ORIGINAL ARTICLE

Pattern of Cutaneous Manifestations among Patients with Hypothyroidism in a Tertiary Care Hospital of Bangladesh

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Abstract

Introduction: Thyroid disorders are commonly associated with a variety of skin problems. Sometimes skin manifestations are the presenting symptom of thyroid diseases. Hypothyroidism, specially of the autoimmune cause, is associated with various common skin, hair and nail problems. The present study aimed to evaluate pattern of skin manifestations in 190 hypothyroid patients in a tertiary care hospital.

Methods: The study was conducted in the Out Patient Departments of both Endocrinology and Metabolism and Dermatology and venerology, Green Life Medical College and Hospital, in Dhaka, Bangladesh, from September 2020 to December 2020. In this case control study blood samples were collected from 190 hypothyroid patients and 100 healthy controls. Dermatological examinations were done at the time of inclusion. Age, Body Mass Index, skin manifestations were noted. Informed written consent was taken from each patient. FT4 and TSH levels were analyzed by ELISA method.

Results: Among the 190 subjects who were enrolled in the case group, 91.6% were female and 8.4% were male. The highest number (43.4%) patients belong to 29 to 48 years age group. The most common skin manifestation was hair fall (48.4%), followed by xerosis or coarse dry skin (29.9%) and urticaria (16.3%). There was a significant and positive correlation between xerosis and hair fall condition in case group (0.040).

Conclusion: The study revealed that cutaneous manifestations are an important association and presenting problem in hypothyroid patients and thyroid function tests should be done to evaluate various skin problems to exclude hypothyroidism.

Key words: Hypothyroidism, Xerosis, Urticaria, Hair loss

Journal of Green Life Med. Col. 2021; 6(2): 41-44

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Received: 19. 05. 2022 **Accepted:** 10.12.2022

Introduction:

Thyroid hormones are necessary in regulating the health and condition of the skin, and thyroid disorders, whether underactive or hyperactive, are associated with a variety of skin problems.[1] Some dermatological conditions may be the first symptom of thyroid disease.[2] It has been seen that thyroid disease at any age can cause multiple manifestations in the hair, skin, and nails.[3] In normal subjects, thyroid-stimulating hormone (TSH) is made by the pituitary gland and stimulates the thyroid gland to secrete T4 (thyroxine) and T3 (triiodothyronine). In the periphery, T4 is converted to T3 by enzymes mainly in the liver and kidney. T3, and to some extent T4, then binds to specific nuclear receptors in the tissues like heart, brain, muscle, and perhaps skin and mediates thyroid hormone

action.[4] In this study, we aimed to detect the common dermatological findings associated with hypothyroid patients in a tertiary care hospital.

Methods:

The study was conducted in the Out Patient Departments of Endocrinology and Metabolism and Out Patient Department of Dermatology and Venerology, Green Life Medical College and Hospital, in Dhaka, Bangladesh, from September 2020 to December 2020. In this case control study 190 hypothyroid patients and 100 healthy controls were enrolled. Dermatological examinations were done at the time of inclusion. Age, Body Mass Index, skin manifestations were noted. Blood samples were taken at the time of enrollment.

Serum T4 and TSH were measured by ELISA method. Values were presented as percentage or mean ± SD. Comparisons between groups were analyzed by Student's t-test, analysis of variance or chi-square tests. All calculations were performed using SPSS 24.0 for windows (SPSS, Inc., Chicago, IL, USA). The level of significance was set at <0.05.

The study protocol was approved by the Ethical Committee of Green Life Medical College. Informed written consent was taken from each subject.

Results:

Total 190 subjects were enrolled in the Case group, with female predominance. Among the Case group 91.6% were female and 8.4% were male.

Table I shows age distribution of the case group where 43.4% patients belong to 29 to 48 years group, 31.7% patients belong to 8 to 28 years age group, 24.3% cases belong to 49 to 68 years age group and 0.5% patients belong to 69 to 88 years age group.

