

Original article

Skin findings in thyroid diseases

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Available online 5 August 2008**Abstract**

Background: In cases of thyroid diseases, many of the symptoms arise on the skin. In this study, we aimed to detect and compare the skin findings and accompanying dermatoses of patients with thyroid diseases.

Materials and methods: 220 patients with thyroid diseases, who did not have any medical cure, and 90 healthy individuals as a control group attended our study. All of the cases were examined, and the skin findings and/or dermatoses were recorded. The skin findings in the patients and the control group were compared statistically.

Results: Among 220 cases, in 125 (56.8%) skin findings were detected. The most frequently observed skin findings were chronic urticaria (6.8%), vitiligo (6.8%), diffuse alopecia (6%), acne vulgaris (5%) and acne rosacea (3.6%). No significant difference was detected statistically between the patients and control group in terms of skin findings. When compared for the presence of each dermatosis, chronic urticaria, vitiligo and pruritus were found to be significantly higher in the patient group with thyroid diseases than in the control group. In terms of the presence of skin findings, no statistical difference was detected between autoimmune hyperthyroidism and non-autoimmune hyperthyroidism, between autoimmune hypothyroidism and non-autoimmune hypothyroidism, or between autoimmune euthyroidism and non-autoimmune euthyroidism. Chronic urticaria, vitiligo, and diffuse alopecia were found to be significantly higher in patients with autoimmune thyroid diseases than in the control group. Vitiligo and diffuse alopecia were found to be higher in autoimmune hyperthyroidism patients than in the control group. Vitiligo was found to be significantly higher in autoimmune hypothyroidism patients than in the control group.

Conclusion: To our knowledge, no report investigating the skin findings among thyroid diseases exists in literature. We believe this study would provide data for further studies.

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Keywords: Skin diseases; Thyroid; Vitiligo; Alopecia Areata

1. Introduction

Thyroid disorders have a high prevalence in medical practice; they are associated with a wide range of diseases with which they may or may not share the etiological factors. One of the organs which best shows this wide range of clinical signs is the skin [1]. In thyroid diseases many symptoms arise on the skin and most of these symptoms disappear with the treatment of thyroid disease. Some dermatological skin findings and diseases may be the first symptoms of thyroid diseases [2]. Moreover, autoimmune thyroid diseases are of vital concern to

the dermatologist [3]. In this study, we aimed to detect the skin findings and the accompanying dermatoses in thyroid diseases by examining 220 patients who were recently diagnosed to have thyroid diseases.

2. Materials and methods

Two hundred and twenty consecutive patients with thyroid diseases that had attended our outpatient clinic and had not received any treatment previously were included in our study. Physical examinations of the patients were performed by an endocrinologist. All of the cases were examined for skin findings or dermatoses by the same dermatologist. Levels of free T3, T4, TSH (chemiluminescent microparticle immunoassay — Abbott) and anti thyroglobulin and anti thyroid peroxidase autoantibodies

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(electrochemiluminescence immunoassay — Roche) were checked in the serum. Normal ranges for thyroid hormones and autoantibodies were accepted as follows: free T3: 1.71–3.71 pg/mL, free T4: 0.70–1.48 ng/mL, TSH: 0.35–4.94 IU/mL, anti thyroglobulin autoantibody: 0–34 IU/mL and anti thyroid peroxidase: 0–115 IU/mL. Thyroid ultrasonography was performed in all cases. As a control group, 90 healthy individuals who did not have any thyroid diseases were included. The skin findings of the patients and control group were compared statistically using Fischer's exact test. The skin findings among six groups — autoimmune hyperthyroidism (AH) and non-autoimmune hyperthyroidism (NAH), autoimmune hypothyroidism (Ah) and non-autoimmune hypothyroidism (NAh), autoimmune euthyroidism (AE) and non-autoimmune euthyroidism (NAE) — were also compared.

3. Results

Our study group included 220 patients (175 female, 45 male) with thyroid diseases, who were between the ages of 3 and 72. Median age was 38.59 ± 14.4 . 120 (54.6%) among 220 cases had hyperthyroidism, 47 (21.3%) had hypothyroidism and 53 (24.1%) had euthyroidism. 94 (42.7%) of 220 patients had autoimmune thyroid diseases, and the remaining 126 (57.3%) had non-autoimmune thyroid diseases. 88 (40%) of 220 patients had overt thyroid diseases, and 132 (60%) had subclinical thyroid diseases.

In 125 (56.8%) among 220 patients, at least one case of skin findings was detected. Skin findings were observed in 73 (60.8%) of hyperthyroid cases, in 27 (57.4%) of hypothyroid cases and in 31 (58.5%) of euthyroid cases. No significant difference was detected between these 3 groups in terms of skin findings ($p=0.207$, >0.05).

