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RESEARCH ARTICLE

SKIN: A WINDOW FOR THYROID DISEASE

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ABSTRACT

Introduction: Endocrine conditions form a major bulk of those visiting physicians and most of the conditions warrant immediate and long term treatment which otherwise can indirectly affect all the organ systems and adversely affect the 'health' of a person. Thyroid diseases are one of the most common endocrinological conditions with varying skin and appandageal manifestations. Skin is an organ that is visible to naked eyes and can at times show certain manifestations which point to an underlying disease. Unless the clinician has high index of suspicion, such conditions can go undetected. Hence it becomes imperative for clinicians and Dermatologists to have an idea about the cutaneous manifestations of endocrinological conditions and hence the study assess the skin manifestations in recently detected hyper and hypothyroid patients. **Objectives:** To evaluate the cutaneous, hair and nail findings and associated conditions in acquired thyroid disorders. **Methodology:** A cross sectional, descriptive study where 50 patients with recently detected thyroid disease were analysed for skin, hair and nail manifestations and associated diseases, after obtaining written informed consent. **Results:** The most common dermatological manifestation in hypothyroid patients were nail changes (88%) followed by dry rough skin(86%) and acanthosis (69%). In hyperthyroid patients, the most common manifestation was warm soft skin (50%) and nail changes(62.5%). The most common comorbid condition in hypothyroid was diabetes mellitus and that in hyperthyroid was chronic urticaria. **Conclusion:** By identifying the skin manifestations, it helps the clinicians to diagnose underlying endocrinopathy and hence helps the patient in receiving corrective rather than symptomatic treatment.

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INTRODUCTION

The skin is the largest and the most visible organ of the body and acts as a mirror to many systemic diseases. Endocrine diseases may cause manifestations in the skin and its adnexa. About 42 million people in India suffer from thyroid diseases (Unnikrishnan, 2011). The cutaneous manifestations of hyperthyroidism and hypothyroidism are varied and are important for the dermatologists. The skin in hyperthyroid patients is typically warm, moist, and smooth. Warm skin is attributed to increased cutaneous blood flow and peripheral vasodilation. Skin moistness results from a combination of peripheral cutaneous vasodilation, increased sebaceous gland secretion, and hyperhydrosis, which is most evident on palmar and plantar surfaces. Patients may also report facial flushing, which can be misconstrued for symptoms of rosacea.

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This flushing disorder results from increased blood flow through the skin. About 2% of patients exhibit hyperpigmentation, typically localized to the palmar creases, soles, gingiva, and buccal mucosa. This hyperpigmentation is thought to be secondary to increased release of pituitary adrenocorticotropic hormone compensating for accelerated cortisol degeneration. In hyperthyroidism, the skin is warm, moist, soft, velvety, and smooth simulating the skin texture of an infant. The warmth is secondary to increased cutaneous blood flow and peripheral vasodilation, which is also responsible for facial flushing and palmar erythema. Picking up minute cutaneous findings helps us to detect underlying endocrinological condition. Hence it is imperative to know cutaneous manifestations of endocrinological conditions.

MATERIALS AND METHODS

This was a cross-sectional, descriptive study conducted in a tertiary care center in Southern India over a period of 1 year.

A total of 50 patients with acquired thyroid disorders who came to dermatological OPD were enrolled in the study. All the patients were assessed for cutaneous, hair, nail changes, and associated autoimmune dermatological diseases. Dermoscopy and other investigations needed for diagnosis of their respective conditions were performed. Exclusion criteria were pregnant and lactating women and patients with systemic diseases such as renal, and liver disease.

RESULTS

Out of 50 patients, 42 had hypothyroidism and 8 had hyperthyroidism. There was more than one medical symptom, cutaneous, hair, nail change, and associated autoimmune dermatological diseases in many patients. The age distribution of thyroid patients are given in graph 1 (Graph 1)

Hypothyroidism: The age of hypothyroid patients ranged from 18 to 62 years. A maximum number of patients was in the age group of 18-39 years. There was female predominance with male-to-female ratio of 1:20. The most common cutaneous finding was xerosis seen in 36(85.7%) patients followed by acanthosisnigricans in 29(69%) patients. Table 1 shows the incidence of various cutaneous manifestations observed in hypothyroid patients. There were no cases of carotenemia, puffy lips, macroglossia, and myxedema. Hair changes were present in 28(67%) of patients. The predominant finding was diffuse hair loss in 24 patients, followed by coarse and dry hair in 20 and patterned hair loss in 4 patients. (Figure 1) Nail changes were present in 37(88%) of hypothyroid patients. The most common nail change was longitudinal striations seen in 32 patients, followed by brittle nails in 24 patients (Table 1)(Figure 2).

