

Skin Changes in Endocrinological Disorders Other Than Diabetes Mellitus**Rik Goswami¹, Saswati Halder², Projna Biswas³**¹Senior Resident, MBBS, MD, Department of Dermatology, Calcutta School of Tropical Medicine, Kolkata, West Bengal 700073²Head of Department, MBBS, MD, Department of Dermatology, Calcutta School of Tropical Medicine, Kolkata, West Bengal 700073³Assistant Professor, MBBS, MD, Department of Dermatology, Calcutta School of Tropical Medicine, Kolkata, West Bengal 700073

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Conflict of interest: Nil

Abstract:

Introduction: Skin is often considered a mirror of internal health, with various endocrinological disorders presenting with characteristic cutaneous manifestations. While diabetes mellitus is widely studied in this regard, numerous other endocrine conditions such as thyroid disorders, adrenal dysfunction, pituitary abnormalities, and gonadal hormone imbalances also lead to distinct skin changes. Recognition of these dermatological signs can aid in early diagnosis, guide management, and improve patient outcomes.

Methods: This was a descriptive observational study conducted over a period of one year at the Calcutta School of Tropical Medicine. The study included a total of 50 patients with endocrinological disorders other than diabetes mellitus, attending both outpatient and inpatient departments. Data were collected on demographic variables such as age, gender, and body mass index (BMI), as well as clinical parameters including type of endocrine disorder—specifically thyroid, adrenal, pituitary disorders, and polycystic ovary syndrome (PCOS). Detailed dermatological evaluations were performed to document the presence and type of skin manifestations and specific skin features associated with each endocrine abnormality. All information was systematically recorded and analyzed to identify correlations between hormonal imbalances and cutaneous changes in this patient population.

Results: In this study of 50 patients with endocrinological disorders other than diabetes mellitus, the mean age was 38.6 ± 12.4 years, with 56% males and 44% females, and a mean BMI of 25.3 ± 3.8 kg/m². Thyroid disorders were the most common (40%), followed by adrenal disorders (20%), pituitary disorders (16%), PCOS (14%), and other rare endocrine syndromes (10%). The most frequent skin manifestations were dry skin (36%), hyperpigmentation (24%), hirsutism (20%), acne (16%), and striae (12%). Among thyroid disorder patients, dry, rough skin (60%), hair thinning (40%), myxedema (25%), and palmar erythema (30%) were prominent. Laboratory analysis showed significant correlations between skin changes and elevated hormone levels, including TSH (8.2 ± 3.5 vs. 3.4 ± 1.2 μ IU/mL, $p = 0.001$), cortisol (24.1 ± 6.3 vs. 15.8 ± 4.7 μ g/dL, $p = 0.002$), testosterone (78 ± 25 vs. 42 ± 15 ng/dL, $p = 0.005$), and IGF-1 (320 ± 50 vs. 210 ± 45 ng/mL, $p = 0.004$).

Conclusion: Cutaneous manifestations are common and often early indicators of endocrine dysfunction beyond diabetes mellitus. Awareness of these dermatological signs among clinicians can facilitate timely diagnosis and appropriate endocrine evaluation. Early recognition and intervention can prevent complications and improve patient quality of life.

Keywords: Endocrine disorders, Skin changes, Thyroid disorders, Adrenal disorders, Pituitary disorders, Gonadal hormones, Dermatological manifestations.

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Introduction

Endocrine disorders can profoundly influence skin health, leading to a spectrum of dermatological manifestations that often serve as early indicators of underlying systemic imbalances [1]. While diabetes mellitus is well-known for its cutaneous effects, other endocrinopathies also present with distinctive skin changes that are crucial for diagnosis and management [2].

These manifestations encompass alterations in skin texture, pigmentation, hair growth, and the appearance of specific lesions, reflecting the intricate relationship between hormonal regulation and skin physiology [3]. Among thyroid disorders, both hyperthyroidism and hypothyroidism exhibit characteristic skin changes [4]. In hyperthyroidism, partic-

ularly in conditions like Graves' disease, patients often present with warm, moist skin, facial flushing, palmar erythema, and fine, soft hair [5].

