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Original Research Article

Clinical Profile of Androgenetic Alopecia at Tertiary Care Hospital

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Abstract

Introduction: Androgenetic alopecia is defined by a specific distribution in both males and females and a progressive loss of the scalp's terminal hair anytime after puberty. According to studies, losing one's hair can worsen psychological issues including sadness, anxiety, and trauma while also lowering one's "quality of life" (QoL).

Aims and Objectives: To analyze the different aspects of androgenetic alopecia with metabolic syndrome and its gradings.

Methods: This case-control study was conducted on the patients with alopecia and controls with minor issues with hair. The patients were determined for general characteristics, correlated with the components of metabolic syndrome and compared that with healthy controls. Again, the grading of alopecia was correlated with the components of the metabolic syndrome. Statistical analysis was conducted for analyzing possible correlation between metabolic syndrome components and alopecia.

Results: The study found that there is elevation of fasting blood glucose in patients with androgenetic alopecia as compared to the healthy controls (P=0.041). It is also found that there is significant decrease in HDL in the patients of alopecia than the healthy controls (P=0.012).

Conclusion: The study has concluded that androgenetic alopecia is significantly linked to metabolic syndrome components, specially with reduction in HDL and elevation in levels of fasting blood glucose.

Keywords: Androgenetic Alopecia, Metabolic Syndrome, Dyslipidemia, Obesity, Dermatology.

Introduction

In people with a hereditary predisposition, androgen-induced androgenic alopecia (AGA) is a condition that causes hair loss. The most typical kind of alopecia is AGA. AGA is characterized by androgen-dependent dermal papillae shrinkage, which is governed by intricate hormonal systems under the direction of regional genetic codes [1]. The genetic background of androgenetic alopecia is unknown, and some experts have hypothesized that early-onset alopecia, which manifests well before age of 35, is genetically diverse from delayed alopecia [2]. Patients with

early-onset AGA showed higher rates of hypertension, obesity, diabetes, and dyslipidemia. Significant metabolic diseases such as hyperinsulinemia, hypertension, elevated TG, diabetes mellitus and glucose intolerance are linked to abdominal fat tissue. Skin and hair follicles have been revealed to contain mineralocorticoid receptors.Up to 50% of males and females can develop a pattern of androgenetic alopecia, a genetically predetermined condition caused by an overactive sensitivity to androgens [1-3]. It is defined by a specific distribution in both males and females and a progressive loss of the scalp's terminal hair anytime after puberty [2,3]. The frontotemporal and vertex regions are where hair loss is most noticeable in men, while the frontal hairline is often spared in women, and scattered apical hair loss is marked by a broader anterior section of the hair [2,4].

As the name implies, androgenetic alopecia is clearly inherited and most likely results from an excess androgen response [4]. Androgen is also necessary for pattern alopecia to develop. It does not develop before puberty. Males with androgen insensitivity syndrome and those who have been castrated before puberty do not experience pattern baldness [5]. It is obvious that pattern alopecia is significantly influenced by androgen receptors as well as hormone metabolism [6].

In today's world, one's hair plays a big role in how one perceives themselves. As a result, hair loss causes a lot of problems for people, including poor self-image, diminished confidence, failed marriages and relationships, as well as potential health effects [7]. According to studies, losing one's hair can worsen psychological issues including sadness, anxiety, and trauma while also lowering one's "quality of life" (QoL). The most prevalent condition causing gradual hair loss is "androgenetic alopecia" (AGA), also referred to as female or male pattern baldness. "Dihydrotestosterone" (DHT), a testosterone metabolite, is frequently regarded as one of the main AGA mediators [8-10].

"Dihydrotestosterone" (DHT), a testosterone metabolite, is frequently regarded as one of the main AGA mediators [11]. It works by inhibiting the activity of "androgen receptors in hair follicles", loosening the anagen (growth) phase, and extending the telogen (resting) stage of hair growth, which improves the portion of immature hair and decreases the amount of new hair [12].

Anagen, or even the growth stage, is shortened in the typical hair growth cycle by androgen receptor activation. In androgenetic alopecia, increased activation causes follicular shrinkage through a significantly shorter anagen phase, leading to thin and smaller hair follicles that may not even reach the epidermis in the end [13,14].