The most common comorbidities noted were diabetes mellitus (9 patients-21%) followed by chronic urticaria (5), psoriasis (2), vitiligo (1), ophiasis pattern of alopecia (1), dermatomyositis (1), pemphigus vulgaris (1), DLE (1) and lichen planus (1).

Hyperthyroidism: Mean age of hyperthyroid patients was 42.75 years with maximum number of patients in the age group of 31–50 years. Majority were males in the ratio 7:1. The cutaneous features in patients with hyperthyroidism were warm, moist skin, with increased temperature seen in 50% of the patients, diffuse hairloss in 37.5% of the patients, facial flushing was seen in 12.5%, eyelid pigmentation in 12.5% and exophthalmos in 12.5% of the patients and nail changes like soft shiny nails, linear striations and Plummers nails. The associated diseases noted with hyperthyroidism were chronic urticaria (37.5%), lichen planus (12.5%) and dermatophytoses (12.5%).

DISCUSSION

Gross clinical manifestations of thyroid hormone imbalance are often first seen in the skin. Thyroid hormone directly influences proteoglycan synthesis in the skin by stimulating fibroblasts, regulatory role in epidermal differentiation and in hair formation and sebum production. As a result, the skin presents important external markers associated with thyroid disease that can signal dermatologists to investigate and diagnose thyroid disorder.

Figure 1. Diffuse hair loss with reduced density in a hypothyroid

Figure 2. Pincer nails in hypothyroid

Disorders of thyroid may manifest in the form of hypothyroidism or hyperthyroidism with their varied cutaneous manifestations.

Hypothyroidism

Mean age of patients was 37.4 years similar to other studies in India. [2] There was a female predominance like in other studies [2,3] with female-to-male ratio of 20:1. Majority of the patients had more than one manifestation. Generalized xerosis was the most common cutaneous manifestation seen in 86% of hypothyroid patients. A similar observation was made in other studies.[2,4,5] Hypohidrosis accompanied by cytologic changes within the eccrine apparatus and diminished sebaceous gland secretion have been considered as possible causes. [6] Hypothyroidism may also hinder the epidermal barrier function by affecting the development of lamellar granules. Xanthelasmapalpebrarum was found in 5% of patients which was much higher than that noted by other studies. [2,3]Acanthosis was present in 69% of the total cases and had involvement of neck, axilla, periorbital or knuckle pad. Acanthosisnigricans possibly occur due to insulin resistance secondary to weight gain in hypothyroidism.

Table 1. Skin, hair and nail manifestations of hypothyroid patients

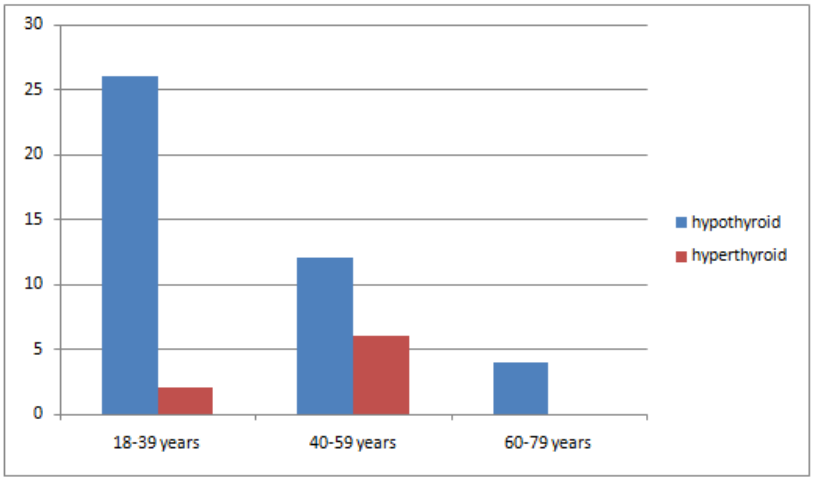
Sl no	Clinical manifestation*	Number of patients	Percentage (out of total hypothyroid cases)
1	Dry rough skin	36	86
2	Acanthosis*	29	69
	•Neck	28	
	•Axilla	24	
	•Knuclepad	6	
	•periorbital	4	
3	Pigmentation*	24	57
	•melasma	19	
	•periorbitalmelanosis	12	
4	Infections	21	50
	•dermatophytoses	11	
	•scabies	6	
	•wart	4	
5	Palmoplantarkeratoderma	6	14
6	Seborrheic dermatitis	12	29
7	Dermatosispapulosanigrans	4	10
8	Puffiness of eyelids	3	7
9	Xanthelasma	2	5
10	Nail changes*	37	88
	•linear striations	28	
	•brittle nails	24	
	•pincer nail	20	
	•platynychia	10	
	•dry nail folds	9	
11	Hair changes*	28	67
	•diffuse hair loss	24	
	•dry coarse hair	20	
	•Patterned hair loss	4	