Skin findings were detected in 58 (61.8%) of autoimmune thyroid (AT) patients and in 67 (53.2%) of non-autoimmune thyroid (NAT) patients. No statistical difference was detected between the NAT and AT patients in terms of the presence of skin findings ($p=0.899$, >0.05) (Table 1).

The most frequently observed skin findings among all patients were chronic urticaria (6.8%), vitiligo (6.8%), diffuse alopecia (6%), acne vulgaris (5%) and acne rosacea (3.6%),

psoriasis (3.2%), pruritus (2.7%), neurodermatitis (2.3%), and xerosis (1.8%).

No significant difference was detected between the patients and control group in terms of the presence of skin findings ($p=0.409$, >0.05). However, when the patients and control group were compared for the presence of each skin disease, chronic urticaria, vitiligo and pruritus were found to be significantly higher in the patient group with thyroid diseases than in the control group (p values respectively: 0.039, 0.039, and 0.039, <0.05).

The skin findings in patients with hyperthyroidism showed no significant difference when compared with the control group ($p=0.65$, >0.05). However, vitiligo and diffuse alopecia were found to be higher in patients with autoimmune hyperthyroidism than in the control group ($p=0.027$ and 0.027) when compared for the presence of each skin disease, while no significant difference was found between patients with NAT disease and the control group ($p=0.193$).

No significant difference was detected between the patients with hypothyroidism and the control group in terms of the presence of skin findings ($p=0.92$, >0.05). However, vitiligo and diffuse alopecia were significantly higher in patients with hypothyroidism than in the control group ($p=0.047$, and 0.047 respectively). Vitiligo was found to be significantly higher in patients with autoimmune hypothyroidism than in the control group ($p=0.011$).

No significant difference was detected between the skin findings in patients with AT diseases and NAT diseases ($p=0.219$, >0.05) and between those with AT diseases and the control group ($p=0.318$, >0.05). However, chronic urticaria, vitiligo, and diffuse alopecia were found to be significantly higher in the autoimmune thyroid patient group than in the control group (p values respectively: 0.006, 0.006, and 0.035, <0.05). No significant difference was found between patients with AH and NAH, Ah and NAh, AE and NAE (p values respectively: 0.432, 0.76, and 0.232, >0.05) (Table 1).

4. Discussion

Thyroid diseases commonly affect the skin. The disorders discussed more frequently are Graves' disease (GD) with orbitopathy and pretibial myxedema and hypothyroidism. However, thyroid disease can also cause multiple changes in the hair, skin and nails [4]. In this study, we aimed to assess the skin findings in thyroid diseases and investigate particularly whether there is difference in skin findings between autoimmune and non-autoimmune thyroid diseases.

In hyperthyroidism, the skin is warm, soft, and smooth. Hyperhidrosis, especially on palms and soles, may be observed. Scalp hair may be fine and soft, and may be accompanied by a diffuse nonscarring alopecia. Patients with hyperthyroidism commonly demonstrate nail changes. Nails may be soft and friable [1–5]. Nail changes such as Plummer's nail and distal onycholysis may also be found, but these changes are not pathognomonic [3,4]. Onycholysis may be observed in psoriasis, trauma, allergic contact dermatitis, and hypothyroidism [6]. Vitiligo occurs in a substantial proportion, and is seen

Table 1
The presence of skin findings in autoimmune and non-autoimmune thyroid diseases.

	Autoimmune (<i>n</i> =94)		Non-autoimmune (<i>n</i> =126)		<i>P</i> *
	Positive skin findings		Positive skin findings		
	<i>n</i>	%	<i>n</i>	%	
Hyperthyroidism	24	63.2	45	54.9	0.432
Hypothyroidism	16	57.1	10	52.6	0.76
Euthyroidism	18	64.3	12	48	0.232
Total	58	61.7	67	53.2	0.899

**p* values are shown in the table: The comparison of the presence of skin findings between AH and NAH, Ah and NAh, AE and NAE, total autoimmune and non-autoimmune thyroid diseases.

especially in Graves' disease, as a marker of the autoimmune disease [3,5,6]. Hyperthyroidism may also induce pruritus with or without urticaria [3]. Patients with GD may also have distinct cutaneous manifestations such as pretibial myxedema and acropachy [6]. Pretibial myxedema is the localized thickening of the pretibial skin due to accumulation of acid mukopolysaccharides. It usually presents with firm nodules and plaques on extensor surfaces and occurs in fewer than 5% of patients with GD [4,7]. Thyroid acropachy consists of the triad of digital clubbing, soft-tissue swelling of the hands and feet, and characteristic periosteal reactions. Thyroid acropachy is a rare manifestation of AT diseases, with an estimated incidence of 0.1% to 1% of patients with GD [8]. In our study, 60.8% of patients with hyperthyroidism were found to have skin findings. The most frequent skin findings that we detected were vitiligo, acne vulgaris, chronic urticaria and pruritus. None of our patients had thyroid acropachy or pretibial myxedema. The skin findings in patients with hyperthyroidism did not reveal significant differences when compared with the control group. However, vitiligo and diffuse alopecia were found to be higher in patients with autoimmune hyperthyroidism than in the control group, while no significant difference was found between those with non-autoimmune thyroid disease and the control group.