After puberty, androgenetic alopecia develops gradually. When it affects the vertex in men, it starts off as bitemporal thinning of the frontal scalp [15]. When it occurs in women, the front hairline is unaffected, and the thinned hair between both the vertex and frontal of the scalp is recognized. This is typically shown by a wider portion or a visible scalp. Early androgenetic alopecia in men is defined as beginning before the age of 30, and it is thought to be the male version of polycystic ovarian syndrome [16-19]. Telogen effluvium, which appears 1–6 months after a stressor prompts a greater proportion of the hair to transition from the anagen to the telogen phase, resulting in a rise in the number of follicles in the exogen phase, frequently reveals pattern baldness in women [15].

Circulating hormones play a major role in regulating hair growth, circulation, and density. Thus, hair loss is a common symptom of endocrine system disorders. A disease known as "hyperandrogenemia"

(HA) occurs when the adrenal cortex and ovaries secrete too much testosterone. Androgenic alopecia is one of the often occurring androgenic skin abnormalities [20,21].

Materials and methods

Study design

This is a case-control analysis conducted on the patients with alopecia who visited the outpatient department of dermatology from December 2021 to September 2022, in our hospital. The study conducted on 54 male patients and 54 age-matched controls. The control group consisted of age-matched healthy people who had normal hair status and other minor skin issues. Due to potential differences in etiology and the debatable function of male hormones in female pattern hair loss, the study was only conducted on male patients. Following the completion of a thorough clinical examination and informed consent in writing from each patient, the information was input into a pre-made proforma. Age, occupation, family background of androgenic alopecia, diabetes mellitus, hypertension, dyslipidemia, background of smoking and alcohol use, and information about alopecia therapy were all part of the history. The patients were determined for general characteristics, correlated with the components of metabolic syndrome and compared that with healthy controls. Again, the grading of alopecia was correlated with the components of the metabolic syndrome.

Inclusion and exclusion criteria

The patients with alopecia who have arrived at the outpatients department of the hospital, those who observed the examination protocol and those who gave written consent for the study, were only included. The patient who have provided information about authorization for the examination are contained in the examination. Therefore, 108patients are included in the examination.

Moreover, patients who did not pursue the examination protocol, or did not complete the whole study process, or did not give approval, were not considered for this study. Patients with family history of metabolic syndrome without alopecia were excluded in this study.

Statistical analysis

The study used SPSS 25 and MS Excel for effective analysis.. The continuous variables were expressed as mean±standard deviation while the discrete variables were expressed as absolute counts. The study employed ANOVA for effective analysis of continuous variables while the discrete variables were analyzed by chi-square. The level of significance was considered to be α=0.05.

Ethical approval

The hospital's Ethics Committee approved the study process. Each patient was given the detailed explanation of the study method and written consent from each patient was obtained.

Results

In table 1 there are 54 participants each in case and control group, the mean age of participants was 26.7. The percentage of smokers in case and control groups are 51.8% and 22.2% respectively, and alcohol consumers are 22.2% and 16.7% in case and control group respectively.

Table 1: Cases and controls' average ages, anthropometric dimensions, and addiction histories

Characteristics	Cases	Controls	*p*-value
Age (years), mean±SD	30.09±5.88	31.78±6.45	0.07
BMI (kg/m^2), mean±SD	25.13±3.56	25.87±2.89	0.38
Waist circumference (cm),	89.12 ± 7.89	87.90 ± 6.23	0.259
smoking, n(%)	28 (51.8%)	12 (22.2%)	0.001
Alcohol, n (%)	12 (22.2%)	9 (16.7%)	0.445

Table 2 shows that the circumference of the waist is 59.2% and 37.03% in case and control groups respectively, raise in BP is 64.8% in the case and 40.7% in the control group, levels of glucose was 59.2% in the case and 9.2% in control groups. Hypertriglyceridemia is 70.4% in the case and 55.5% in the control groups. The study found that there is elevation of fasting blood glucose in patients with androgenetic alopecia as compared to the healthy controls (P=0.041). It is also found that there is significant decrease in HDL in the patients of alopecia than the healthy controls (P=0.012).

Table 2: Metabolic syndrome component distribution in patients and controls

Metabolic syndrome components	Cases N (%)	Controls N (%)	*p*-value
Circumference of waist	32 (59.2%)	20 (37.03%)	0.027
Increase in BP	35 (64.8%)	22 (40.7%)	0.055
Hypertriglyceridemia	38 (70.4%)	30 (55.5%)	0.146
Decrease in HDL	35 (64.8%)	20 (37.03%)	0.012
Elevation in levels of fasting blood glucose	32 (59.2%)	5 (9.2%)	0.041

Table 3 shows grades of alopecia 20 patients are present in grade 3, 18 in grade 4, and 16 in grade 5 and above. The rise in BP (blood pressure) is high in grade 3 (25%), hyperglyceridemia is high in grade 3 (30%). There is significant correlation between the gradings of alopecia with that of fasting blood glucose level of metabolic syndrome (P=0.001). Also, there is significant correlation with alopecia grading with reduction in HDL level (P=0.027).

