of androgen receptors have no detectable sebum secretion and therefore there is no development of acne.

DHEAS, regulator of sebaceous gland activity through its conversion to DHT and Testosterone in sebaceous gland by potent enzymes.

Progesterone

It inhibits 5 α -reductase required to convert testosterone to the more potent DHT. Menstrual flare and sebum exacerbations are caused by progesterone whose receptors are expressed in basal epidermal keratinocytes only.

Oestrogen

High-dose oestrogen exerts a negative feedback on the gonadal axis. This results in the reduction of sebaceous gland size and concomitantly reduced sebum formation.

Pituitary Hormones

MSH and ACTH, growth hormone and prolactin act directly on sebaceous glands that increases both sebum production and mitosis of sebaceous cells. Androgens are secreted by the ovaries under regulation of LH.

Peroxisome Proliferator-Activated Receptor (PPAR)

Present in sebocytes are activated in patients receiving fibrates (PPAR-alpha ligands) for hyperlipidaemia and thiazolidinediones taken for Type 2 DM increases sebum production.

Glucocorticosteroids

Steroids are thought to increase acne eruptions (steroid acne) through their increased toll-like receptor 2 gene expressions and further release of the pro-inflammatory mediators.

Endocrinal Evaluation in Patients with Suspected Hormonal Acne

Hormonal evaluation is mandatory for those who experience short bouts of onset and offset or even those who respond well to standard treatments. However, in the more resistant cases and for those who fail to respond to conventional therapies, endocrinal evaluation is an important tool to

consider as well as in the following cases- Late-onset acne; Therapy-resistant acne; Prepubertal acne; Stress-exacerbated acne; Premenstrual onset; and Hyperandrogenism. Signs of virilisation (Clitoromegaly, deepened voices and masculine features) PCOS; signs of hyperinsulinaemia (Obesity in the trunks, skin tags and acanthosis); distribution of the acne lesions. It is well recognised that hormonal acne concentrates in the lower third of the face along the chin and jaw lines.

MATERIALS AND METHODS

25 female patients aged between 16 - 35 years who failed to respond to novel conventional treatments of acne were selected and subjected to hormonal assessment based on Global Acne Grading System.

Global Acne Grading System

Location of the Acne	Factor
Forehead	2
Right cheek	2
Left cheek	2
Nose	1
Chin	1
Chest and Upper back	3

Severity	Grade
Number of lesions	0
Comedones	1
Papules	2
Pustules	3
Nodules	4

Local score= Factor *Grade.

Staging

Mild	1-18
Moderate	19-30
Severe	31-38
Very Severe	>39

Laboratory Tests to be done in a Patient with different Grades of Acne Includes

1. Serum Free Testosterone (free and total); 2. Serum Prolactin (done during follicular phase); 3. Serum FSH and LH; 4. Fasting Lipid Profile; 5. Thyroid profile; and 6. Ultrasound abdomen. Early morning samples are preferred. Other hormonal treatments such as oral contraceptives should be terminated and stopped 1 month before laboratory investigations to avoid false results. Other hormonal treatments such as oral contraceptives should be terminated and stopped 1 month before laboratory investigations to avoid false results.

Patient Evaluation

A special proforma was prepared to include all the details including age, sex and occupation. Detailed history was also taken with the onset, duration and grading of acne. Detailed examination was carried out in all the cases to find out the precise distribution and morphology of the lesions and to detect if any associated thyroid disorder or hypertriglyceridaemia or PCOS.

Objectives of the Study

Assessment of Hormonal levels (Serum free testosterone, DHEA serum, FSH and LH, and serum prolactin levels) in different grades of acne vulgaris.

Study Design

This is a descriptive study by assessing various hormonal levels in selected patients.

Study Setting

DVL Department, Andhra Medical College affiliated to King George Hospital, Visakhapatnam, Andhra Pradesh, India.

RESULTS

This study was done in 25 female patients who attended the DVL OP, KGH, Visakhapatnam, in our study of 25 female patients.

In Between the Ages	Number of Patients
15-20 years	12 patients (48%)
21-25 years	08 patients (32%)
26-30 years	03 patients (12%)
31-35 years	02 patients (08%)

Table 1. Out of 25 Patients, Age Distribution among the Patients with Acne Vulgaris

Staging of Acne	Number of Patients
Severe	10 patients (40%)
Moderate	12 patients (48%)
Very Severe	01 patients (04%)
Mild	02 patients (08%)

Table 2. Among 25 Patients

With Associated Abnormality	Number of Patients
Hypertriglyceridaemia	14 patients (56%)
PCOS	03 patients (12%)
Virilisation features	01 patient (4%)
Obesity	02 patients (8%)

Table 3. Out of 25 Patients

Staging of Acne	No. of Patients	S. free Testosterone Levels Elevated	S. DHEA Levels	S. FSH and LH Levels	S. Prolactin Levels
Mild	04 (16%)	07 (28%)	06 (24%)	-	-
Moderate	12 (48%)	10 (40%)	09 (36%)	-	-
Severe	04 (16%)	05 (20%)	07 (28%)	-	-
Very Severe	05 (20%)	03 (12%)	03 (12%)	-	-

Table 4. Finally, Hormonal Levels in various Stages of Acne Vulgaris in 25 Selected Patients are as Follows

DISCUSSION

Hyperandrogenism should be considered in the female patient whose acne is severe, sudden in its onset or

associated with hirsutism or irregular menstrual periods. The patient should be asked about the frequency and character of her menstrual periods and whether her acne flares with changes in her menstrual cycle. A complete medication history is important, as some medications can cause an abrupt onset of a monomorphic acneiform eruption. Drug-induced acne may be caused by: anabolic steroids, corticosteroids, corticotropin, phenytoin, lithium, isoniazid, vitamin B complexes, halogenated compounds and certain chemotherapy medications, particularly with epidermal growth factor receptor (EGFR) inhibitors.

The laboratory workup should include measurement of serum DHEAS, total testosterone and free testosterone. Additional tests to consider include the luteinising hormone (LH) to follicle-stimulating hormone (FSH) ratio with values of DHEAS in the range of 4,000 - 8,000 ng/mL. An ovarian source of excess androgens can be suspected in cases where the serum total testosterone is 150 ng/dL. Serum total testosterone in the range of 150 - 200 ng/dL or an increased LH/ FSH ratio (2.0) can be found in cases of polycystic ovary disease.

In our study out of 25 patients, most of the patients with or without hormonal abnormalities along with PCOS and elevated hypertriglyceridaemia were in the age group between 15 - 20 years with moderate grade of acne. So, Hormonal therapy is effective in acne despite elevated androgen levels or not. It is frequently used as a combination and not a stand-alone therapy. It can be synergistically combined with antibiotics, benzoyl peroxide, azelaic acid and even retinoids.

CONCLUSION

Thus, Hormonal evaluation should not be a last option in treating acne vulgaris and is mandatory not only for more resistant acne cases and for those who fail to respond to conventional therapies, but it also should be done in the beginning even in mild degrees of acne to prevent acne scarring.

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