

A Study on association between Vitiligo and Thyroid Dysfunction

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Abstract:

Background: Vitiligo is a depigmenting disorder characterized by the loss of melanocytes. Thyroid functional disorders and autoimmune thyroid diseases have been reported in association with vitiligo. This study was thus conducted to find out any association of vitiligo with thyroid dysfunction.

Methodology: This study was conducted at the Dermatology Department of a teaching medical college. This case-control study included 100 new cases of various types of vitiligo and 100 age and sex matched healthy controls. Serum samples from both patients and controls were collected and assayed for triiodothyronine (T3), thyroxine (T4), thyroid stimulating hormone (TSH) and anti-TPO antibodies. Statistical comparisons were performed using Chi-square test.

Results: Forty two patients had focal vitiligo, 20 had segmental vitiligo, 13 had acrofacial vitiligo and 25 had generalized vitiligo. Thyroid hormonal profile revealed a statistically significant relationship between hypothyroidism and vitiligo as hypothyroidism was seen in 28 (28%) vitiligo patients and six controls (6%) ($p < 0.05$). Antithyroid peroxidase antibodies were present in 19 cases as compared to two controls. Thus, out of twenty eight vitiligo cases with hypothyroidism 19 cases had positive thyroid antibody, which was statistically significant ($p < 0.05$) in comparison to controls with hypothyroidism with positive thyroid antibody.

Conclusion: Considering the fact that vitiligo usually precedes the onset of thyroid dysfunction, periodic follow-up of vitiligo patients for detecting thyroid diseases is further emphasized especially in patients with increased level of anti-TPO.

Keywords: Vitiligo, Thyroid dysfunction, Anti TPO antibodies

I. Introduction

Vitiligo is a depigmenting disorder characterized by the loss of melanocytes from the cutaneous epidermis. Although the exact cause of the condition remains to be established, an autoimmune aetiology has been suggested and several observations support this theory. Many studies from abroad have described an association of vitiligo with other autoimmune disorders such as thyroid disease (Hashimoto's thyroiditis and Graves' disease), Addison's disease, pernicious anemia, insulin – dependent diabetes mellitus and alopecia areata.^{1,2,3} Thyroid functional disorders and autoimmune thyroid diseases have been reported in association with vitiligo and it seems that the incidence of clinical and subclinical thyroid involvement is more common in vitiligo patients than healthy subjects.⁴ In India however, few studies have focused on the association of autoimmune thyroid dysfunction with vitiligo. This study was thus conducted to find out any association of vitiligo with thyroid dysfunction in patients attending the dermatology OPD of a teaching hospital of Kolkata, India.

II. Materials and Methods

This study was conducted at the Dermatology Department of a teaching medical college between January and December 2014. The study was approved by the Institutional Ethics Committee. This case-control study included 100 new cases of various types of vitiligo attending the above center over the 12-month period. The control group comprised 100 age and sex-matched healthy outpatients relatives. Subjects having following conditions was excluded from the study-

i) known thyroid disease, history of thyroid surgery & those receiving thyroid medications. ii) White patches due to skin trauma, burn iii) Other autoimmune disorder like Rheumatoid arthritis, SLE, Psoriasis iv) Exposure to certain chemicals like phenolic or catecholic derivatives. Written informed consent from all patients and

controls was obtained prior to the study. In all patients, a complete history was taken including age of onset, duration, family history of vitiligo. The diagnosis of vitiligo was made on clinical grounds. A thorough dermatological examination was done and an approximate percentage of the body surface involved was calculated using the "rule of nine". All the vitiligo patients were classified into four groups: focal, segmental, acrofacial and generalized vitiligo. For statistical analysis, focal and segmental vitiligo were considered under localized vitiligo whereas acrofacial and generalized vitiligo were considered under generalized vitiligo. A complete general examination and clinical examination of the thyroid gland was done in all cases and controls.

