

# Cutaneous Manifestations of Hashimoto's Thyroiditis: A Cross-Sectional Study

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## ABSTRACT

**Introduction:** The inter-relationship between the thyroid gland and the skin is dynamic and complex. Various studies have revealed multitude of cutaneous changes that occur in thyroid hormonal dysfunction. Hashimoto's thyroiditis is a common form of autoimmune thyroid disease. This study evaluates skin, hair and nail changes in patients diagnosed with Hashimoto's Thyroiditis.

**Material and Methods:** 63 cases of Hashimoto's Thyroiditis, diagnosed by serum TSH and thyroid specific Auto-antibodies in serum (Antithyroid peroxidase, anti-thyroglobulin) were included in the study. They were examined and relevant findings were documented in prestructured proforma. Study duration was one year.

**Results:** Sixty three patients with Hashimoto's Thyroiditis were included in this study, out of which 55 were females and 8 were males. Affected age group was 21-69 years. The most common cutaneous conditions for which patients visited our OPD were for Xerosis (77%) followed by Diffuse Alopecia, Maderosis (unilateral), Acanthosis Nigricans, Melasma, Alopecia Areata and Seborrheic Dermatitis. The commonest nail changes were brittle nails (47.6%) followed by slow nail growth, longitudinal ridging, chronic paronychia and soft nails. The most common hair findings were diffuse hair fall, seen in 66% of patients, followed by coarse scalp hair. Other autoimmune conditions associated were Alopecia Areata (16%) and Vitiligo. Type 2 Diabetes mellitus was present in 13% of patients.

**Conclusion:** Xerosis and pale old wrinkled skin formed the majority of skin manifestations among the study group. The most common hair related complaint was of Diffuse hair loss, followed by dry, coarse hair. The commonest nail change seen was brittle nails.

**Keywords:** antithyroid peroxidase, anti-thyroglobulin, Autoimmune diseases, brittle nails, Diffuse hair loss, Hashimoto's thyroiditis, Xerosis

## INTRODUCTION

Hashimoto thyroiditis (HT) earlier known by chronic lymphoid thyroiditis, lymphadenoid goitre, struma lymphomatosa and autoimmunizing thyroiditis<sup>1</sup> was initially described in the year 1912 by Dr. Hakaru Hashimoto who was a Japanese surgeon employed in Berlin.<sup>2</sup>

Primary hypothyroidism is due to the failure of the gland which could be mostly due to autoimmune diseases.<sup>3</sup> Amongst the causes, the most commonly associated one is Hashimoto's thyroiditis, which has at least 5-10 times greater prevalence in women than in men.<sup>4</sup> It exhibits many multisystem complications during the course of the disease, which can involve the blood vessels, skin, eye, kidney, and the nervous system.

This condition could physically manifest as a diffuse or nodular goiter, when a lymphocyte directed autoimmune attack occurs on the thyroid gland.<sup>5</sup> The patient could present initially as a euthyroid, hypothyroid, transiently hyperthyroid or even

subclinically hypothyroid or hyperthyroid. The diagnosis of Hashimoto thyroiditis is currently established by a combination of clinical features, presence of serum antibodies against thyroid antigens (mainly to thyroperoxidase and thyroglobulin). Thyroid ultrasonography which characteristically shows reduced echogenicity in HT can also be done to confirm this diagnosis.

Since there are just few data regarding the cutaneous changes associated with Hashimoto's Thyroiditis, the present study was designed to study in detail the skin, hair and nail changes in patients diagnosed with Hashimoto's Thyroiditis.

Study aimed to study skin, hair and nail changes in patients diagnosed with Hashimoto's Thyroiditis.

## MATERIAL AND METHODS

After obtaining the ethical approval from Institutional Ethics Committee, a hospital based cross sectional study of 1 year duration, was conducted on 63 diagnosed cases of Hashimoto's Thyroiditis attending the Out Patient Department of K S Hegde Hospital; informed consent was obtained from all patients.

All patients above age 18 years with thyroid disorders were included in this study. Patients below 18 years and those with cutaneous manifestations suggestive of thyroid disorder, but with normal values of T3, T4, TSH were excluded from the study.

History, physical and cutaneous examinations and demographic data such as age, sex, BMI, duration of thyroid condition, whether on treatment, family history were noted in a pre structured proforma. The diagnosis of Hashimoto thyroiditis was established by a combination of clinical features and Thyroid function tests and autoantibody detection of antithyroglobulin and anti-thyroperoxidase (anti-TPO).

## STATISTICAL ANALYSIS

Results obtained were tabulated and statistically analyzed using Chi-square test. *P*-value of <0.05% was considered statistically significant.