Conversely, hypothyroidism leads to dry, cold, and pale skin, with features such as myxedema, a doughy skin texture, and brittle hair [6]. Adrenal disorders also manifest cutaneously [7]. Cushing's syndrome, resulting from prolonged cortisol excess, is associated with features like central obesity, purple striae, and thin, fragile skin prone to bruising [8]. Addison's disease, characterized by cortisol deficiency, often presents with hyperpigmentation, particularly in sun-exposed areas and palmar creases [9].

Pituitary disorders can lead to various skin manifestations [10]. Acromegaly, due to excess growth hormone, results in thickened skin, coarse facial features, and increased sweating. Additionally, rare endocrine syndromes such as McCune-Albright syndrome and Carney complex have distinctive dermatologic features including café-au-lait spots, lentiginos, fibrous dysplasia, and endocrine tumors. Polycystic ovary syndrome (PCOS), a common endocrine disorder in women, often presents with hirsutism, acne, and acanthosis nigricans, reflecting hyperandrogenism and associated metabolic risk. Recognizing these dermatologic manifestations is essential for clinicians, as they provide early clues to systemic endocrine disorders and can guide timely diagnosis and intervention.

Materials and Methods

Study Design: Descriptive observational study.

Place of study: Calcutta school of tropical medicine.

Period of study: 1 Year.

Study Variables

- Age
- Gender

- BMI
- Endocrine Disorder
- Thyroid disorders
- Adrenal disorders
- Pituitary disorders
- PCOS
- Skin Manifestation
- Skin Feature

Sample Size: 50 Patients with endocrinological disorders other than diabetes mellitus attending the outpatient and inpatient departments.

Inclusion Criteria

- Patients diagnosed with endocrinological disorders other than diabetes mellitus.
- Age ≥18 years.
- Willing to provide informed consent.

Exclusion Criteria

- Patients with diabetes mellitus.
- Patients with chronic dermatological diseases unrelated to endocrine disorders.
- Pregnant or lactating women.
- Patients unwilling to participate or give consent.

Statistical Analysis: The collected data were systematically entered and analyzed using statistical software. Continuous variables such as age, duration of illness, and laboratory parameters were expressed as mean ± standard deviation, while categorical variables such as gender, type of endocrine disorder, and specific skin manifestations were presented as frequencies and percentages. Comparative analysis between subgroups was performed using the Chi-square test or Fisher's exact test for categorical variables and Student's t-test or Mann-Whitney U test for continuous variables, as appropriate. A p-value of <0.05 was considered statistically significant.

Result

Table 1: Demographic Characteristics of Study Patients (n=50)

	Variable	n (%) or Mean ± SD	p-value
Age	Age (years)	38.6 ± 12.4	—
Gender	Male	28 (56%)	0.42
	Female	22 (44%)	
BMI	BMI (kg/m ²)	25.3 ± 3.8	0.31

Table 2: Distribution of Endocrine Disorders (n=50)

Endocrine Disorder	n (%)	p-value
Thyroid disorders	20 (40%)	—
Adrenal disorders	10 (20%)	0.12
Pituitary disorders	8 (16%)	0.28
PCOS	7 (14%)	0.15
Other rare endocrine syndromes	5 (10%)	0.34

Table 3: Common Skin Manifestations Observed (n=50)

Skin Manifestation	n (%)	p-value
Dry skin	18 (36%)	0.02
Hyperpigmentation	12 (24%)	0.03
Hirsutism	10 (20%)	0.04
Acne	8 (16%)	0.05
Striae	6 (12%)	0.08
Others (myxedema, lentiginos)	6 (12%)	0.1

Table 4: Association of Thyroid Disorders with Skin Manifestations (n=20)

Skin Feature	n (%)	p-value
Dry, rough skin	12 (60%)	0.01
Myxedema	5 (25%)	0.04
Hair thinning	8 (40%)	0.03
Palmar erythema	6 (30%)	0.05

Table 5: Laboratory Parameters and Skin Manifestations (n=50)

