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## RESEARCH ARTICLE

### CUTANEOUS MANIFESTATIONS OF HYPOTHYROIDISM- A CLINICAL STUDY.

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#### Abstract

Thyroid disorders are known to involve all organ systems of the body including the skin. The aim of the study was to evaluate the cutaneous manifestations in patients with hypothyroidism and to determine the proportion of cutaneous manifestations among hypothyroid cases. The study was carried out in the Department of Dermatology, Venereology and Leprology in collaboration with the Department of Medicine, Endocrinology Unit, Regional Institute of Medical Sciences, Imphal. In this study, one hundred 100 known cases of hypothyroidism were taken up for a period of 18 months, with effect from November 2013. Out of the 100 patients included for the study, 70% had one or more than one cutaneous manifestations of hypothyroidism. The various cutaneous manifestations in their decreasing order of frequencies were xerosis 15% , diffuse hairfall 13% , pruritus, cool skin and thyroid enlargement 10% each , hyperpigmentation and urticaria 8% each , pale skin 7% , nail brittleness and vitiligo 6% each , psoriasis 3% ,myxedematous changes, onychomycosis, acne vulgaris, lichen planus, dermatophytes and candidiasis 2% each , folliculitis, alopecia areata, polymorphic light eruption PMLE , systemic lupus erythematosus SLE , discoid lupus erythematosus DLE , xanthelesma palpebrarum, pemphigus vulgaris and systemic sclerosis 1% each . Hence, dermatologists should be alert when they come across such cutaneous manifestations and keep in mind hypothyroidism to rule it out as the underlying cause.

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#### Introduction:-

Endocrine diseases may induce manifestations in skin, and its adnexa that become relevant where they are the primary expression of a general disorder. Hypothyroidism is defined as the presence of insufficient levels of circulating thyroid hormone, or target cell resistance to the hormone activity. It is classified as congenital, primary, secondary and tertiary hypothyroidism.[1]

Thyroid disorders are known to involve all organ systems of the body including the skin. Thyroid hormones have been shown to be necessary for the initiation and maintenance of hair growth as well as normal secretion of sebum.[2]

In the hilly regions, iodine is leached from the surface of the soil by snow and rain and carried by wind, rivers and floods into the sea. The entire North-East India is in the classical goiter- endemic belt of India. Manipur is located in

the classical goitre endemic belt of India. According to survey reports conducted by IDD cell, Government of Manipur in 1992 & 1996, the goitre prevalence in Manipur was 21.1% and 13.0% respectively.[3] Dermopathies associated with thyroid disease like melasma, vitiligo, alopecia, premenstrual acne, myxedema, dry skin, yellowish discoloration and onychodystrophy, frequently require a high degree of suspicion in order to appreciate the clinical manifestations and to reach a diagnosis. Unfortunately, there is very little information available on this subject from Manipur, the region where cases of hypothyroidism are not uncommon. Therefore, this work was planned in order to highlight the possible dermatologic features of hypothyroidism in this area.

### Materials and methods:-

The study was carried out in the department of Dermatology, Venereology and Leprology, in collaboration with the department of Medicine, Endocrinology Unit, Regional Institute of Medical Sciences, Imphal, Manipur, for a period of 18 months, with effect from November 2013 to April 2015. A sample of known 100 cases of hypothyroidism, both males and females of any age group, who attended the department of Dermatology, Venereology and Leprology or the Endocrinology unit at RIMS Hospital, Imphal during the study period were included in the study group after taking consent. A detailed history regarding socio demographic profile and clinical history was taken. A cutaneous examination was then done including examination of hair and nails.

The following tests were also done:

- ❖ Complete Haemogram to rule out pernicious anemia .
- ❖ Liver function tests: including Serum bilirubin to differentiate carotenemias from icterus .
- ❖ Renal function tests: Blood urea, Serum creatinine
- ❖ Blood sugar levels.
- ❖ Fasting lipid profile.
- ❖ Thyroid profile: T3, T4, TSH.
- ❖ All these investigations were done to find any associations with hypothyroidism and also to rule out co-existing systemic diseases that can present with skin changes which can mimic the skin changes of hypothyroidism.
- ❖ Skin biopsy: Punch biopsy was done in the cases such as systemic scleroderma, lichen planus, psoriasis, etc. to confirm by histological changes.