## RESULTS

A total of 63 patients with Hashimoto's thyroiditis were included in this study. There were 55 females and 8 males who

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participated in this study. The age of the patients ranged from 21-63 years with an average age of 42 years. Among patients participated in our study, most of them were in the age group of 31-40 years (29%). The distribution of the cases according to different age groups are given in Table 1.

Duration of course of disease - Majority of the patients observed for this study (42.8%) were diagnosed of the disease under 6 months duration, which was closely followed by 26 patients in between 1 – 5 years. Among this, 1 patient was an earlier case of hyperthyroidism, who underwent thyroidectomy 5years back and was now diagnosed with hypothyroid since 1year.

Amongst the 63 patients detected with this disease, most of them (93%) were already on treatment.

Of the autoantibodies that were tested, Anti-TPO was present in 92% of the patients in total while Anti-Thyroglobulin were present in 42 (66%) of patients.

The most common cutaneous sign was found to be Xerosis (77.7%) followed by the complaint that the texture of the skin was pale, cold and wrinkled which was seen in 38 patients (60%).

All patients examined in the study showed at least one or more cutaneous manifestation. The incidence of commonly seen cutaneous lesions in HT as observed in this study are shown in Graph 1.

The predominant finding on examination of hair in our patients was diffuse hair fall, seen in 66% of patients, followed by lustreless scalp hair which were seen in 40 patients. Other hair changes observed were diffuse alopecia 58.3% and madarosis (unilateral), was found in 30 patients

The commonest nail change in the observed patients was brittle nails (47.6%), followed by slow nail growth, noticed in 21 patients and longitudinal rigidity in nails in 29% (18 patients)

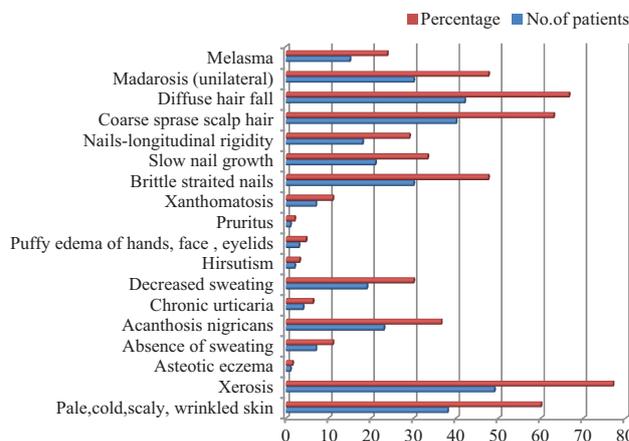
Among the autoimmune conditions with known thyroid associations, chronic urticaria and vitiligo vulgaris were found in 4 (6.3%) and 3 (4.76%) patients respectively. Both Anti-TPO and Anti Thyroglobulin were raised in these patients. Lichen plano pilaris, scleroderma was seen in just 1 patient

each, and anti thyroglobulin was found to be normal in both the patients. but there was no significant association with positivity of autoantibodies and these skin conditions; chronic urticaria ( $P=0.38$ ), vitiligo vulgaris ( $P=0.46$ ), lichen planopilaris ( $P=0.35$ ), scleroderma ( $P=0.35$ ). Frequency of autoimmunity positivity in autoimmune skin conditions is depicted in Table 2

Among the autoimmune hair conditions, Alopecia areata was found in 10 patients (15.8%), and amongst that Ophiasis type alopecia was found in 1 female patient (Figure 1), and also Alopecia universalis was found in 1 patient. There was no significant association between positivity of autoantibodies and hair disorders; alopecia areata ( $P=0.09$ ), telogen effluvium ( $P=0.33$ ), ophiasis type alopecia ( $P=0.35$ ), alopecia universalis ( $P=0.35$ ). These findings are depicted in Table 3. The other associated skin conditions with no known thyroid relation



Figure-1: Ophiasis pattern of alopecia areata in a female patient with hashimoto's thyroiditis



Graph-1: Cutaneous Signs and symptoms and their Incidence (n=63)

Number of patients studied and their percentages in different age group (n=63)*		
Age (in years)	No. of cases	Percentage (%)
21-30	13	20
31-40	18	29
41-50	15	24
51-60	13	21
>60	4	6.3
Total number of patients (n)		

Table-1:

Auto antibodies in autoimmune skin conditions				
Skin disorders	No. of positive anti-TPO	No. of positive anti thyroglobulin	Percentage	P value
Chronic urticaria	04	04	6.3%	0.38
Vitiligo vulgaris	03	03	4.76%	0.46
Lichen planopilaris	1	0	1.5%	0.35
Angioedema	0	0	0	0
Scleroderma	1	0	1.5%	0.35
Disseminated dle	0	0	0	0
All are non significant				

Table-2:

which we noticed in the patients are depicted in Graph 2.