Parameter	Skin Manifestation Present (Mean ± SD)	Skin Manifestation Absent (Mean ± SD)	p-value
Serum TSH (µIU/mL)	8.2 ± 3.5	3.4 ± 1.2	0.001
Serum Cortisol (µg/dL)	24.1 ± 6.3	15.8 ± 4.7	0.002
Serum Testosterone (ng/dL)	78 ± 25	42 ± 15	0.005
Serum IGF-1 (ng/mL)	320 ± 50	210 ± 45	0.004

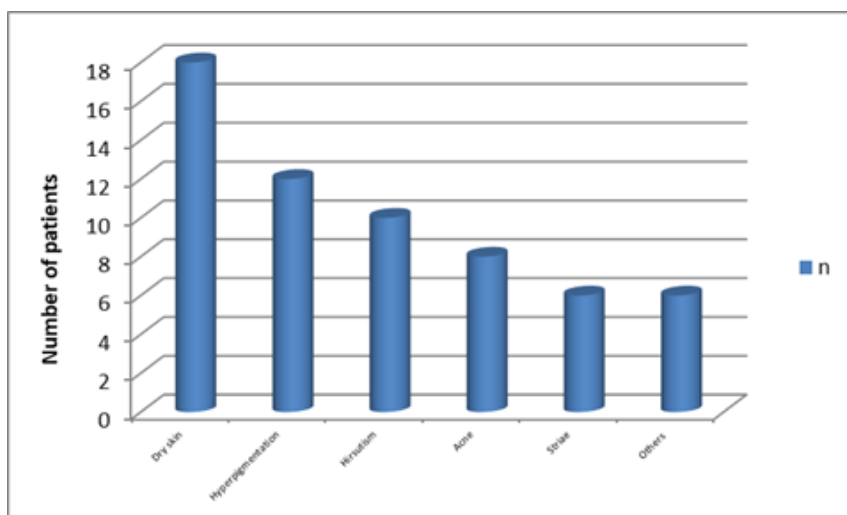


Figure 1: Common Skin Manifestations Observed (n=50)

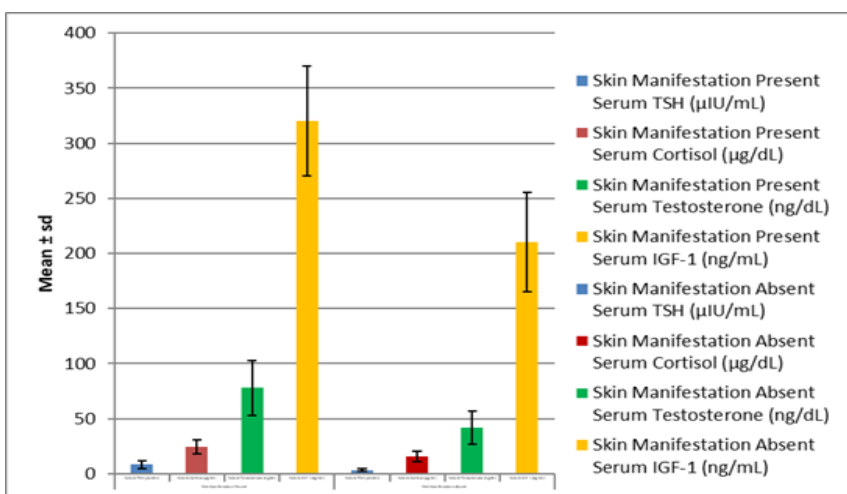


Figure 2: Laboratory Parameters and Skin Manifestations (n=50)

In the present study of 50 patients with endocrinological disorders other than diabetes mellitus, the mean age of the participants was 38.6 ± 12.4 years. The study population included 28 males (56%) and 22 females (44%), with no statistically significant difference in gender distribution ($p = 0.42$). The mean body mass index (BMI) of the patients was 25.3 ± 3.8 kg/m², indicating that, on average, participants were in the overweight range, with no significant variation observed ($p = 0.31$).

