Original Research Article

Endocrine analysis in patients with hirsutism

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Abstract: The aim of the study is to co-relate various laboratory and imaging profiles in patients with hirsutism. Hirsutism is defined in this study by using Modified Ferriman-Gallwey score ≥ 8 (mFG). 30 female patients between 15-50 years of age were included in the study. Detailed history and clinical examination were conducted for each patient followed by various endocrinal tests like FBS, PPBS, FSH, LH, Free and Total Testosterone, DHEAS, Fasting insulin, Thyroid Profile, 17-hydroxyprogesterone and Prolactin. Radio diagnosis studies including ultrasound, CT scan were also carried on selected patients. Mean age of presentation of hirsutism was found to be 20-29 years of age in our study. Upper lip was the most common site involved. Irregular menses and hair loss were the most common associated chief complaints noted. Obesity had a significant correlation with severity of hirsutism. Idiopathic hirsutism was the most common diagnosis found in our study followed closely by polycystic ovarian syndrome. We detected one case of Non classical congenital adrenal hyperplasia and no cases of adrenal or ovarian tumors. Serum testosterone and LH/FSH ratio were found to be elevated with PCOS group as compared to IH group. Obesity had a strong relation with severity of hirsutism independent of other parameters. Fasting blood sugar, serum testosterone, TSH and Fasting insulin levels had no correlation with severity of hirsutism.

Keywords: Hirsutism, endocrinal profile, Modified Ferriman-Gallwey (mFG).

INTRODUCTION:

The word hirsutism means pilosity, hairiness, bushy and wooly. It is characterized by excessive male patterned terminal hair growth in females involving growth on the face, chest, and abdomen, lower back and inner aspect of the thighs [1]. It is defined objectively by Modified Ferriman-Gallwey Score ≥ 8. (MFG) [2].

Vellus hair and terminal hair are the two types of hair found on the surface of the body. Vellus hair is short, fine, light colored and barely noticeable thin hair while the terminal hair is thick, heavily pigmented, coarse hair [3].

Androgens induce vellus follicles to develop into terminal hair. Hence hirsutism may be due to increased androgen production and the apparent sensitivity of the hair follicle to androgens. Androgens additionally prolong the antigen phase of body hair but shorten the same for scalp hairs which in turn leads to hirsutism and alopecia respectively [4]. The enzyme5 αreductase converts testosterone to dihydrotestosterone, which is more potent than testosterone in exerting effect on hair follicle.

Causes of hirsutism include polycystic ovarian syndrome, idiopathic hirsutism, ovarian or adrenal tumors, late onset congenital adrenal hyperplasia and endocrinal disorders like hypothyroidism, Cushing's syndrome, acromegaly, hyperprolactinemia.

Certain drugs namely anabolic steroids, progestins, minoxidil, phenytoin, valproic acid and cyclosporine may give rise to hirsutism [5]. Cutaneous signs of hyperandrogenism include seborrhea, acne, hirsutism and androgenic alopecia. In this study we have assessed the endocrinal profile in women presenting with hirsutism at our institution.

MATERIAL AND METHODS:

This interventional study with study population of 30 patients was conducted from June 2015 to June 2016 at the Dermatology Out Patient Department, VS General Hospital, and Ahmedabad.

➢ A thorough history, assessment and physical examination of each patient were conducted.
➢ Complaints of patients including weight gain, hair loss, voice changes, and menstrual irregularity were noted separately.
➢ Body mass index of each patient in the study were calculated by the formula: BMI=weight in kg/height (m^2). Based on this formula, patients were considered to be underweight, normal, overweight or obese according to south Asian BMI standards [6] (Table 1).

Table 1: Body Mass Index

BMI in Kg/m^2	Inference
<18.5	Underweight
18.6-22.9	Normal
23-25	Overweight
>25	Obese

➢ Patients were graded on the basis of hair growth as per the Modified scale of Ferrimen and Gallwey. The nine body areas which included upper lip, chin, chest, abdomen, pelvis, upper arm, thighs, upper back, and lower back were examined. These are the areas considered to be androgen sensitive. They were graded from 0-4. If no terminal hair was observed it was considered to be 0, and if frankly virile pattern of hair was seen it was graded to be 4. Minimum possible score was zero and maximum was 36. A score of less than 8= no hirsutism, 8-16 = mild hirsutism, 17-25 = moderate hirsutism, greater than 25 = severe hirsutism [7].
➢ Clinical hyperandrogenism, ovalutatory dysfunction, various signs of diabetes mellitus like polyphagia, polyuria were inquired for. Also any other signs of virilization were kept under check.
➢ Further work up included the laboratory and radiological profile of these patients to confirm the underlying diagnosis.
➢ PCOS was graded using Rotterdam scale [8].

