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Dermatology

A PROSPECTIVE STUDY OF SERUM T3, T4 LEVELS AND ANTITHYROID PEROXIDASE ANTIBODIES IN ALOPECIA AREATA PATIENTS IN A TERTIARY CARE CENTER AT KARAIKAL,PUDUCHERRY.

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ABSTRACT **Background:** Alopecia areata (AA) is a common, recurrent form of non-scarring alopecia which often presents as circumscribed patches of spontaneous hair loss. The global prevalence of this disease varies from 0.1% to 0.2% in general population and 7–30 cases per 1000 dermatological patients. The etiology of AA still remains uncertain; however; genetic , environmental factor or autoimmunity are claimed responsible for it. Various autoimmune diseases, such as Hashimoto's thyroiditis, diabetes mellitus, vitiligo, and lupus erythematosus, have been reported in association with AA. **Aim:** The index study was aimed at estimation of serum T3, T4, thyroid-stimulating hormone, and antithyroid peroxidase (TPO) antibodies in Alopecia Areata patients. **Material and Methods:** Similar age/sex-matched AA patients and controls (60 in each group) were included. Enhanced chemiluminescence immunoassay for thyroid profile and anti-TPO antibody level estimation in venous blood sample were performed. **Observations:** The mean/standard deviation (SD) of T3 was 3.30 ± 0.84 pg/ml in AA while 3.27 ± 0.67 pg/ml in controls (P = 0.302). Serum mean/SD of T4 level was1.23 ± 0.76 ng/dl in AA patients while 1.17 ± 0.34 ng/dl in controls (P = 0.522). The mean/SD of anti-TPO levels in AA patients was 21.52 ± 35.09 while 56.43 ± 140.72 in controls (P = 0.136). Limitation: The limitation of this study was moderate number of AA patients and different genotype of study population. **Conclusion:** Occurrence of thyroid dysfunction and evidence of anti-TPO antibodies in AA is rare event in this study population

KEYWORDS : Alopecia Areata, Thyroid, AutoImmune

INTRODUCTION:

The word "alopecia areata" (AA) was introduced by Sauvages in his "Nosologica Medica" published in1760, in France. It is a common form of nonscarring, chronic alopecia which often presents as circumscribed patches of hair loss at scalp, beard, moustache, or body.[1] Occasionally, it may lead to diffuse, total, ophiasis or universal baldness. In a population study of AA from Olmsted County, Minnesota, USA, the incidence was 0.1%–0.2% with a projected lifetime risk of 1.7%.[2] Its etiology is multifactoral, where genetic [3],[4] or environmental [5] and autoimmune hypotheses are prevailing.[6],[7] Current evidence indicate that AA is caused by a T-cell-mediated autoimmune mechanism.[8],[9] Various autoimmune disorders, such as Hashimoto's thyroiditis,[10],[11] diabetes mellitus, vitiligo, and systemic lupus erythematosus, have been reported with AA.[12],[13] Hence, the index case–control study was conducted to observe any correlation between AA and serum T3, T4, thyroid-stimulating hormone (TSH), and antithyroid peroxidase (TPO) antibodies in the sera.

MATERIALS AND METHODS

Study design

This was a hospital-based observational analysis.

Study duration

This study was conducted from June 2019 to December 2019.

Sample size

A total of 60 cases of clinically diagnosed AA and 60 persons of other dermatoses (without any known immunological disorders) were subjected to serum T3, T4, TSH, and anti-TPO antibody estimation. Written informed consent from every AA case and control was taken. The college Ethical Committee's permission was also taken before starting the study.

Sampling method

Blood samples from antecubital vein of every selected AA case and control were collected in sterilized vial, taking all aseptic precautions. The blood samples were kept at room temperature for 1 h. Then, sera were separated using test tubes and rotated in a centrifuge machine at 3000 rpm for 30 s.