Table 1

Distribution of age in the case group

Age group	Percent (case)	Percent (control)
8 to 28 years	31.7% (n=61)	22.00% (n=22)
29 to 48 years	43.4%(n=83)	47.00%(n=47)
49 to 68 years	24.3%(n=46)	27.00%(n=27)
69 to 88 years	0.5%(n=1)	4.00%(n=4)

The most common skin manifestation was Hair Fall (48.4%), followed by Xerosis or coarse dry skin (29.9%) and Urticaria (16.3%). Table II shows distribution of skin manifestations in the Case group.

Table II

Distribution of Skin Manifestations in the Case group

Skin Manifestation	
Xerosis	29.9% (n=57)
Hair fall	48.4% (n=93)
Urticaria	16.3% (n=31)
Vitiligo	4.7% (n=9)
Goiter	15.3% (n=29)

In Table III the correlation between skin condition in case group is shown where there was a significant and positive correlation between xerosis and hair fall condition was seen group (0.040); whereas, there was a negative and strong correlation between xerosis and urticaria diseases condition (-.002) was observed.

Table III

Correlation between skin condition in Case group

Skin condition	Hair fall p value	Urticaria p value	Xerosis, p value
Xerosis	.040	-.002	.040
Hair fall	1	.057	
Urticaria	-.002	1	.040

Table IV shows distribution of study subjects according to their TSH levels. In case group 88.4% had >4 mU/L TSH level, whereas in control group, 92% had TSH level<4 mU/L.

Table IV

Distribution of study subjects according to TSH level

TSH level	Case group, Percent	Control Group, %
>4 mU/L	88.4(n=169)	8(n=8)
< 4 mU/L	11.6(n=22)	92(n=92)

Discussion:

Hypothyroidism is associated with various skin problems. The common dermatologic manifestations seen in hypothyroidism include thick, dry skin, thinning hair, and loss of the lateral aspect of the eyebrows. Patients also may have livedo reticularis on the extremities, thick, protuberant lips, thickened and perhaps everted eyelids. Scalp hair may be thin, and pubic and axillary hair may be sparse.[5] The dermatologic manifestations of hypothyroidism may vary depending on the extent and

duration of thyroid disease but also on the patient's ethnicity.[6]

The problem is that most of these manifestations are nonspecific and many individuals without a definable thyroid problem may exhibit them. But hypothyroidism should be included in the differential diagnosis when confronted by possible cutaneous manifestations of thyroid disease, and thyroid function tests should be obtained in the skin diseases suggesting hypothyroidism.[6]

Hashimoto's thyroiditis is the most common cause of hypothyroidism, which is an autoimmune disease, and also related to Graves' disease.[7] Patients with both disorders can develop a variety of thyroid autoantibodies. There is clinical and biochemical overlap between Hashimoto's thyroiditis and Graves' hyperthyroidism, and it is not surprising that the same dermatologic and ophthalmologic manifestations can occur in both.[5] It should be remembered that any patient with autoimmune hypothyroidism is more likely to get other autoimmune disorders. Vitiligo, alopecia areata, pemphigus vulgaris, pemphigus folieaceous, and dermatitis herpetiformis are considered as autoimmune disorders of the skin and are theoretically related to autoimmune thyroid disease. Indeed, these dermatologic disorders occur more frequently in patients with autoimmune thyroid disorders.[3]

The most frequent dermatological findings detected in our study was hair fall (48.4%). In other studies, an association between diffuse alopecia and thyroid diseases was found in 60% of the cases, mainly of autoimmune origin. [8,9]. Our study also supports this relation. 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.[10]

Chronic urticaria is another skin condition associated with thyroid disease. It was found that thyroid autoimmunity is more prevalent in patients with chronic urticaria than in the general population.[11] One study compared three groups of patients: patients with demonstrable thyroid autoimmunity, patients with thyroid disease but without thyroid autoantibody production, and a control group. Chronic urticaria was significantly associated with thyroid autoimmunity.[12] Another study reported a study investigating the association between chronic urticaria and thyroid autoimmunity, and they found a higher frequency of thyroid autoantibodies in chronic urticaria patients, while no significant frequency of urticaria was found in patients with/without thyroid antibodies in thyroid diseases.[13] In our study we found urticaria in 16.3% patients with hypothyroidism, which was higher than findings of other studies done in this area.[14, 15]