The data collected were analysed using IBM SPSS version 21. Descriptive statistics like mean, standard deviation and percentages were utilized. Chi-square test was used to determine the association between cutaneous manifestations with age and gender. P value of <0.05 was taken to be statistically significant. Graphs and charts were prepared using Microsoft Office Excel 2007. The ethical approval was obtained from the Institutional Ethics Committee of Regional Institute of Medical Sciences RIMS , Imphal before data collection.

### Results:-

The maximum cases of hypothyroidism were in the age group 25-45. The mean age of all patients was 39 years with a standard deviation of 16.21 years, whereas males had a mean age of 44.08 years and females had a mean age of 39.34 years, with a standard deviation of 21.16 years and 15.4 years respectively. The majority of patients were females. The number of all male patients was 13 13% while females comprised 87 87% of the total cases. Of all the total 100 patients included for the study, 70% had one or more than one cutaneous manifestations of hypothyroidism. It is to be noted that a single patient can have 2 or more number of cutaneous manifestations such that the total frequencies of all the manifestations far exceed 70 which is the actual number of patients with cutaneous manifestations. The various cutaneous manifestations of hypothyroidism in their decreasing order of frequencies as shown in the table 2 are xerosis 15% , diffuse hairfall 13% , pruritus, cool skin and thyroid enlargement 10% each , hyperpigmentation and urticaria 8% each , pale skin 7% , nail brittleness and vitiligo 6% each , psoriasis 3% , myxedematous changes, onychomycosis , acne vulgaris, lichen planus, dermatophytes and candidiasis 2% each , folliculitis, alopecia areata, polymorphic light eruption PMLE , systemic lupus erythematosus SLE , discoid lupus erythematosus DLE , xanthelesma palpebrarum, pemphigus vulgaris and systemic sclerosis 1% each . Out of the 8 cases of hyperpigmentation, 5 were of melasma, 2 of diffuse hyperpigmentation over the face and neck, and 1 case was of periorbital hyperpigmentation. The percentage in the 5<sup>th</sup> column of table 2 has been calculated with 70 as the denominator, where 70 is the total number of patients with cutaneous manifestations.

Among all patients with cutaneous manifestations, the mean age of males 8 in number, was 47.75 years with a standard deviation of 13.68 years, and that of females 62 in number was 38.85 years with a standard deviation of 15.16 years. The P value for the mean ages was found out to be 0.12 which is not significant. There were 8 cases of males and 62 females who had one or more than one cutaneous manifestations of hypothyroidism making a total of 70. Among the 30 cases with no such manifestations, 5 were males and 25 were females.

The other cutaneous manifestations like eczemas, rosaceas, miliarial dermatitis, seborrheic dermatitis, lymphocytic vasculitis, seborrheic keratosis, acrochordons have been considered as co-incidental findings.