These sera were then subjected to enhanced chemiluminescence immunoassay -(real-time polymerase chain reaction technique) for estimation of T3, T4, TSH, and anti-TPO antibodies. Important tests, such as hemogram, blood sugar, venereal disease research laboratory, and antinuclear antibody test, were performed to exclude possibility of any other diseases.

Statistical method

Continuous data were summarized in the form of mean and standard deviation. The differences in mean were analyzed using Student's t-test. Count data were expressed in the form of proportion. The difference in proportion was analyzed using "Chi-square test." The level of significance was kept 95% for all statistical analysis.

Statistical analysis was performed with SPSS trial version 20 for Windows statistical software package (SPSS Inc., Chicago, IL, USA). The test normality was done by Kolmogorov–Smirnov test. The categorical data were compared as percentage and were compared among groups using "Chi-square" test. The differences among groups were analyzed using "Student's t-test." Probability P < 0.05 was considered statistical significant.

RESULTS

The age-wise distribution of AA patients indicated highest percentage among 21–30 years' age group (21, 35%), while in controls, it was (26, 43.3%) patients . The mean age of AA patients and controls was 23.64 ± 11.2 and 24.78 ± 10.51 years, respectively. It showed insignificant age difference among both groups (P = 0.270). However, any age may be affected by AA, with a peak between the second and fourth decades.

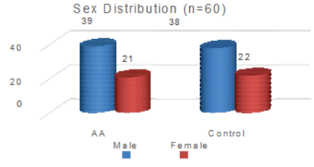


Fig 1:Sex Distribution

The sex distribution indicated male predominance among AA patients (39, 65%) and in controls (38, 58.3%) (P = 0.270). The students were predominantly affected in both groups (AA patients were 31, 51.6% while controls were 29, 48.3%, respectively). However, all occupational groups may be affected.

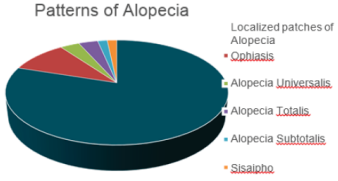
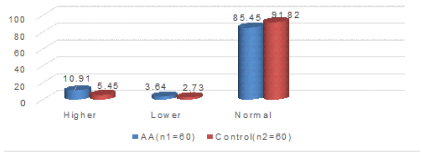


Fig 2:Patterns of Alopecia

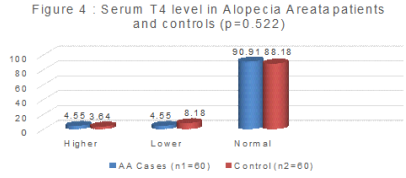
The family history of atopy was evident in 12 (20%) AA patients while in 6 (10%) controls. Atopic disease, especially atopic eczema, is also a common association with AA. Majority of AA patients (48, 80%) evidenced localized patches of alopecia, while majority of controls (50, 83.3%) had acne vulgaris. Other variants of AA patients evidenced ophiasis in 6, diffuse hair loss in [7] alopecia universalis in 2, totalis in 2, subtotalis in 1 and sisaipho in 1 case, respectively. Nail pitting in AA patients was an additional finding in 24 cases (40%).

Figure 3: Insignificant Difference in T3 level in Alopecia Areata patients and controls (p=0.302)



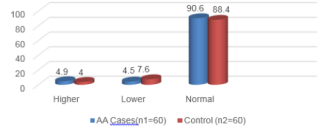
The mean serum T3 level in AA patients was 3.30 ± 0.84 pg/ml with the range of 1.8–4.2 pg/ml, while in controls, it was 3.27 ± 0.67 pg/ml [P = 0.302].

Figure 4 : Serum T4 level in Alopecia Areata patients and controls (p=0.522)



The mean of serum T4 level in AA group was 1.23 ± 0.76 ng/dl, while in controls, it was 1.17 ± 0.34 ng/dl (P = 0.522) .