Serum samples from both patients and controls were collected and assayed for triiodothyronine (T3), thyroxine (T4), thyroid stimulating hormone (TSH) and anti-TPO antibodies. The normal range for serum T3 was 70-200 ng/dl, for serum T4 was 5-13 ng/dl and for serum TSH was 0.5-5 micro U/ml. A diagnosis of hypothyroidism was made when thyroid function tests showed a raised TSH with or without low T3/T4 levels. Hyperthyroidism was diagnosed if T3/T4 levels were raised with associated lowered levels of TSH. Antithyroid antibodies were assayed by enzyme-linked immunosorbent assay using commercial kits. Numerical and graphical techniques have been used to summarize and present the quantitative data of this study. Statistical comparisons were performed using Chi-square test. Data were considered statistically significant at $p < 0.05$.

III. Results

We performed this study in 100 consecutive patients with vitiligo and 100 age- and sex-matched controls. Demographic data of patients and controls are shown in Table 1. Out of the 100 vitiligo patients, 54 were males and 46 were females. The mean (SD) age of the patient and control groups was 35.96 (± 10.01) and 36.02 (± 10.18), respectively. Some of the clinical findings of vitiligo patients are presented in Table 2. Mean age of onset of vitiligo was about 34.12 (± 11.69). The duration of the disease ranged from 3 months to 282 months with a mean duration of 4.4 years (SD = 1.10 years). Forty two patients had focal vitiligo, 20 had segmental vitiligo, 13 had acrofacial vitiligo and 25 had generalized vitiligo.

Thyroid hormonal profile revealed a statistically significant relationship between hypothyroidism and vitiligo as hypothyroidism was seen in 28 (28%) vitiligo patients and six controls (6%) ($p < 0.05$) [Table 3]. Antithyroid peroxidase antibodies were present in 19 cases as compared to two controls [Figure 1]. Thus, out of twenty eight vitiligo cases with hypothyroidism 19 cases had positive thyroid antibody, which was statistically significant ($p < 0.05$) in comparison to controls with hypothyroidism with positive thyroid antibody [Table 4]. Hyperthyroidism was not detected in any of the cases or controls.

IV. Discussion

This study revealed a significant association between vitiligo and thyroid autoimmunity. Pathogenesis of vitiligo involves complex genetic, immunological, neural and self-destructive mechanisms.⁵ Higher prevalence of vitiligo in patients with autoimmune diseases (10-15%) in comparison with the general population (1-2%) and high prevalence of autoantibodies to melanocytes in the serum of patients with vitiligo support the autoimmune hypothesis.^{6,7} The majority of vitiligo patients are healthy and have no associated pathology, but it is well-known that vitiligo is frequently associated with other autoimmune disorders such as thyroid dysfunction, Addison's disease, insulin – dependent diabetes mellitus, alopecia areata etc.^{8,9,10,11}

In our study, though none of the cases had specific clinical signs of thyroid disease, autoimmune thyroid dysfunction manifesting as hypothyroidism occurred in 28 (28%) vitiligo patients and in six out of 100 controls, this difference being statistically significant ($p < 0.05$). Similar higher prevalence of hypothyroidism resulting from autoimmune thyroiditis in vitiligo patients has been reported by Kumar et al. (40%), Akay et al. (31%) and Iacovelli et al. (16%) though a lower occurrence was noted by Narita et al. and Handa and Kaur.^{3,12,13,14,15}

In accordance to previous studies, we also demonstrated that antithyroid autoantibodies were significantly increased in vitiligo patients in comparison to healthy subjects. We detected elevated anti-TPO in 19 (19%) of patients with vitiligo. Compared with the control group, the frequency of anti-TPO antibodies was significantly higher in those with vitiligo. Our results are consistent with a clinical study performed by Sedighe and Gholamhossein.¹¹ Daneshpazhooch and colleagues measured only the serum level of anti-TPO antibody and reported significantly high levels in vitiligo patients compared to healthy controls.¹⁶ Vitiligo frequently precedes the thyroid involvement, thus screening vitiligo patients for thyroid antibody seems plausible.

