Original Research Article

Thyroid abnormality in hilly children with vitiligo: A case control study

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Abstract

Background: Vitiligo is a common disorder causing depigmentation of the skin affecting patient's quality of life. Various autoimmune disorders accompany vitiligo; this study was done to determine the prevalence of thyroid abnormality in children with vitiligo and compared with controls in this part of India.

Materials and methods: Forty five children, suffering from non-segmental vitiligo, less than 16 years old and 60 healthy children were enrolled as cases and controls, respectively. Serum levels of Thyroid stimulating hormone (TSH), Free triodothyronine (fT3), Free thyroxine (fT4) and Anti-TPO antibody were accessed and compared with controls.

Results: In both the groups, females outnumbered males. Thyroid function tests and thyroid autoantibodies abnormality were found in 15 (33.3%) cases. In controls, 8 (13.33%) children had increased TSH. The difference in both groups for thyroid function abnormality was significant (P= 0.0142).

Conclusion: There is significant incidence of thyroid disease in children with vitiligo and hence they should be screened for thyroid function tests.

Key words

Thyroid profile, Thyroid stimulating hormone, Anti-Thyro Peroxidase, Vitiligo, Children.

Introduction

Vitiligo is a common depigmenting, often heritable and acquired cutaneous disorder characterized by well circumscribed hypopigmented and depigmented macules and patches [1]. It affects 0.1-2% of the world population and both sexes are equally affected [2]. Vitiligo may present anytime in life but childhood vitiligo deserve special attention as

50% of the disease onset is before 20 years of the age and starts before the age of 10 years in 25% of cases [3, 4].

Among various theories regarding pathogenesis of vitiligo, autoimmunity is the most plausible and it is based on the association of vitiligo with known autoimmune disorders and presence of specific autoantibodies in affected person [5].

Vitiligo is frequently associated with Hoshimoto thyroiditis, Addison's disease, Pernicious anemia, Diabetes mellitus type 1, Alopecia areata, Systemic Lupus Erythematosus and others [6]. Autoimmune thyroid diseases frequently accompany vitiligo and as per literature, prevalence upto 20.8% has been noted [7]. In India, a prevalence of 31.4% has been reported for the same [8]. Hence, we did the study to determine the prevalence of thyroid abnormality in children with vitiligo as compared with controls in this part of India.

Materials and methods

We conducted a case control study to determine the prevalence of thyroid function abnormality and anti-thyro Peroxidase (TPO) positivity in children with vitiligo and to compare the thyroid function abnormality in vitiligo in healthy children. For cases, we enrolled 45 children less than 16 years old attending the Dermatology OPD in a tertiary care centre in Dehradun from November 2015 to November 2017, after taking informed consent from the parents. The diagnosis of vitiligo was confirmed by Wood's lamp examination. Patients who had other conditions with depigmentation such as albinism, achromic naevus, segmental vitiligo and other causes of leukoderma were excluded. Also the patients with known thyroid disease, on thyroid supplementation therapy or antithyroid medications and those who did not provide informed consent were excluded from the study. For controls, we included the age matched 60 healthy children coming to paediatric OPD for routine checkup from schools attached to our trust. We included only those children who were not having any type of leukoderma in present or past and those not having history of vitiligo in first and second degree relatives. All the subjects in two groups underwent the complete skin and thyroid examination along with detail medical history taking. Venous blood was collected under aseptic conditions and sent to the central lab to access the serum level of Thyroid stimulating hormone (TSH), Free triodothyronine (fT3) and Free thyroxine (fT4). Anti-TPO levels were accessed only in case group due to the cost constraints.