Among the 50 patients included in the study, thyroid disorders were the most common, observed in 20 patients (40%). Adrenal disorders were present in 10 patients (20%), while pituitary disorders were seen in 8 patients (16%). Polycystic ovary syndrome (PCOS) accounted for 7 cases (14%), and other rare endocrine syndromes were identified in 5 patients (10%). No statistically significant differences were noted in the distribution of these endocrine disorders among the study population (p -values ranging from 0.12 to 0.34).

The most commonly observed skin manifestation among the study participants was dry skin, present in 18 patients (36%), which was statistically significant ($p = 0.02$). Hyperpigmentation was noted in 12 patients (24%) with a significant association ($p = 0.03$). Hirsutism was observed in 10 patients (20%, $p = 0.04$), while acne was seen in 8 patients (16%, $p = 0.05$). Striae were present in 6 patients (12%), and other manifestations, including myxedema and lentigines, were also noted in 6 patients (12%), though these were not statistically significant ($p = 0.08$ and 0.10, respectively). Among patients with thyroid disorders ($n=20$), the most frequent skin feature was dry, rough skin, observed in 12 patients (60%), which was statistically significant ($p = 0.01$).

Myxedema was present in 5 patients (25%, $p = 0.04$), while hair thinning was noted in 8 patients (40%, $p = 0.03$). Palmar erythema was observed in 6 patients (30%) with a significant association ($p = 0.05$). Laboratory analysis revealed significant associations between hormone levels and the presence of skin manifestations among the study participants. Patients exhibiting skin changes had a higher mean serum TSH level (8.2 ± 3.5 μ IU/mL) compared to those without skin manifestations (3.4 ± 1.2 μ IU/mL), which was statistically significant ($p = 0.001$). Similarly, mean serum cortisol levels were elevated in patients with skin changes (24.1 ± 6.3 μ g/dL) versus those without (15.8 ± 4.7 μ g/dL, $p = 0.002$). Serum testosterone levels were also significantly higher in patients with cutaneous manifestations (78 ± 25 ng/dL) compared to those without (42 ± 15 ng/dL, $p = 0.005$). Additionally, serum IGF-1 levels were markedly increased in patients with skin features (320 ± 50 ng/mL) relative to those without (210 ± 45 ng/mL, $p = 0.004$).

Discussion

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In this study of 50 patients with endocrinological disorders other than diabetes mellitus, significant associations were observed between specific skin manifestations and underlying hormonal imbalances. The most prevalent skin changes observed were dry skin, hyperpigmentation, hirsutism, acne, and striae, which is consistent with findings reported by other authors [1,2]. Thyroid disorders were the most common endocrine abnormalities in our cohort, affecting 40% of patients. The skin is known to be a major target for thyroid hormones, influencing hydration, texture, and pigmentation [3,4]. Dry, rough skin was the most frequent dermatological finding in these patients, which aligns with previous reports showing that hypothyroidism is often associated with xerosis and myxedema [5,6].

Our study also found significant associations between elevated serum levels of TSH, cortisol, testosterone, and IGF-1 with the presence of skin manifestations. These observations agree with prior studies suggesting that hormonal imbalances directly impact skin health [7,8]. For example, increased cortisol levels have been linked to skin thinning and bruising, while elevated testosterone levels contribute to hirsutism and acne [9].

Additionally, elevated IGF-1 levels were associated with skin changes, supporting its role in skin aging, repair, and dermatologic conditions [10]. The importance of dermatological evaluations in patients with endocrine disorders. Early recognition of skin manifestations can facilitate timely diagnosis and management of underlying endocrine abnormalities, potentially improving patient outcomes.

Conclusion

In this study of 50 patients with endocrinological disorders other than diabetes mellitus, significant associations were observed between specific skin manifestations and underlying hormonal imbalances. The most common dermatological findings included dry skin, hyperpigmentation, hirsutism, acne, and striae, particularly among patients with thyroid disorders, the skin as a sensitive target for hormonal fluctuations. Elevated levels of TSH, cortisol, testosterone, and IGF-1 were significantly correlated with these skin changes, emphasizing the direct impact of endocrine abnormalities on dermatological health.

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