One of the most significant cutaneous findings of hypothyroidism is xerosis. In our study we found xerosis and coarse dry skin as second common association with hypothyroid patients. The result was similar to those seen in other studies.[16] The etiology of xerosis in hypothyroidism is unknown. Theories suggesting are hypohidrosis related to cytologic alterations in the eccrine apparatus such as PAS-positive, diastase-resistant granules in the pale cells of the secretory coil, diminished sebaceous gland secretion, and diminished epidermal sterol biosynthesis, especially cholesterol and cholesterol esters.[17,18]

Conclusion:

The relationship between thyroid disease and skin problems are dynamic and complex. Often the symptoms and signs related to skin, hair and nails go undiagnosed and many a times are not evaluated to detect associating thyroid hormone abnormalities. In our study we found that there is a close association of hypothyroidism with many skin disorders, especially hair loss, xerosis and urticaria. It is our recommendation to test thyroid hormones when the mentioned cutaneous symptoms and signs are present in any patient which will help for early detection and treatment of hypothyroidism.

References:

1. Heymann WR, Marlton MD. Cutaneous manifestations of thyroid disease. J Am Acad Dermatol 1992; 26: 885-99.
2. Mullin GE, Eastern JS. Cutaneous signs of thyroid disease. Am Fam Physician 1986;34:93–8.
3. Leonhardt JM, Heymann WR. Thyroid disease and the skin. Dermatol Clin 2002;20:473-81, vii.
4. Burman K. Hyperthyroidism, Chapter 41. In: Becker KA, editor. Principles and practice of endocrinology and metabolism. 2nd ed. Philadelphia (Pa)7 J.B. Lippincott; 1995. p. 367 - 85.
5. Jabbour SA. Cutaneous manifestations of endocrine disorders: a guide for dermatologists. Am J Clin Dermatol 2003;4:315 – 31
6. Dermatologic aspects of thyroid disease Kenneth D. Burman, MDa,b, *, Lynn McKinley-Grant, MDc, Clinics in Dermatology (2006) 24, 247-255.
7. Lu R, Burman KD, Jonklaas J. Transient Graves' hyperthyroidism during pregnancy in a patient with Hashimoto's hypothyroidism. Thyroid 2005;15:725 - 9.
8. Niepomniszche H, Amad RH. Skin disorders and thyroid diseases. J Endocrinol Invest 2001;24:628–38

9. Jabbour SA, Miller JL. Endocrinopathies and the skin. Int J Dermatol 2000;39:88–99.

10. R K Freinkel, N Freinkel. Hair growth and alopecia in hypothyroidism. Arch Dermatol, 1972 Sep;106(3):349-52.

11. Dreskin SC, Andrews KY. The thyroid and urticaria. Curr Opin Allergy Clin Immunol 2005;5:408–12.

12. Lanigan SW, Short P, Moult P. The association of chronic urticaria and thyroid autoimmunity. Clin Exp Dermatol 1987;12:335-8

13. Verneuil L, Leconte C, Ballet JJ, Coffin C, Laroche D, Izard JP. Association between chronic urticaria and thyroid autoimmunity: A prospective study involving 99 patients. Dermatology 2004;208:98–103.

14. 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.

15. Keen MA, Hassan I, Bhat MH. A clinical study of the cutaneous manifestations of hypothyroidism in kashmir valley. Indian J Dermatol 2013;58:326

16. Tonacchera M, Chiovato L, Pinchera A. Clinical assessment and systemic manifestations of hypothyroidism Oxford Textbook of Endocrinology and Diabetes 1st edition, 2002:491-501.

17. Means M. A., Dobson R. L. Cytological changes in the sweat gland in hypothyroidism. JAMA 1963; 186: 113±115.

18. Rosenberg R. M., Isseroff R. R., Ziboh V. A. et al. Abnormal lipogenesis in thyroid hormone-deficient epidermis. J Invest Dermatol 1986; 86: 244±248.