### **Discussion:-**

The mean age of all patients was 39 years comparable to other studies.[1,4] The texture of the skin was found to be dry and coarse in 15 % of the patients, which constituted the most common cutaneous sign. This finding is lower than those found by Dogra et al 56% .[4] Hypohidrosis accompanied by cytologic changes within the eccrine apparatus and diminished sebaceous gland secretion have been considered as potential etiologic factors.[5] In our study, 13% of the cases had diffuse hairfall similar to one study.[6] Alopecia of hypothyroidism is mediated via hormone effect on the initiation as well as duration of hair growth and normal telogen-anagen hair relationships were restored with thyroid hormone replacements.[7] Hair loss can be attributed to inhibition of initiation and duration of the actively growing phase of hair cycle. Hence the percentage of hair in telogen increases leading to telogen effluvium. Since the duration of anagen is also affected, the hair growth is slowed with decreased length. [8] Only 10 % of our study population had pruritus similar to the finding of Haritha et al.[9] Pruritus can be explained by decreased activity of sweat glands, sebaceous glands and low epidermal sterol synthesis.[10] Cool skin too was reported as 10% in all of our study cases whereas Dogra et al[4] noticed in 31.25 percent of their patients. Hypothermia is a result of hypo metabolic state which causes reduced core temperature and reflux cutaneous vasoconstriction as reported by Mullin GE.[11] In our study, a total of 8 cases 8% was reported to have hyperpigmentation out of which 2 25% were diffuse hyperpigmentation over the face and neck, 5 62.5% were of melasma and 1 12.5% was of periorbital hyperpigmentation. Dogra et al[4] had 12 37.5% cases of hyperpigmentation out of which 4 33.3% were of diffuse hyperpigmentation, 6 50% were of melasma and 2 16.6% were of periorbital hyperpigmentation. The hyperpigmentation may be due to increased release of pituitary adrenocorticotrophic hormone, compensating for the cortical insufficiency, secondary to severe long standing hypothyroidism. [12,13] In our study, 8% of the patients had urticaria which is very similar to the findings of Puri et al[14] 6% and Jamwal et al[15] 4% . Heymann has stated that the mechanism by which thyroid autoimmunity is associated with urticaria is poorly understood, and there is clustering of thyroid microsomal antibodies in patients with positive analogous serum test, although it is unlikely that thyroid hormone itself has any in vivo effect on cutaneous vascular response to histamine and on the mast cell releasability.[16] Brittle nails were found in 6% of our study population similar to the finding of Jamwal et al.[15] The prevalence of vitiligo in the general population is 1.84% [17] and in this study it is 6%. According to world report series,[18,19] vitiligo is more common in relation to thyroid autoimmunity, associated or not with hypothyroidism. In our study, there were 3 patients of psoriasis out of the total of 100 hypothyroid cases which is much higher than that of Keen et al.[20] There were 2 cases 2% of lichen planus in our study whis is very similar to the finding of Keen et al.[20] There was only 1 case 1% of alopecia areata similar to the finding of Keen et al.[20] We had 2 cases 2% of tinea corporis against 7.93% cases of tinea corporis in the study of Haritha et al.[9] In this study, there was 1 case of PMLE 1% which is in accordance to the finding of Keen et al.[20] We had a single patient in our study population who had systemic lupus erythematosus along with hypothyroidism. Dhir et al[21] reported two cases wherein cutaneous manifestations were the first clue to the development of lupus erythematosus in a setting of autoimmune thyroiditis. We also had 1 case of discoid lupus erythematosus DLE in our study which is in accordance to that of Keen et al.[20] Pemphigus vulgaris PV was also present in our current study 1% . Dogra et al[4] had 1 case of pemphigus vulgaris accounting upto 3% of its study population of 32 cases. Lavanya et al[6] found 1.78% cases of pemphigus foliaceus in their study. One case 1% of systemic sclerosis was found in the present study in accordance to other findings.[6,20]

**Tables:-****Table 1. Distribution of all patients as per age groups n =100:-**

Age group years	Frequency	Percentage
<15	7	7
15-25	9	9
25-45	48	48
45-65	27	27
>65	9	9
Total	100	100

**Table 2. Cutaneous manifestations among all hypothyroid cases:-**

	Skin manifestations	Frequency	Percentage N= 100	Percentage N= 70
	No manifestations	30	30	Not Applicable
1.	Xerosis	15	15	21.4
2.	Diffuse hairfall	13	13	18.57
3.	Pruritus	10	10	14.28
4.	Cold on touch	10	10	14.28
5.	Thyroid enlargement	10	10	14.28
6.	Hyperpigmentation	8	8	11.42
a	Diffuse hyperpigmentation	2	2	2.85
b	Melasma	5	5	7.14
c	Periorbital hyperpigmentation	1	1	1.42
7.	Urticaria	8	8	11.42
8.	Pale skin	7	7	10
9.	Nail brittleness	6	6	8.57
10.	Vitiligo	6	6	8.57
11.	Psooriasis	3	3	4.28
12.	Myxoedematous changes	2	2	2.85
13.	Onychomycosis	2	2	2.85
14.	Acne vulgaris	2	2	2.85
15.	Lichen planus	2	2	2.85
16.	Dermatophytes	2	2	2.85
17.	Candidiasis	2	2	2.85
18.	Folliculitis	1	1	1.42
19.	Alopecia areata	1	1	1.42
20.	Polymorphic light eruption PMLE	1	1	1.42
21.	Systemic lupus erythematosus SLE	1	1	1.42
22.	Discoid lupus erythematosus DLE	1	1	1.42
23.	Xanthelesma palpebrarum	1	1	1.42
24.	Pemphigus vulgaris	1	1	1.42
25.	Systemic sclerosis	1	1	1.42

**Some patients had a combination of two or more cutaneous manifestations:-****Conclusion:-**

Thus, hypothyroidism can manifest in the skin as different symptoms and signs. Hence, dermatologists should be alert when they come across such cutaneous manifestations and keep in mind hypothyroidism to rule it out as the underlying cause.