*some patients had more than one finding

Table 2. Skin, hair and nail manifestations of hypothyroidism

Sl no	Clinical manifestation	Number of patients	Percentage (out of the total hyperthyroid)
1	Warm moist skin	4	50
2	Diffuse hairloss	3	37.5
3	Facial flushing	2	25
4	Exophthalmos	1	12.5
5	Jellinek's sign	1	12.5
6	Nail changes*	5	62.5
	•Linear striations	4	50
	•Soft shiny	2	25
	•Plummers nail	1	12.5

*some patients had more than one finding



Graphs 1. Graphical representation of age distribution of hyper and hypothyroid

Hair manifestations were seen in 67% and included diffuse hair loss (57%), coarse dry hair (48%) and patterned hair loss(10%). Diffuse hair loss was much higher than that noted by Bains A et al and Dogra A et al which had only 47.78% and 40.6% respectively [3,5] T4 stimulates the proliferation of hair matrix keratinocytes, whereas their apoptosis is decreased by both T3 and T4. T4 prolongs the duration of anagen in vitro, by downregulation of TGF-2, the key anagen-inhibitory growth factor. Hypothyroidism has been proposed to cause premature catagen induction. [7] The most common finding in nails in patients of hypothyroidism was longitudinal striations (67%) followed by brittle nails (57%), pincer nail (48%) and platynychia (24%). The results showed a varied pattern as compared to previous studies. [5,8] Not all these manifestations are unique to thyroid disorders.

Thyroid disease is known to be associated with various autoimmune diseases and in this study they were chronic urticaria, diabetes mellitus, alopecia areata, vitiligo vulgaris and pemphigus vulgaris. Association between urticaria and thyroid disease is established in various studies, such as those conducted by Thomas and Kadyan (Thomas, 2009). Vitiligo was present in 1(2.4%) hypothyroid patient which was similar to that seen by Bains et al. (2019) Melasma was present in 45% of patients which was much higher than other studies (Haritha, 2013; Dogra, 2006; Zanni, 2008).

Hyperthyroidism: Mean age of hyperthyroid patients was 37.4 years with maximum number of patients in the age group of 40-60 years. Females outnumbered male like in other studies (Caravati, 1969; Ramanathan, 1989). The most common cutaneous manifestation in hyperthyroid patients was warm skin present in 50% of patients similar to that found by other studies (Bains, 2019; Caravati, 1969). None of the patients complained of hyperhidrosis or generalised pruritus as noted by other studies (Bains, 2019; Caravati, 1969). Jellinek's sign also known as Rasin's sign, which is pigmentation of eyelids was present in 12.5% of patients. There was diffuse hair loss in 37.5% and soft and shiny nails in 25% patients. These findings vary from other studies probably because of a small sample size (Bains et al., 2019).

Conclusion

This study enlightens clinicians about the various skin, hair and nail manifestations a patient with underlying thyroid disease can have and thereby helps them for early diagnosis. It also assess the various comorbid conditions that has to be looked for when a patient is diagnosed with the same.

Key points

- Skin manifestation in thyroid diseases can be varied
- High index of suspicion needed for clinician to pick up the signs and look for underlying thyroid abnormality
- Always evaluate for associated comorbid conditions When thyroid abnormality is detected.

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GLOSSARY OF ABBREVIATIONS:

Abbreviation	Expansion
DLE	Discoid Lupus Erythematosus
OPD	Out patient department
TGF	Transforming growth factor

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