

Original Research Article

Evaluation of general and cutaneous manifestations of hypothyroidism: a single center experience in Odisha

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ABSTRACT

Background: Endocrine diseases may induce manifestation through the skin. Hypothyroidism is known to cause a wide range of general and skin manifestations. Dermatologists may commonly see skin disorders that reflect an underlying hypothyroid state. The objective of the study was to evaluate varied general and cutaneous manifestations of hypothyroidism.

Methods: A hospital based descriptive clinical study was conducted in the department of Dermatology, Venerology and Leprosy, MKCG Medical College, Berhampur, Odisha. Diagnosed cases of hypothyroidism were included as the study subjects. An informed consent was taken from each patient. Institutional ethics committee of the college approved the Study.

Results: 320 patients of hypothyroidism were evaluated. Maximum patients 115 (35.9%) were among 31-40 years of age group. Male to female ratio was 1:5.7. The percentage of hypothyroid patients who complained of constipation, fatigue, Cold intolerance, weight gain and neck swelling was 75.0%, 57.2%, 50.9%, 35.9% and 31.9% respectively. Among females, 54.5% were having irregular menses. The most common cutaneous symptom was dry course skin (75.9%), followed by diffuse hair loss (50.9%), puffy oedema (48.1%), decreased sweating (11.9%) and yellow skin (9.1%). The most observed cutaneous sign was xerosis (66.9%), followed by alteration in skin texture (55.0%). Some patients showed more than one cutaneous signs. The most common hair changes in our patients were diffuse hair loss (55.9%), followed by course scalp hair (29.4%).

Conclusions: The interaction between hypothyroidism and skin is of profound clinical importance. So, dermatologists need to be alert of the ways in which these two organ systems interact, so that early diagnosis and management of hypothyroidism may ensue.

Keywords: Cutaneous manifestations, Hypothyroidism, Xerosis, Odisha

INTRODUCTION

Thyroid disorders involve all organ systems of body and the skin is no exception. "Thyroid skin connections" are a long recognized complex problem of dermato-endocrinology. Cutaneous manifestations may be the first presenting signs or may precede thyroid disease diagnosis by many years.¹

Hypothyroidism is the most common pathological hormone deficiency. Worldwide, the most common cause of hypothyroidism is iodine deficiency.² Almost one-third of the world's population lives in areas of iodine deficiency.³ Hypothyroidism can be caused by either inadequate circulating levels of thyroid hormone or target cell resistance of hormonal action.

Primary hypothyroidism of autoimmune etiology is the most common cause.⁴ In the adults, the onset of hypothyroidism is usually so insidious that the typical manifestations may take months or years to go unnoticed by individual, family and friends.⁵

Hypothyroidism can manifest as asymptomatic subclinical condition to overt myxoedema. Several general and cutaneous manifestations can be present. Other than these, many organ systems are also affected.⁶ Hypothyroidism shows many non-specific cutaneous manifestation and many individuals without a thyroid disease may exhibit them. So, these do not allow definite diagnosis without Thyroid function test.⁷

There is a paucity of data in Berhampur district of Odisha regarding the hypothyroidism. So, the present study was done to evaluate varied general and cutaneous manifestations of hypothyroidism.

METHODS

The study was a hospital based descriptive clinical study conducted in the department of Dermatology, Venerology and Leprosy with the collaboration of department of Endocrinology, MKCG Medical College & hospital, Behrampur, Odisha. The duration of the study was two years.

Patients diagnosed with hypothyroidism constituted the study subjects. The diagnosis of hypothyroidism was established after laboratory investigations on the basis of both clinical manifestations and laboratory reports of thyroid profile. Three hundred and twenty hypothyroid patients (TSH level >5.5 µIU/dl) were included in the study.

Exclusion criteria included all patients of thyroid ablation or thyroidectomy, co-existing infections, thyroid or other malignancies, other systemic illness like diabetes mellitus, cardiac, renal and liver failure etc., pregnancy and those already on thyroid hormone replacement therapy. Known cases of hypothyroidism who were on treatment but their serum TSH level was <5.5 µIU/dl were excluded from the study. It should also be noted that

pathologies such as psoriasis, lichen, eczema, acrochordons, lentiginos, and nevi evidenced and recorded at the physical examination of patients, have not been included in this work because, although they are common in daily dermatological practice, they are not related directly to hypothyroidism.

An informed consent was taken from each patient. A general physical examination, systemic examination and a detailed dermatological examination was carried out and the relevant details recorded and tabulated. Apart from routine laboratory investigations, thyroid function tests (TSH, T3 and T4) were also done by radioimmunoassay.

Institutional ethics committee of the college approved the Study. Statistical analysis of data was performed using statistical package for social sciences (SPSS Version 16) and inferences were drawn. 2-sample z-test was used to compare two sample proportions. P values were calculated for two-tailed comparisons. Asymptotic (normal approximation) confidence limits (95% CI) for the difference in proportion was also calculated.⁸ Data is expressed in absolute (n) and relative (%) figures.