Results

A total of 45 paediatric patients with age less than 16 years were enrolled in the study out of which 19 were males and 26 were females with female: male sex ratio of 1.37:1. Age of the patients ranged from 0.5-15.6 years with mean age of 7.14 ± 4.43. Age of onset of disease ranged from 0.2-14 years with mean age of onset of 4.98 ± 3.5. Duration of disease onset was found to be 0-9.8 years with mean of 2.15 ± 2.14. Out of 45 patients, 4 patients were having generalised presentation, 15 were having localised progressive and 24 were having localised stable form (**Table - 1** and **Table - 2**).

Table - 1: Clinical characteristics of vitiligo patients; Original.

Parameters	**No. of patients**
Age range (years)	0-16
Mean age (± SD, years)	7.14 ± 4.43
Males: Females	1.34:1
Age groups (years)	
0- 3.9	12
4- 7.9	14
8- 11.9	8
12- 15.9	11
Mean age of onset of disease (± SD, years)	4.98 ± 3.5
Mean duration (years)	2.15 ± 2.14
Types of vitiligo	
Generalised	5
Localised progressive	15
Localised Stable	25

Table - 2: Age-wise distribution of paediatric patients with thyroid profile; Original (TSH: Thyroid Stimulating Hormone, fT3: Free triodothyronine, fT4: Free thyroxine, TPO Ab: Thyro Peroxidase Antibody)

Age group (years)	No. of patients			
	TSH abnormality	fT3	fT4	TPO
0-3.9	3	1	0	0
4- 7.9	3	1	1	2
8- 11.9	1	0	1	1
12- 15.9	3	0	2	2
Total	10	2	4	5

Table - 3: Gender distribution of paediatric patients with thyroid profile; Original (TSH: Thyroid Stimulating Hormone, fT3: Free triodothyronine, fT4: Free thyroxine, TPO Ab: Thyro Peroxidase Antibody)

Gender	No. of patients			
	TSH abnormality	fT3	fT4	TPO Ab
Males	4	0	2	2
Females	6	2	3	3
Total	10	2	5	5

Table - 4: Differences between cases and controls; Original (TSH: Thyroid Stimulating Hormone, fT3: Free triodothyronine, fT4: Free thyroxine, TPO Ab: Thyro Peroxidase Antibody)

	No. of patients			
	TSH abnormality	fT3	fT4	TPO Ab
Cases	10	2	4	5
Controls	8	0	2	0

Thyroid function tests and thyroid autoantibodies abnormality were found in 15 (33.3%) patients. TSH abnormality was found in 10 (22.22%) patients, out of which 4 (8.8%) were males and 6 (13.33%) were females. Free T4 abnormality was found in 5 (11.11%) patients out of which 2 were male and 3 were females. Free T3 abnormality was seen in only 2 (4.44%) patients, both were females. TPO Antibodies (TPOAb) positivity was found in 5 (11.11%) patients, which included 2 male (4.44%) and 3 (6.66%) females (**Table - 3**). Of the 15 patients in whom thyroid function test and/or antibodies were abnormal, only 6 (13.33%) had high TSH levels and normal free T3 and T4 level and classified as subclinical hypothyroidism. FT4 abnormality was seen in 5 (11.11%) patients. Out of 5, 1 (2.2%) patient had high levels of FT3 and THS and was evaluated as hyperthyroidism. In 1 (2.2%) patient, both T4 and T3 were decreased while TSH was increased and in 2 (4.44%) patients, FT4 was decreased and TSH was increased and evaluated as hypothyroidism. In 1 (2.22%) patient, FT4 was decreased along with positive TPOAb and normal TSH and this patient was evaluated as autoimmune thyroiditis and hypothyroidism. TPOAb positivity was seen in total 5(11.11%). Out of 5, in 1(2.22%), FT4 levels was also low, while in 2(4.44%) patients, TSH levels were increased and were evaluated as subclinical hypothyroidism with autoimmune thyroiditis. In 2 (94.44%) patients, only TPOAb was positive and they were evaluated as autoimmune thyroiditis.

In our study, subclinical hypothyroidism was the most frequent diagnosis established in 9 patients out of total 45 patients with vitiligo.