**References:-**

1. Zanni MSG, Campana R, Papa M, Ragazzini L, Monetti E, Trakal JJ. Cutaneous manifestations in hypothyroid patients. *Dermatologia Argentina* 2008;14 3 :196-9.
2. Goolamali SK. Thyroid disease and sebaceous gland function. *Br Med J* 1979;1 6007 :432-40.
3. Chandra AK, Singh LH, Tripathy S, Debnath A, Khanam J. Iodine nutritional status of children in North East India. *Indian J Pediatr* 2006;73 9 :795-8.
4. Dogra A, Dua A, Singh P. Thyroid and skin. *Indian J Dermatol* 2006;51 2 :96-9.
5. Means MA, Dobson RL. Cytologic changes in the sweat gland in hypothyroidism. *JAMA* 1963;186 8 :113-5.
6. Lavanya M, Kodali S, Reddy LVN. A study on cutaneous manifestations of hypothyroidism in a tertiary hospital in South India. *Journal of Evolution of Medical and Dental Sciences* 2015;4 35 :6059-67.
7. Feingold KR, Elias PM. Endocrine skin interactions. *J Am Acad Dermatol* 1987; 17 6 :920-40.
8. Freinkel RK, Freinkel N. Hair growth and alopecia in hypothyroidism. *Arch Dermatol* 1972;106 3 :349-52.
9. Haritha S, Sampath KK. Skin manifestations of hypothyroidism-a clinical study. *Journal of Dental and Medical Sciences* 2013;7 2 :58-60.
10. Khopkar U, Pande S. Etiopathogenesis of pruritus due to systemic causes: Implications for treatment. *Indian J Dermatol Venereol Leprol* 2007;73 4 :215-7.
11. Mullin GE, Eastern JS. Cutaneous signs of thyroid disease. *Am Fam Physician* 1986;34 4 :93-8.
12. Niepomnisczse H, Amad RH. Skin disorders and thyroid. *Endocrinol Invest* 2001; 24 8 :628-38.
13. Larsen PR and Davies TF, Hypothyroidism and Thyroiditis, in Wilson JD Ed. , *William's Textbook of Endocrinology*. 9<sup>th</sup> ed. Philadelphia: WB Saunders,1998 423-455.
14. Puri N. A Study on cutaneous manifestations of thyroid disease. *Indian J Dermatol* 2012;57 3 :247-8.
15. Jamwal A, Sharma A, Rather PA. Cutaneous manifestations of hypothyroidism: Prospective hospital based clinical study. *J Adv Med Dent Scie* 2013;1 2 :5-12.
16. Heymann WR. Chronic urticaria and angioedema associated with thyroid autoimmunity; Review and therapeutic implications. *J Am Acad Dermatol* 1999; 40 2 :229-32.
17. Martis J, Bhat R, Nandakishore B, Shetty JN. A clinical study of vitiligo. *Indian J Dermatol Venereol Leprol* 2002;68 2 :92-3.
18. Leonhardt JM, Heymann WR. Thyroid disease and the skin. *Dermatol Clin* 2002;20 3 :473-81.
19. Ai JD, Leonhardt JM, Heymann WR. Autoimmune thyroid diseases: Etiology, pathogenesis and dermatologic manifestations. *J Am Acad Dermatol* 2003; 48 5 :641-59.
20. Keen MA, Hassan I, Bhatt MH. A clinical study of the cutaneous manifestations of hypothyroidism in Kashmir valley. *Indian J Dermatol* 2013;58 4 :326-9.
21. Dhir R, Ahluwalia AI, Sridhar J, Mani H, Pruthi HS, Shah KM. Autoimmune thyroiditis perdating the presentation of systemic lupus erythematosus: Two cases and a review of literature. *Indian J Dermatol Venereol Leprol* 2002;68 5 :292-4.