RESULTS

Total 320 patients were analyzed for the study. The age of patients ranged from 16 to 45 years, with a mean of 33.42 (±9.31) years. Maximum patients (115; 35.9%) were among 31-40 years of age group. Among patients of hypothyroidism, 272 (85.0%) were females. Females outnumbered males significantly in each age group, with a total male to female ratio of 1:5.66 as shown in Table 1.

The general complaints in the history in our study group are depicted in Table 2. Total 240 (75.0%) patients presented with constipation while 183 (57.2%) patients complained of fatigue. Cold intolerance was present in 50.9% of patients while 35.9% perceived weight gain and 31.9% complained of neck swelling. Of the 272 hypothyroid females, 244 were menstruating. Among them, 111 (45.5%) had regular cycles and 133 (54.5%) had irregular periods. Oligomenorrhoea and menorrhagia were the most common features in the latter group.

Table 1: Age and sex distribution of hypothyroid cases (n=320).

Age Group (in years)	Male (%)	Female (%)	Z	95% CI	Total (% of N)
<20	9 (14.8)	52 (85.2)	7.8	0.55- 0.85	61 (19.1)
21-30	13 (14.0)	80 (86.0)	9.8	0.57-0.86	93 (29.1)
31-40	13 (11.3)	102 (88.7)	11.7	0.65- 0.90	115 (35.9)
>40	13 (25.5)	38 (74.5)	4.9	0.29-0.68	51 (15.9)
Total	48 (15.0)	272 (85.0)	17.7	0.62-0.77	320 (100)

*All P values are highly significant (<0.0001)

Table 3 exhibits the most common cutaneous symptom in hypothyroid patients as dry course skin, noticed by 243 (75.9%) patients, followed by diffuse hair loss, which was reported by 163 (50.9%) patients. 16.9% patients

noticed hair loss in other sites like axillae, pubic and lateral eyebrows. Generalized pruritus was complained by 131 (40.9%) patients. Puffy edema as a cutaneous symptom was reported by 154 (48.1%) patients.

Decreased sweating was reported by 38 (11.9%) patients, whereas yellow skin was noticed by 29 (9.1%) patients.

Table 2: General symptoms among hypothyroid cases (n=320).

Symptoms	n	%	95% CI
Constipation	240	75.0	69.9–79.6
Fatigue/ Tiredness	183	57.2	51.6–62.7
Cold Intolerance	163	50.9	45.3–56.5
Weight gain	115	35.9	30.6–41.4
Neck swelling	102	31.9	26.8–37.3
Hoarseness of voice	54	16.9	12.9–21.5
Sleepiness	29	9.1	6.2–12.8
Menstrual Irregularity (n=244)*	133	54.5*	48.0–60.9

*Out of 272 females, 12 had hysterectomy and 16 were already having menopause

Table 3: Various skin manifestations (symptoms) among hypothyroid cases (n=320).

Symptoms	n	%	95% CI
Dry skin	243	75.9	70.8 – 80.5
Generalized Pruritus	131	40.9	35.5 – 46.5
Puffy edema (hands, face & eyelids)	154	48.1	42.5 – 53.7
Decreased sweating	38	11.9	8.6 – 15.9
Yellow skin	29	9.1	6.2 – 12.8
Diffuse hair loss (scalp)	163	50.9	45.3 – 56.5
Hair loss in other sites	54	16.9	12.9 – 21.5
Urticaria	55	17.2	13.2 – 21.8
Brittle nails	13	4.1	2.2 – 6.9

The most observed cutaneous sign was xerosis, seen in a total of 214 (66.9%) patients. This was followed by alteration in skin texture, which was seen in 176 (55.0%) patients. The least common cutaneous sign in our patients was xanthasma palpebrum, which was noticed in 9 (2.8%) of our patients. Some patients showed more than one cutaneous signs as presented in Table 4.

Table 4: Cutaneous signs among hypothyroid cases (n=320).

Signs	n	%	95% CI
Xerosis	214	66.9	61.5 – 72.0
Alteration in texture of skin	176	55.0	49.4 – 60.5
Puffy face	127	39.7	34.3 – 45.3
Keratoderma	67	20.9	16.6 – 25.8
Carotenemia	22	6.9	4.4 – 10.3
Non-pitting oedema	17	5.3	3.1 – 8.4
Xanthomas	9	2.8	1.3 – 5.3

*Some patients had more than one cutaneous signs.

The most common hair changes in our patients was diffuse hair loss, seen in 179 (55.9%) patients, followed

by coarse scalp hair, seen in 94 (29.4%) patients. Least common hair changes were madarosis, seen in only 17 (5.3%) cases. No hair changes were seen in 110 (34.4%) patients.

