Original Research Article

Metabolic syndrome in alopecia areata: an observational study at a tertiary care center

Subrata Kumar Das[1]*, Saptadipa Das[2]

[1]Department of Dermatology, [2]Department of Medicine, Sikkim Manipal Institute of Medical Sciences, Gangtok, Sikkim, India

*Correspondence:
Dr. Subrata Kumar Das,
E-mail: subha607@gmail.com

ABSTRACT

Background: The aim was to evaluate the parameters of metabolic syndrome (MS) in patients of alopecia areata and to investigate the possibility of an existing relationship between MS and alopecia areata (AA).
Methods: This cross-sectional observational study included 50 patients with AA who attended OPD of department of dermatology at a tertiary care center during a period of 1 year. Clinical and laboratory parameters were noted in each patient.
Results: This study included 50 patients with AA (33 males and 17 females). In the present study maximum number of patients belonged to the age group 20-30 years with 23 patients, followed by 30-40 years with 17 patients. Most of the study subjects, 17 were college students and number of employees were 15. Out of 50 patients 44 had patch(es) and 2 patient had alopecia totalis. In this study out of 50 patients, 38 had mild AA, 7 had AA and 5 patients had severe AA. No significant derangement of clinical and laboratory parameters of MS observed in patients of AA.
Conclusions: In the present study we did not observe any significant derangement of clinical and laboratory parameters of MS in patients of alopecia areata.

Keywords: Alopecia areata, Metabolic syndrome, Low-density lipoprotein

INTRODUCTION

The word alopecia areata (AA) was introduced by Sauvages in his Nosologica Medica published in 1760, 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 or environmental and autoimmune hypotheses are prevailing.[3-7] 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.[10-13]

Recently, some oxidative stress molecules have been suggested as biomarkers of disease activity and prognosis.[14] In addition, it has been shown that metabolic processes within the cholesterol synthesis pathway may directly influence hair growth through particular signaling molecules.[15] Recently, Lim et al suggested possible metabolic co-morbidities including hyperlipidemia in AA.[16] Increased level of small dense low-density lipoprotein cholesterol (sd-LDL-C) is one of the main components of atherogenic dyslipidemia.[17] There are limited data available regarding the relationship

among metabolic conditions, cardiovascular diseases and AA. In addition, recent trials have shown increased lipid peroxidation and defective antioxidant activity in patients with AA.[18] Based on these findings, in the present research, we conducted a observational study to evaluate the clinical and laboratory parameters of MS in AA patients.

Aim and objectives

The aim was to evaluate the parameters of MS in patients of AA and to investigate the possibility of an existing relationship between MS and AA.

METHODS

The study was hospital based observational study and conducted in outpatient dermatology clinics at Sikkim Manipal institute of medical sciences, Gangtok, Sikkim in the period between August 2019 and December 2020. It was approved by the institutional ethical committee.

Sample size

A total of 50 patients were included in our study.

Inclusion criteria

Male and female patients with clinical diagnosis of AA were included in the study.

Exclusion criteria

Patients who were having cardiovascular disease or glucose metabolism disorder, patients who presented with other patterns of nonscarring alopecia such as AGA, telogen effluvium and anagen effluvium, patients who were taking androgen or antiandrogen therapy, insulin treatment and glucocorticoids treatment within the previous 6 months were excluded from the study.

Clinical history

A detailed history of the patients as per the prepared questionnaire was taken with emphasis on history of hair fall, onset, duration, any associated symptoms (itching, pain in scalp and scaling of the scalp) and history of exacerbating factors if any.

Clinical examination

Elaborate general, physical and systemic examinations were carried out and recorded. Complete examination of scalp was done with emphasis on pattern and severity of hair loss. Hair loss was graded according to SALT.[19] Disease characteristics including the pattern of scalp hair loss, eyebrow involvement, beard involvement, body hair loss, nail involvement, AA severity as well as previous and current treatment modalities were noted.

Anthropometric and blood pressure measurement

Height

It was measured against a vertical board with attached metric rule and by bringing a horizontal headboard in contact with the uppermost point on the head. It was recorded in barefoot, full erect position with deep inspiration.

Weight

It was recorded without footwear and with light clothes on Indian standards institute certified weighing machine to the nearest of 100 g.

Body mass index (BMI)

It was calculated as weight in kg/height in m^2 (kilogram/square meter). In adults, overweight is defined as BMI between 25 and 29.9 and obese is defined as BMI ≥30.

Waist circumference

It was measured at the midpoint between the lower margin of the last palpable rib and the top of the iliac crest, using a stretch-resistant tape that provides a constant 100 g tension.

Blood pressure (BP) measurement

BP was recorded with sphygmomanometer on the right arm in a sitting position after 20 min rest. The mean value for systolic and diastolic BP was calculated from average of three readings.

Systolic BP ≥130 mm of Hg and diastolic BP ≥85 mm of Hg were taken as cut off points for hypertension.

Investigations

Blood samples were collected from all enrolled participants after 12 hour fast and the following investigations were performed. The investigations were fasting blood sugar level (FBS), triglycerides (TGs), low-density lipoprotein (LDL), high-density lipoprotein (HDL), total cholesterol.

Diagnosis of MS

Diagnosis of MS was done based on the National cholesterol education programme (NCEP) adult treatment panel III by the presence of three or more of the following criteria.[20] The criterias were waist circumference (WC) ≥102 cm in male, ≥88 cm in female; TGs value ≥150 mg/dl; HDL >40 mg/dl; FBS ≥110 mg/dl; BP ≥130/85 mmHg.