Table 2 Rotterdam Criteria

To define PCOS patient should have any two of three features :
1. Clinical or Biochemical evidence of Hyperandrogenism (Hirsutism, Acne , Androgenic Alopecia or elevated Serum androgen results)
2.Clinical features of Anovulation (Oligomenorrhea or less than 6-9 Menses per year)

3.USG features
  a. Ovarian volume >10 mm3
  b. OR 12 or more follicles measuring 2-9 mm in size

INCLUSION CRITERIA:
• Patients having clinical features of hirsutism.

• Patients giving consent for undertaking history, examination and laboratory work up.
• Females within age group of 15-50 years were selected

EXCLUSION CRITERIA:
• Pregnant females
• Lactating mothers
• Patients on drugs which would modify the hormonal profile
• Patients already taking treatment for hirsutism
• Patients with other major diseases
• Patients not giving the consent

OBSERVATION AND DISCUSSION:
1. Age at presentation. (N=30):

Age group	Number	Percentage
17-19 years	6	20%
20-29 years	17	56.67%
30-39 years	3	10%
40-50 years	4	13.33%
Total	30	100%

Maximum members of the study population were in the age between 20-29 years followed by 17-19 years of age group. The least common age group of presentation in our study was 30-39 years of age.

2. **Family history of the study patients (N=30):**

Family history	No	Percentage
Positive	11	36.67%
Negative	19	63.33%
Total	30	100%

36.67% patients in our study had a positive family history. The mean duration of hirsutism in our study was 3.5 years.

3.Mean mGFs related to Distribution of Hair Growth:

Distribution of hair	Total score	Meanscore
Upper lip	80	1.81
Chin	75	1.75
Chest	29	0.70
Upper back	30	0.72
Lower back	20	0.47
Upper abdomen	55	1.25
Lower abdomen	79	1.79
Upper arms	05	0.11
Thighs	73	1.65
Total	453	10.3

Most of the patients in our study had mild hirsutism. The maximum severity of growth of hair was present in the upper lip, lower abdomen and chin area.

Upper arm was the least common site of hair growth seen in our study.

4. Presenting features of the patients (N=30):

Signs/Symptoms	Frequency	Percentage
Acne	10	33.33%
Hair loss	15	50%
Voice changes	5	16.67%
Menstrual irregularities	15	50%
Acanthosis Nigricans	3	10%
Polyuria, polyphagia and other features of Diabetes Mellitus	2	6.67%
Weight gain	9	30%
Other	12	40%

The most common associated cutaneous manifestations in patients of hirsutism were hair loss followed closely by acne. Other most common presenting feature in the study was noted to be menstrual irregularities which accounted for a total of 15 patients (50%) of the study population.

5. As per body mass index:

Normal (18.6-22.9)	18	60%
Overweight (23-25)	7	23.33%
Obese (>25)	5	16.67%

Of 30 patients in the study, 7 were overweight and 5 were obese as per body mass index calculation. Hence hirsutism patients may be either overweight or obese which were found in 40% of the population studied.

6. Underlying conditions leading to hirsutism:

Polycystic Ovarian Syndrome	11	36.67%
Idiopathic Hirsutism	13	43.33%
Late onset congenital adrenal hyperplasia	1	3.33%
Hypothyroidism	3	10%
Diabetes Mellitus	2	6.67%

In Chhabra *et al.;* study [9] PCOS was found in 70% of the patients, idiopathic hirsutism in 15% of patients, whereas in our study PCOS was found in 36.67% of study population while idiopathic hirsutism was the commonest.