All the above findings establish a clear association between vitiligo and autoimmune hypothyroidism. Gene expression studies and genomic analysis of families with generalized vitiligo and associated autoimmune disorders will be important in shedding light on the mechanisms of vitiligo pathogenesis. These studies will in turn provide novel approaches to the prevention and treatment of vitiligo and associated autoimmune diseases.^{9,17} We suggest that all patients with vitiligo should be routinely subjected to thyroid screening as the diagnosis of autoimmune thyroiditis is important to avoid the negative impact of hypothyroidism on health status. Prompt intervention in all detected cases will prevent long-term morbidity and complications. More

Indian studies with a larger sample size will shed further light on the association of hypothyroidism in vitiligo patients.

V. Conclusion

According to our study, vitiligo patients had significantly higher level of anti-TPO in comparison to the control group. Considering the fact that vitiligo usually precedes the onset of thyroid dysfunction, and anti-TPO being a sensitive tool for the detection of autoimmune thyroid disorders including Graves' disease and Hashimoto thyroiditis, periodic follow-up of vitiligo patients for detecting thyroid diseases is further emphasized especially in patients with increased level of anti-TPO.

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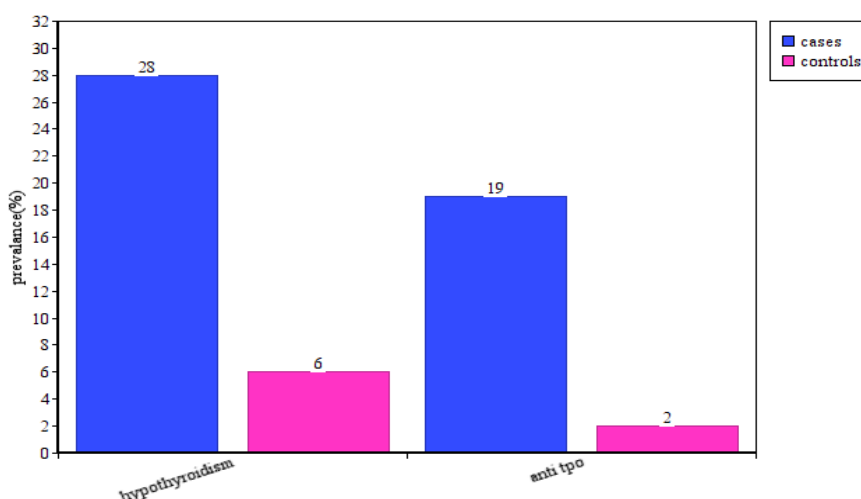


Figure 1: Prevalence of hypothyroidism, thyroid antibody positivity in vitiligo patients and controls.

Table-1 : Demographic data of patients (Vitiligo group) and volunteers (Control group).

	Vitiligo group (%)	Control group (%)
Men, (%)	54(54)	54(54)
Women, (%)	46(46)	46(46)
Age range, years	15-57	15-62
Age, mean years (SD)	35.96(10.01)	36.02(10.18)

Table-2 : Clinical characteristics of patients with vitiligo.

Mean age of onset (SD) (year)	34.12(11.69)
Age of onset range (year)	14-56
Mean duration (SD) (month)	52.44(22.12)
Duration Range (month)	3- 282
Type of vitiligo (%)	
Generalized	38(38)
Localized	62(62)

Table-3 : Hypothyroidism in vitiligo patients and controls

subjects	No of subjects examined	Patients having hypothyroidism		% of having total
		males	females	
hypothyroidism				
Cases	100	10	18	28
Controls	100	2	4	6

(p< 0.05)

Table-4: Frequency of thyroid autoantibodies in the study group.

Anti-TPO (threshold value 34 IU/mL)

Group	Negative (%)	Positive (%)
Vitiligo	81(81)	19(19)
Control	98(99)	2(2)
Total	179(89.5)	21(10.5)
Difference		17(17)

(p< 0.05)