In controls, the age range was 0.5 to 16 years with the mean of 8.1. Out of 60 patients 27 (45%) were males and 33 (55%) were females with a female to male ratio of 1.2:1. From 60 controls, 8 (13.33%) children had increased TSH levels, which included 3 males and 5 females. In 5 (8.33%) children, only TSH levels were raised, while in 2 (3.33%) FT4 was also decreased (**Table - 4**).

There was no statistically significant difference in thyroid function abnormality with respect to age (P= 0.2859) and between males and females patients (P= 0.8310). However, the difference in case and control groups for thyroid function abnormality was significant (P= 0.0142).

Discussion

Vitiligo affects both sexes equally, but due to cosmetic reasons, women often visit the doctors more frequently. In our study, females were more than males with ratio of 1.34:1. Many studies published earlier have suggested the involvement of females more common than males in vitiligo, as it is an autoimmune disease. Also due to cosmetic reasons, women more frequently visit the doctor [9, 10]. The mean age of onset of disease in our study was 4.98±3.5. Vitiligo has been reported to start between 8 to 10 years of age in 51% of the children [11]. The maximum patients were in the age group of 4-7.9 years whereas 45.5% of the children with vitiligo were in between 6 and 10 years of age [10]. The mean duration of the disease onset was 2.15± 2.14 years.

In paediatric patients with vitiligo, a significant incidence of thyroid dysfunction has been found. In our study, a total of 15 (33.3%) patients were having abnormal thyroid function abnormalities, which is little higher than the study conducted by Afsar, et al., where 25.3% of children experienced thyroid dysfunction [10]. Iacovelli, et al. reported a figure of 10.7% in children with non-segmental vitiligo, especially in females, all of whom had thyroid dysfunction [12].

Subclinical hypothyroidism is characterized by an elevated serum TSH level associated with a normal total or free T4 and T3 values [13]. The prevalence of subclinical hypothyroidism is considered to be <2% in the paediatric age group [14].

In our study, 6 (13.33%) patients were classified as subclinical hypothyroidism which is higher than reported in other studies with <2% and 4.1% of the paediatric patients with subclinical hypothyroidism [14, 15]. Our results are almost consistent with the study conducted by Afsar, et al., where 10 (12.6%) paediatric patients were evaluated as subclinical hypothyroidism [10]. Our 4.44% patients diagnosed with subclinical hypothyroidism were diagnosed with autoimmune thyroiditis. These results are comparable to the findings by Xianfeng C, et al. [15]. Although subclinical hypothyroidism is a laboratory diagnosis with no significant findings or symptoms in patients, studies have demonstrated the development of overt hypothyroidism at a rate of 5- 20% per year, especially in autoimmune thyroiditis [16].

TPOAb positivity was found in 11.11% patients similar to Yang, et al. (11.8%) [17] whereas Afsar, et al. have reported in 25.3% of the patients [10]. In a study of children and adolescents with vitiligo, Hashimoto thyroiditis was found to be two and a half times and hypothyroidism ten times more frequent than in a healthy age and sex matched population and 24.1% of these 54 patients with vitiligo had autoimmune thyroiditis as compared to 9.6% of school aged children from an iodine replete area of Greece [18]. The occurrence of Graves' disease and vitiligo in young children in a study conducted by Prindaville, et al. further supports the notion that the nature of the autoimmune disorder in the young population differs from that seen in older children [19].

Conclusion

The thyroid abnormality with prevalence of 33.3% determined in our study is compatible

with the literature attracting attention to the association of thyroid disease and vitiligo in childhood. As the studies published earlier reported the risk of developing overt hypothyroidism is high in patients with subclinical hypothyroidism, the thyroid function tests and thyroid autoantibodies should be analyzed in children with vitiligo. Overall, our observations of a significant incidence of thyroid disease in children with vitiligo shows that children with vitiligo should be screened for thyroid function tests.

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