RESULTS

This study included 50 patients with AA (33 females and 17 males). Baseline demographics and clinical characteristics of the participants are presented in Table 1. In the present study maximum number of patients belonged to the age group 20-30 years with 23 patients, followed by 30-40 years with 17 patients (Table 2). Most of the study subjects, 17 were college student and number of employee were 15 (Table 3). 27 patients had duration of lesions between <1 month, 13 patients had duration between 1-2 months (Table 4). Out of 50 patients, 44 had patch(es) and 2 patient had alopecia totalis (Table 5).

Table 1: Distribution of subjects according to gender.

Distribution	Male	Female	Total
No	33	17	50
%	66	34	100

Table 2: Distribution of subjects according to their age.

Age distribution (in years)	Male	Female	Total
10-20	3	2	5
20-30	17	6	23
30-40	10	7	17
Above 40	3	2	5
Grand total	33	17	50

Table 3: Occupational status of study subjects.

Occupation	Male	Female	Total
School student	2	2	4
College student	11	6	17
Employee	10	5	15
Others	10	4	14
Grand total	33	17	50

Table 4: Distribution of subjects according to duration of disease.

Duration (in months)	Male	Female	Total
< 1	17	10	27
1-2	9	4	13
3-4	5	2	7
>4	2	1	3
Grand total	33	17	50

In this study out of 50 patients, 38 had mild AA, 7 had AA and 5 patients had severe AA (Table 5). The clinical and laboratory parameters are depicted in Table 7 and 8.

Table 5: Distribution of subjects according to types of lesions.

Types of AA	Number
Patches	44
Alopecia totalis	2
Alopecia subtotalis	1
Alopecia universalis	1
Ophiasis	1
Sisaipho	1
Total	50

Table 6: Distribution of subjects according to severity of aa.

SALT score (in %)	No. of patients
Mild AA (SALT score <25)	38
Moderate AA (SALT score 25-49)	7
Severe AA (SALT score >50)	5
Total	50

Table 7: Anthropometric measurements and BP in study subjects.

Parameters	Findings (mean)
Waist circumference (in cm)	92
BMI (in kg/m^2)	23.6
Systolic BP (in mm of Hg)	118
Diastolic BP (in mm of Hg)	76

Table 8: Laboratory investigations in study subjects.

Investigations	Results (mean)
Fasting blood glucose level (in mg /dl)	101
Triglycerides (in mg /dl)	139.5
Total cholesterol (in mg /dl)	172
LDL cholesterol (in mg /dl)	90.1
HDL cholesterol (in mg /dl)	51.1

DISCUSSION

AA is a common, recurrent form of nonscarring hair loss.[1] The global statistic reports showed 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%, which was quite less than Sharma et al (1.3%).[13,21,22] The majority of AA patients 23 in this study were in the age group of 20-30 years. The mean age of AA patients was 23.6 years. It indicated that AA affected predominantly young persons, like in other previous studies.[23] It may be because of the fact that AA preferably affected pigmented hair and graying of hair usually started at 35 years.[24,25] However, many authors have reported its peak at the third to fourth decade.[26-28] The sex distribution of AA patients was often equal in both the genders.[29,30] However, Sharma et al reported male preponderance.[29] The index

study also showed male preponderance (66%). Besides genetic predisposition and autoimmunity, psychological stress may play important role in the pathogenesis of AA.[3,4,12,13,21,22,25] It was also indicated in the index study which showed that majority of AA patients were students. There was 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 was an alteration of hair cycle which ultimately led to hair loss.[26] Patch(es) over the scalp was the most common form of involvement in AA, which was also substantiated in the index study also (44 patients).[27-29] However, certain uncommon forms such as diffuse alopecia (2 cases), ophiasis/sisaipho (2 cases), total/subtotal alopecia (1 case) and universal alopecia (1 case) were also reported. Beard and moustache were also involved in some cases. Various authors have also reported uncommon forms of AA.[14,22] The National AA foundation committee has devised severity of alopecia tool score.[21] Occasionally, nails may be affected in AA in the form of fine/coarse pitting and dystrophy of nail plates. Similarly, the index study had also reported nail pitting in 7 AA patients.

The severity of AA depended on family/personal history of atopy, autoimmune disorders such as Hashimoto's thyroiditis, vitiligo, pernicious anemia, diabetes mellitus, lupus erythematosus and other diseases.[22-24,26,27,29,30] It was noteworthy that the association of AA with other immune disorders such as systemic lupus erythematosus, celiac disease, thyroid disease, atopy and vitiligo supported the potential role of systemic inflammation in AA pathogenesis.[31] There were conflicting results in the literature regarding the metabolic profile and cardiovascular risk of AA patients. An association between AA and MS had been reported in a recent study.[32] Lim et al found that the LDL levels of women with AA were higher than those of healthy women.[16] The authors clearly suggested a link among lipid metabolism, cholesterol biosynthesis and hair disorders in this report. In contrast, the present study did not reveal any abnormalities in lipid profiles of the AA patient. The NCEP ATP III mentioned MS as a major cardiovascular risk factor. Individuals with MS are at an increased risk of coronary arterial calcification. The presence of MS has been associated with a three-fold increase of risk for CADs and five-fold increase for cardiovascular mortality.[33] In the present study we did not observe any significant derangement of clinical and laboratory parameters of MS in patients of AA.

CONCLUSION

Increasing evidence suggest the potential role of oxidant-antioxidant imbalance in AA. There are conflicting results in the literature regarding metabolic profiles in AA patients. We aimed to hypothesized that the oxidative process might be associated with disease activity in AA patients. However, this study did not reveal any significant derangements of clinical and laboratory

parameters of MS in AA patients. The observations in the present study may raise awareness in susceptible individuals that lifestyle changes (weight control, exercise diet with a low glycemic index) in early life may reduce the risk of coronary heart diseases. Future , large-scale prospective studies that eliminate the confounding factors are required for determining the exact relationship between MS and AA.

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