7. MFGs based severity of Hair Growth:
Mild (8-16): 28 patients
Moderate (17-24): 02 patients
Severe (25-36): 00

Hirsutism and Hormones:

Condition	Total testosterone		DHEAS		LH/FSH ratio		TSH	
	Raised	Normal	Raised	Normal	Raised	Normal	Raised	Normal
Polycystic Ovarian Syndrome (11)	7	4	2	9	9	2	00	11
Idiopathic Hirsutism (13)	00	13	00	13	1	12	00	13
Late onset congenital adrenal hyperplasia (01)	01	00	01	00	00	01	00	01
Hypothyroidism (03)	00	03	00	03	00	03	03	00
Diabetes Mellitus (02)	00	02	00	02	00	02	00	02
Total	08	22	03	27	10	20	03	27

27% patients of hirsutism had abnormal testosterone levels, while 63.6% patients with PCOS had abnormal levels. Late onset congenital adrenal hyperplasia revealed raised testosterone and DHEAS with normal LH/FSH ratio.

8. Percentage of Above Normal Value:

Raised Values	Frequency	Percentage

Total Testosterone	08	27%
DHEAS	03	10%
LH/FSH ratio	10	33%
TSH	03	10%

9. Fasting Blood Sugar in the study patients:

FBS	Frequency	Percentage
Normal	20	66.7%
Impaired Glucose Tolerance Test	8	26.6%
Diabetic	2	6.7%
Total	30	100%

66.7% patients of hirsutism had normal fasting blood sugar (FBS) levels. 8 patients had impaired glucose tolerance (IGT) and 2 had FBS, in the diabetic range.

10. Prolactin in study patients: (N=13)

Prolactin	Frequency	Percent
Normal	10	77%
Above Normal	03	23%
Total	13	100%

Prolactin was done in 13 patients, of whom 03 had abnormal results, thus suggesting Hyperprolactinemia in 23% patients of hirsutism in whom prolactin estimation could be possible.

11. Abdominal Ultrasonography in study patients (N=30)

	Findings suggestive of PCOS Present	Findings Absent
Number of Patients	9	21
Percentage	30%	70%

30% of the study population had USG findings positive for PCOS. No other ovarian or adrenal pathology could be detected on USG. Special investigations like 17 hydroxyprogesterone for LOCAH, HbA1C for Diabetes Mellitus were performed to rule out specific disorders.

DISCUSSION:
The majority of our patients had mild hirsutism but none had severe hirsutism. This could be due to the fact that none of our patients had any tumor of the adrenals or ovaries which produces severe hirsutism.

Maximum members of the study population were in the age range between 20-29 years of age. The mean age of the study population of Sharma *et al.;* [10] was 23.8 while it was 24.18 in the study by Chhabra *et al.;* We noted the mean duration of hirsutism in our study as 3.29 years. In our study idiopathic hirsutism was the leading cause followed by PCOS. While in Chhabra at al study, PCOS was found in 70% of patients, idiopathic hirsutism in 15%.

26.6% patients had impaired glucose tolerance and thus hirsutism could prove to be a useful marker of early diabetes. Insulin resistance was found not only in PCOS patients but also in idiopathic hirsutism group. Also in our study 27% patients of hirsutism had abnormal testosterone levels, while 63.6% patients with PCOS had abnormal levels. Patients with diabetes and thyroid dysfunction had normal while the patient with LOCAH had abnormal levels of total testosterone. Apart from the blood investigations done, USG had 88.23% sensitivity in detection of PCOS in our study. No other ovarian or adrenal pathology could be detected on USG.

Hence it utmost important to find the underlying cause in patients presenting with hirsutism. A multidisciplinary approach of treatment was adopted with the help of endocrinologist, gynecologist and psychiatrist apart from the dermatological care of the patient. Most patients wanted cosmetic treatment for which they presented to us. Patients were started on cosmetic as well as pharmacological treatment. Treating only the local cause will not eradicate the underlying disease process and hence all the patients should be screened well for any hidden pathology.

CONCLUSION:
Our study was conducted to explore the endocrinal as well as radiological aspect in relation to hirsutism. It was also aimed to study dermatological

and systemic association in patients presented with hirsutism. We found that the most common presentation of a patient with hirsutism was irregular menstruation while idiopathic hirsuitism was the commonest form. Obesity has some relation to the severity of hirsutism.

A holistic treatment aimed at finding the underlying endocrinal dysfunction of a patient of hirsutism and treatment for same could reach a better goal then using local treatment like lasers alone.

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