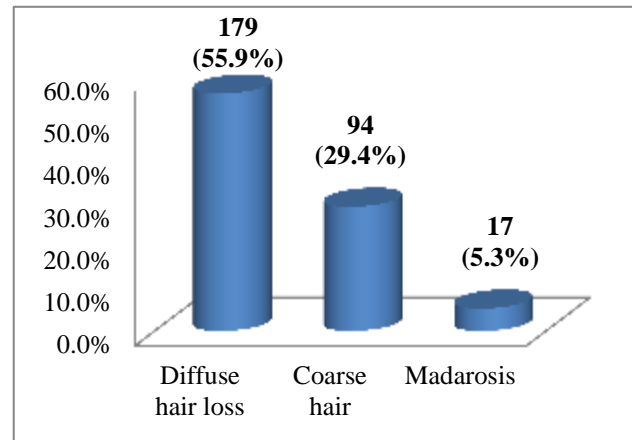


Figure 1: Hair changes in hypothyroid patients (n=320).

In this study, Vitiligo was seen in 40 patients while 22 patients had melasma. The other associated cutaneous diseases were also noted including Acanthosis nigrans (8), systemic sclerosis (6), discoid lupus erythematosus (5), alopecia areata (5) and psoriasis (4).

DISCUSSION

In our study group of 320 patients, the mean age of patients was 33.42 years, which corresponds with other studies.^{9,10} There were 272 (85.0%) females and just 48 (15.0%) males. Female preponderance may be due to increased association of autoimmune disorders including autoimmune thyroiditis in females.^{11,12}

The most common general symptom complained by patients was constipation. Gastrointestinal system disorders are usually ignored in hypothyroidism because of certain systemic symptoms of cardiovascular, neuromuscular, and ocular disorders with thyroid dysfunctions.¹³ Constipation in hypothyroidism may occur due to changes in the motor activities of the digestive systems.¹⁴ Limited number of studies has found that hypothyroid patients show significant reduction in gastric emptying.^{15,16}

57.2% of hypothyroid patients complained of fatigue in day to day activities, mostly by older patients. Many hypothyroid patients experience persistent fatigue and fatigue-related symptoms, as well as poor performance on various domains of neurocognitive functioning. A more sensitive TSH receptor (TSHR-Glu 727) increases the ability of neurons to adjust intracellular thyroid hormone levels, thereby affecting neuropsychological functioning.¹⁷⁻¹⁹ Among menstruating females, 54.5% had irregular periods with complaints of oligomenorrhoea as

well as menorrhagea. Both hyper and hypothyroidism may result in menstrual disturbances. In hypothyroidism, polymenorrhoea is more common due to defects in hemostatis. Fertility is also reduced in hypothyroidism.

Menstrual irregularity tends to be more frequent in severe hypothyroidism in comparison to mild cases.^{20,21} A study done in Meerut showed oligomenorrhoea as the most common menstrual abnormality in hypothyroid female patients.²²

The predominant cutaneous symptom in our patients was dry skin, followed by diffuse hair loss and puffy edema. Similar observations were made by Jabbour et al and Hueston et al., in their studies.^{23,24} Other cutaneous symptoms in our study were very similar to studies conducted by other authors.⁹⁻¹² Generalized pruritus was complained by many patients as it is related to dry and course skin.

Classical myxoedema, formerly used as a synonym for hypothyroidism is rarely seen today.⁵ Although puffiness in hands, face and eyelids was complained by nearly half of our patients. This might have occurred due to increased glycosaminoglycan deposition in skin. Hyaluronic acid, a mucopolysaccharide may also be deposited. These materials are hygroscopic and they produce mucinous oedema, responsible for the mucinous features and puffy appearance with hypothyroidism.⁵

The dryness of hypothyroid skin may result from decreased eccrine gland secretion. The mechanism for decreased sweating is not clear although the hypothyroid glands are atrophic on histological examination. A role may also be played by periodic acid-Schiff (PAS)-positive material that can accumulate in hypothyroid patients.²⁵

The most common cutaneous sign observed in our study was xerosis, followed by alteration in skin texture. Thyroid hormone is an important regulator of epidermal homeostasis. The skin in hypothyroids become rough and altered, sometimes covered with fine scales, notably on extensor extremities.²⁶

Thyroid hormones also accelerate barrier formation by increasing the activity of enzymes in the cholesterol sulfate cycle. Thus, hypothyroidism may hinder the epidemiological barrier function too.²⁷

Hypothyroidism also may affect the development of the lamellar granules (Odland bodies), which are vital in the establishment of a normal stratum corneum.²⁸ In the upper spinous layer and stratum granulosum layer of the epidermis, lamellar bodies are secreted from keratinocytes. They form an impermeable, lipid-containing membrane that serve as a water barrier and is important for correct skin barrier function.

In this study, a variety of associated cutaneous diseases were noticed. Several studies have shown an association of hypothyroidism with these cutaneous diseases.^{12,29-32} Irrelevant diseases were not included in this study whose findings might be coincidental.

CONCLUSION

We conclude that the interrelationship between hypothyroidism and skin is dynamic and complex. Thus, it is critical to examine thoroughly any patient presenting with sign and symptom of hypothyroidism. Dermatologists must see skin lesions that reflect an underlying hypothyroid state. The early identification by laboratory test can lead to prompt treatment and reduce further complications.

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Ethical approval: The study was approved by the institutional ethics committee

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