Dermatological manifestations of hypothyroidism include thick, dry skin. Scalp hair may be thin, and pubic and axillary hair may be sparse. Diffuse loss of scalp, body and eyebrow hair are well-recognized clinical signs of thyroid deficiency [1–6]. Hair changes manifest as dry, coarse, brittle hair with a tendency to fall out, resulting in diffuse or partial alopecia in hypothyroidism [2,8]. The nails are thin, striated, and brittle. Onycholysis is also associated with hypothyroidism [1–4]. The most frequent skin findings detected in patients with hypothyroidism in our study were vitiligo, diffuse alopecia, chronic urticaria and xerosis. Palmoplantar hyperkeratosis, easy bruising, eruptive and tuberous xanthomas were not detected among our patients. No significant difference was detected between the patients with hypothyroidism and the control group in terms of the presence of skin findings. However, vitiligo and diffuse alopecia were significantly higher in patients with hypothyroidism than in the control group. Vitiligo was found to be significantly higher in patients with autoimmune hypothyroidism than in the control group.

Although there have been published reports investigating the relationship between vitiligo and thyroid autoimmunity, there still exists a debate about the true association [9,10]. Betterle et al. reported a study including 3737 thyroid patients, 373 of whom had vitiligo, and compared them with 1000 patients with non-autoimmune diseases and 822 normal controls, looked for thyroid autoantibodies in serum, and found a significant increase in thyroid autoimmunity in patients with vitiligo compared with normal, but no significant increase when compared with a non-autoimmune control group [11]. Alkhateeb et al. reported a study which included 2624 patients with vitiligo and found a significant increased frequency of thyroid diseases [12]. Consistent with literature, we found vitiligo more frequently in patients with autoimmune thyroid diseases than in the control group. In both

autoimmune hyperthyroidism and autoimmune hypothyroidism patients, vitiligo was found to be higher than in the control group.

An association between diffuse alopecia and thyroid diseases was found in 60% of the cases, mainly of autoimmune origin [1,5,6]. In our study, diffuse alopecia was found to be in 6% among all patients. Diffuse alopecia was found to be significantly higher in both autoimmune hyperthyroidism and autoimmune hypothyroidism patients than in the control group. Our study results also support the relation between autoimmune hyperthyroidism and vitiligo, and diffuse alopecia.

Chronic urticaria (CU) and alopecia areata are the other dermatological diseases that were found to be related to thyroid diseases, particularly with autoimmune diseases [13,14]. Although it is generally accepted that thyroid autoimmunity is more prevalent in patients with CU than in the general population, the importance of this finding is unclear [15]. Verneuil et al. reported a study investigating the association between CU and thyroid autoimmunity, and they found a higher frequency of thyroid autoantibodies in CU, while no significant frequency of CU was found in patients with/without thyroid antibodies in thyroid diseases [16]. Our results revealed that CU was seen more frequently in patients with thyroid diseases and in patients with autoimmune thyroid diseases than in the control group. However, no significant difference was detected in the frequency of CU between autoimmune thyroid and non-autoimmune thyroid diseases.

We think that acne vulgaris, rosacea, psoriasis and the other findings with lower ratios that we observed in patients with thyroid diseases in our study were coincidental.

As a conclusion, many cutaneous manifestations can be caused by an underlying thyroid disorder, and dermatologists commonly see skin lesions that reflect an underlying thyroid disease. An optimal approach should rely on an understanding of the pathophysiology, early recognition of the thyroid and cutaneous disorders. Although there exist many studies investigating thyroid functions and diseases in cutaneous disorders [10,12–14,16], to our knowledge, no report investigating the opposite association exists. Moreover, there exists no report studying and comparing the skin findings between autoimmune and non-autoimmune thyroid diseases. Our report is an attempt to update the current knowledge about the relationship between the thyroid and the skin diseases. We believe our report would add a new aspect to further studies.

5. Learning points

- Thyroid disorders are associated with a wide range of disorders.
- One of the diseases with which they have an association is skin disease.
- Dermatologists may commonly see skin lesions that reflect an underlying thyroid disease.
- Most commonly reported cutaneous disorders related with thyroid diseases are vitiligo, alopecia areata, urticaria, which have especially autoimmune etiology.
- There is convincing evidence of a significant association between thyroid autoimmunity and skin disorders.

- In our study, chronic urticaria, vitiligo and diffuse alopecia were found to be higher in autoimmune thyroid diseases when compared with the control group.
- Although there have been reports investigating the thyroid function tests, autoantibodies and thyroid diseases in various cutaneous disorders, no report has been found investigating the presence of cutaneous manifestations in thyroid diseases.

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