**DISCUSSION**

In this study a female preponderance was observed with female:male ratio of 6.8:1 which is similar to a study done by Dogra et al.<sup>6</sup> The reasons for female preponderance are unclear but may reflect the high level of opportunistic screening carried out as observed by Bonar et al.<sup>7</sup> An additional observation was made by Keen et al in relation to increased number of female patients. It was that females are more prone to autoimmune conditions than males and autoimmunity plays a major role in thyroid disorders.<sup>8</sup>

In our study majority of the patients fell into the age group of 31-40 years (29%) which is in contrast to a study done by Jamwal et al<sup>9</sup> which states that most of the patients who had Autoimmune thyroid Disease (AITD) belonged to the age group between 41-50years. While 30 years and below (20%) and above 60 years (6%) has the least number of patients. Even Khurram et al had similar findings.<sup>10</sup> This suggests the increase in the incidence of hypothyroidism as age advances, though the reduced number of cases in the senile category could be due to majority of doctors dismissing them off as senile skin changes.

In this study, Xerosis constituted the main cutaneous finding. Raised frequency of xerosis were also observed by Jabbour et al too.<sup>11</sup> Hypohidrosis accompanied by cytologic changes within the eccrine apparatus<sup>12</sup> and diminished sebaceous gland secretion have long been considered potential etiologic factors. Diminished epidermal sterol biosynthesis, predominantly cholesterol and its esters, which ends up causing a decrease in the epidermal barrier function<sup>13</sup> that was noted by Heymann W<sup>14</sup> could also contribute towards the appearance of xerosis on skin. This was followed by the complaint that the texture of the skin in 38 of the patients (60%) was found to be pale, cold and wrinkled in appearance. The skin in HT becomes cool, xerotic,

pale and is covered with fine scales which shows resemblance to ichthyosis. The hypothermia and reflex vasoconstriction in the skin induced by the hypometabolic state of the body due to reduced levels of hormones is what causes the cold and pale skin.<sup>6</sup>

Acanthosis nigricans(AN) was noticed in 23 of our patients. In a study by Sturner RA et al<sup>15</sup> a review of 12 patients with AN suggest that the onset may predate a variety of classic autoimmune diseases of which Hashimoto's Thyroiditis has been described one of them.

Localized hyperpigmentation like melasma (15%) were seen in this study. They belonged to the age group of 31-40 years and had been having the disease since 5-10 years. The association with melasma has been well documented by Lufti, et al<sup>16</sup> in their study.

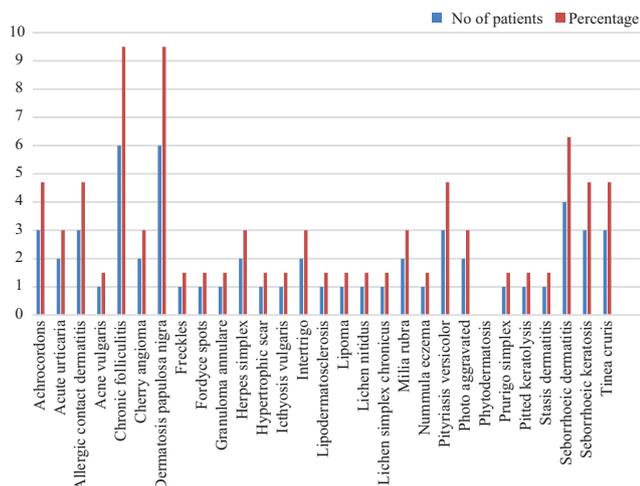
Only 11% of cases in total had Xanthelasma. In a study done by Haritha et al, 1.58% of cases had it<sup>17</sup> In a patient with poorly treated hypothyroidism, it could lead to hypercholesterolemia and hypertriglyceridemia which results in the appearance of xanthelasmas. The raised number of affected patients in this study could be because of the middle age group preponderance where they are prone to an increase in their cholesterol levels as compared to a younger age group.

Generalised myxedema which is a part of Thyroid dermopathy, which is said to be the most characteristic cutaneous sign of hypothyroidism was absent in our study. Similarly, none of the patients had ivory-yellow skin colour or purpura or ecchymosis. These were found to be the least common cutaneous finding of Hashimoto's Thyroiditis in this study.

The most common hair related complaint was of diffuse hair loss which was seen in 42 (66.6%) of our patients. The changes in the telogen:anogen ratio is to be blamed for this finding along with the presence of receptors of the thyroid hormone on the dermal papilla as well as the outer root sheath of the follicle. In comparison to a study done by Razi et al,<sup>18</sup> 59.4% of hypothyroid patients complained of the same as observed by Samson et al.<sup>19</sup> The other Hair changes seen were as dry, coarse, brittle hair (63.4%) and diffuse alopecia were seen in 37 (58.3%). In this study, unilateral madarosis was seen in 30 pts. The eyebrows frequently disappear with loss usually originating laterally (madarosis).<sup>20,21</sup>

The most common nail change seen in our patients was brittle nails, seen in 30pts which was in contrast to the study by Dogra et al., who noticed nail changes in just 6% of their patients. The fragility of the nail were observed in 70% of the patients in a study done by Razi A et al. Slow nail growth, longitudinal ridging, chronic paronychia and soft nails were other common nail changes observed in our patients.