Table 3: Correlation of gradings of alopecia with that of Metabolic Syndrome components

Grade	III	IV	V and more	*p*-value
Circumference of waist (n=32)	5	12	15	0.724
Increase in BP (n=35)	6	15	14	0.218
Hypertriglyceridemia (n=38)	11	15	12	0.422
Decrease in HDL (n=35)	3	8	24	0.027
Elevation in levels of fasting blood glucose (n=32)	0	10	22	0.001

Discussion

The most typical reason for hair loss is androgenetic alopecia (AGA). Despite the fact that it's a medically benign illness, patients may still experience considerable emotional effects. The term "metabolic syndrome" (MetS) refers to a group of clinical symptoms that concentrate on factors related to the heart and diabetes. Despite the high prevalence of MetS and AGA in India, there aren't many details available about the participants. The study's objective is to examine the relationship between AGA and Metabolic

syndrome and its parameters. The study comes to the conclusion that androgenic alopecia has an increased incidence of MetS. It is advantageous for individuals with androgenic alopecia to have early Metabolic syndrome screening [22].

Inconclusiveness concerning the gender-specific and differential connection of MetS with worsening AGA severity persists despite mounting evidence linking androgenetic alopecia (AGA) and metabolic syndrome (MetS). Additionally, there is a dearth of data specifically related to Indian situations. The purpose of the study was to determine how frequently MetS occurred in Indian settings in people with early AGA. When compared to the control group, more individuals with AGA had MetS, and these discrepancies were statistically significant. Patients with AGA showed greater triglycerides, systolic and diastolic blood pressures when compared to controls, as well as significantly decreased levels of HDL cholesterol. AGA intensity was not related to MetS. According to the study's findings, AGA occurs in male Indian patients under the age of 30 and is linked to MetS [23].

The waist-hip ratio is used to assess the amount of abdominal fat tissue as a separate risk factor for coronary artery disease (CAD). Waist circumference and BMI did not significantly correlate with AGA, according to our research. It showed that young males with moderate-to-extensive alopecia had greater BMI and waist measurement than those with little to no baldness. However, it was still unclear what function mineralocorticoids served in the skin. Androgenetic alopecia may be influenced by the function of mineralocorticoid pathways. It has been shown that elevated levels of aldosterone within the prescribed range increase the risk of developing hypertension. Patients with androgenic alopecia may be more likely to develop cardiovascular disease as a result of a link between Metabolic syndrome and early-onset androgenic alopecia. Cardiovascular disease may be avoided by early detection and treatment of MetS and its elements in patients who have early-onset androgenic alopecia.

Male-pattern alopecia (MPA), also known as androgenetic alopecia (AGA), is a dermatological disorder that affects more men than women. AGA is a medical ailment, but because of how much it affects a person's self-esteem, it must be taken seriously. Numerous physiological and social facets of one's life are significantly impacted, as well as the person's general quality of life (QOL). The goal of the study is to examine the clinical characteristics of male MPA patients and determine how their quality of life (QOL) is affected by this condition using the Skindex-29 for hair and the Dermatology Life Quality Index (DLQI). The study concluded that AGA negatively impacted patients' QOL, and it cautions doctors to pay special attention to Quality - of - life deterioration in AGA patients in order to better understand the burden of the disease on specific patients [24].

The most typical type of alopecia in both men and women is androgenetic alopecia (AGA). Over 90% of men have AGA to some extent before the age of 20. AGA affects about 50 percent of the total male population. The goal of the current research was to examine these patients' clinical profiles and quality of life. According to the study's findings, AGA can cause a patient to experience severe psychological discomfort, especially when they are younger. Therefore, it is crucial that doctors take into account the psychosocial effects of AGA on patients' life while treating them [25,26].

Conclusion

The study has concluded that androgenetic alopecia is significantly linked to metabolic syndrome components, specially with reduction in HDL and elevation in levels of fasting blood glucose. Therefore, the study has brought forward an

important correlation between alopecia and metabolic syndrome. This would help the clinicians to contribute in overall management of the patients for positive clinical outcomes and prevention of further metabolic syndrome related issues. The authors suggest that there is a need to conduct more similar studies with larger set of population whose conclusion will be more validated with respect to the population in large. Overall, this current study has concluded that there should be total clinical investigations required in patients with androgenetic alopecia for metabolic syndrome. This would help in early management and prevention for further complications.

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