Figure 5: Distribution of antithyroid peroxidase antibody levels in alopecia areata cases and controls (*P* = 0.139)



The mean anti- TPO level in AA patients was 21.52 ± 35.09 IU/ml, while in control group, it was 56.43 ± 240.72 IU/ml [P = 0.176].

DISCUSSION:

AA is a common, recurrent form of nonscarring hair loss.[1] The global statistic reports show its incidence 0.1%–0.2% in general population, with lifetime risk 1.7.[2] In the index study, the incidence of AA was 0.07% The majority of AA patients (52%) and controls (63.2%) in this study were in the age group of 11–30 years. The mean age of AA patients was 24.3 years, while in controls, it was 25.2 years. It indicates that AA affects predominantly young persons, just like other previous studies.[16] It may be because of the fact that AA preferably affects pigmented hair and graying of hair usually starts at 35 years.[17],[18] However, many authors have reported its peak at the third to fourth decade.[19],[20],[21]

The sex distribution of AA patients is often equal in both the genders.[20],[21] However, Sharma et al.[22] reported male preponderance. The index study also showed male preponderance.

Besides genetic predisposition [3],[4] and autoimmunity,[12],[13],[14],[15] psychological stress [18] may play important role in the pathogenesis of AA. It is also indicated in the index study which showed that majority of AA patients were students. There is a complex correlation of stress and AA. Probably, sympathetic system stimulation and substance P secretion during stress of study and job, the vascular supply to scalp hair may be altered or there is an alteration of hair cycle which ultimately leads to hair loss.[18]

Patch(es) over the scalp is the most common form of involvement in AA,[20],[21],[22],[23] which was also substantiated in the index study also (48, 80% patients). However, certain uncommon forms, such as diffuse alopecia (two cases), ophiasis/sisaipho (seven cases), total/subtotal alopecia (three cases) and universal alopecia (two cases), were also reported. Beard and moustache were also involved in some cases. Various authors have also reported uncommon forms of AA.[14],[24] The National Alopecia Areata Foundation Committee has devised "Severity of Alopecia Tool Score."[23] Occasionally, nails may be affected in AA in the form of fine/coarse pitting and dystrophy of nail plates. Similarly, the index study has also reported nail pitting in 40% AA patients.

The severity of AA may depend on family/personal history [25],[26],[27] of atopy, autoimmune disorders such as Hashimoto's thyroiditis, vitiligo, pernicious anemia, diabetes mellitus, lupus erythematosus, and other diseases.[24],[28],[29],[30],[31]

Serum T3 and T4 levels were reported to be similar in AA cases and controls in index study (P = 0.302 and 0.522, respectively)[Figure 1 & 2]. However, Ahmed et al. have reported thyroid dysfunction in AA patients (hypothyroidism in 8.9% and hyperthyroidism in 1%). Rahnama Z et al.[32] have also reported insignificant difference of thyroid disorders in AA cases and controls.

Bakry et al. have concluded that most of AA patients screened for thyroid functions may show thyroid autoantibodies in the absence of clinical manifestations of thyroid affection. The anti- TPO antibodies were found to be insignificant in AA patients and controls in index study. It may be because the herd population in this geographical area which may not have high prevalence of autoimmunity. However, Sharma et al.[22] and others have also detected antithyroid antibodies in AA patients.[32] Seyrafi et al.[33] conducted a retrospective analysis over 123 AA patients. Thyroid function abnormalities were found in 8.9% of patients. Positive autoantibodies were associated in 51.4% patients; however, insignificant correlation was found between severity and duration of AA and the titer of antibodies.

Kasumagic-Halilovic [34] conducted a study on seventy AA patients and thirty healthy volunteers. He reported thyroid dysfunction in 8 (11.4%) patients. Positive autoantibodies were associated in 18 (25.7%) patients only. The frequency of thyroid autoantibodies was significantly higher than controls (P < 0.05%).

CONCLUSION:

We found insignificant correlation between Serum T3 ,T4 levels and anti-TPO antibody levels in Alopecia Areata patients.

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