Amongst these patients studied, majority of the patients (58 patients:92%) had positivity for antithyroid peroxidase and 66% were positive for anti-thyroglobulin. This finding was much



**Graph-2:-** Frequency of skin conditions with no known thyroid relation (\*some of the patients had more than one cutaneous findings)

Auto antibodies in autoimmune hair disorders				
Hair disorders	No. of positive anti-TPO	No. of positive anti thyroglobulin	Percentage	P value
Alopecia areata	10	08	15.8%	0.09
Telogen effluvium	02	01	3%	0.33
Ophiasis type	01	01	1.5%	0.35
Alopecia universalis	01	01	1.5%	0.35

**Table-3:**

higher compared to the frequency of AITD observed by Artantas et al (42.7%). He reported 57.1% of hypothyroid patients with AITD. Amongst the skin conditions with a known relation to autoimmunity, the most common condition was chronic urticaria (6.3%). Chronic urticaria which can be idiopathic in nature, 30-50% of them has been reported to be autoimmune in origin of which it could mainly be Hashimoto's thyroiditis,<sup>22,23</sup> and about 80% having positive autoantibodies.<sup>24</sup> But in this study it was observed that 4 of the cases were chronic urticaria and all of them were positive for both the autoantibodies (100%). It is said that chronic urticaria is only an occasional indicator of thyroid disorders and has lot of associations with other autoimmune disorders.

The next associated disease seen was vitiligo (4.7%) of which there were single cases of facial vitiligo and lip-tip vitiligo. One of the hypothesis of the etiology of Vitiligo is that damage to the melanocytes in the skin and mucosa resulting in depigmented macules occurs in relation to autoimmunity. Its seen in about 0.4% of the population with a well-known relation to other autoimmune conditions. The initiation of vitiligo can precede the occurrence of AITD and Hari kumar et al. noticed a 40% increased risk of thyroid condition along with vitiligo.<sup>25,26</sup> In this study it was observed in 6% of the patients and all of them were hypothyroid (100%) and about 83.33% were having positive autoimmunity unlike as reported by Sawicki et al were they observed 12% of these patients as hypothyroid<sup>27</sup> The other noted conditions associated with AITD seen in this study was 1 case of lichen plano pilaris and 1 case of scleroderma.

While observing the hair conditions with autoimmune connection, most in number was alopecia areata (15.8%) of which there were single cases of ophiasis type and universalis type alopecia. 3% of cases had telogen effluvium too. Alopecia areata which is a common condition known to occur in connection with autoimmune conditions, usually is seen in atleast 0.7% - 4% of patients with dermatological complains and atleast 8-28% will have an associated thyroid condition.<sup>28</sup> The autoimmunity occurrence is said to be due to T-cell response to the antigens of the hair follicle.

There were many other non-thyroid associated skin findings observed in patients in this study. Highest number of cases, i.e 9.5% of them had dermatosis papulosa nigra and chronic folliculitis and 4.7% each of patients had seborrheic dermatitis allergic contact dermatitis, tinea cruris, seborrheic keratosis and achrochordon were also seen. Intertrigo, pityriasis versicolor, miliaria rubra, and cherry angiomas were other findings. All these findings were seen along with positive autoimmunity but none were statistically significant.

Similarly, various nail conditions with no known thyroid relation in our study included chronic paronychia which was a finding seen in 6.3% and 1 patient each with tinea unguium, pincer nails, onychorrhexis, and onychoschizia.

In our study, 13% of the patients were found to have Type II Diabetes Mellitus. There are many evidence in literature indicating a contribution of abnormalities of thyroid hormones to type 2 DM. Hypothyroidism have been associated with insulin resistance which has been reported to be the major cause of impaired glucose metabolism in T2DM. These studies document about the complex intertwining biochemical, genetic, and hormonal malfunctions showing the underlying

pathophysiological association.<sup>29</sup>

The limitations of this study were its sample size, which was not large enough to reflect upon as general population. It included the demographic region of North Kerala and Dakshin Kannada which was where most of our patients hailed from.

## CONCLUSION

Various cutaneous manifestations associated with skin, hair and nails, such as xerosis, altered skin texture, diffuse hair loss, coarse hair and brittle nails, are usually not evaluated in-detail. With our study, we attempted to find a possible association between these symptoms and signs and an underlying autoimmune thyroid disorder. Keeping this in mind, a dermatologist can provide an essential link for early evaluation and detection of Hashimoto's thyroiditis for its curative treatment

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