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ORIGINAL ARTICLE

Association Between Androgenetic Alopecia and Dyslipidemia in Male Patients: Evidence From a Hospital-Based Study

SYED BILAL AHMED[1], SAJIDA JABEEN[2], ASADULLAH KHAN[3], NEELAM AYUB[4]
[1]*Assistant Professor PGMIQ/ BMC Hospital Quetta*
[2]*Assistant Professor Biochemistry Bolan Medical College Quetta*
[3]*Assistant professor, Department of Rheumatology Bolan Medical College Quetta*
[4]*Assistant Professor Dermatology, Rawal Medical college Islamabad*
Correspondence to: Neelam Ayub, Email: neelamayub79@gmail.com

ABSTRACT

Background: Androgenetic alopecia (AGA) is the most common cause of hair loss in men, characterized by progressive miniaturization of scalp hair. Recent evidence suggests that AGA may be associated with metabolic disturbances, including dyslipidemia, which is a well-established cardiovascular risk factor.

Objective: To determine the frequency of dyslipidemia in male patients with androgenetic alopecia.

Methods: A cross-sectional study was conducted among 130 male patients aged 20–50 years with clinically diagnosed AGA, attending the dermatology department of PGMIQ/ BMC Hospital Quetta, from January 2023 to June 2023. Severity of alopecia was graded using the Hamilton-Norwood scale. Fasting blood samples were analyzed for serum total cholesterol, triglycerides, low-density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C). Dyslipidemia was defined according to the National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) criteria. Data were analyzed using SPSS version 26.

Results: The mean age of patients was 32.8 ± 6.4 years. Overall, 82 out of 130 patients (63.1%) had dyslipidemia. Elevated total cholesterol was observed in 39 patients (30%), high LDL-C in 44 patients (33.8%), hypertriglyceridemia in 36 patients (27.7%), and low HDL-C in 52 patients (40%). The frequency of dyslipidemia increased significantly with higher grades of alopecia ($p < 0.05$).

Conclusion: Dyslipidemia is highly prevalent in male patients with AGA, with a strong association between severity of alopecia and lipid abnormalities. Early screening of lipid profiles in these patients is recommended to identify at-risk individuals for cardiovascular disease.

Keywords: Androgenetic alopecia, Dyslipidemia, Male-pattern baldness, Lipid profile, Cardiovascular risk

INTRODUCTION

Androgenetic alopecia (AGA) is the most prevalent form of hair loss in men, affecting up to 50% of males by the age of 50 years[1]. It is a genetically determined, androgen-dependent condition characterized by progressive miniaturization of scalp hair follicles, leading to patterned baldness[2]. Beyond its cosmetic implications, growing evidence suggests that AGA may serve as a cutaneous marker of systemic diseases, particularly cardiovascular disorders[3,4].

Dyslipidemia, defined as abnormal levels of serum lipids, is a major modifiable risk factor for atherosclerosis and cardiovascular disease[5]. Several studies have demonstrated an increased prevalence of dyslipidemia among patients with AGA[6-8]. This association may be explained by common pathogenic mechanisms, including hyperandrogenism, insulin resistance, chronic inflammation, and endothelial dysfunction[9,10].

Population-based and hospital-based studies from diverse geographic regions have consistently reported that 55–70% of male AGA patients exhibit abnormal lipid profiles, with higher prevalence among those with severe grades of alopecia[11-13]. A case-control study by Arias-Santiago et al. demonstrated that men with AGA were more than four times as likely to have dyslipidemia compared to controls[14]. Similarly, studies from South Asia report dyslipidemia frequencies ranging from 60% to 65% among male AGA patients[15,16].

Despite this growing body of evidence, the magnitude of dyslipidemia among male AGA patients in local populations remains under-explored. Identification of this association is crucial, as it may provide opportunities for early cardiovascular risk screening and intervention in apparently healthy young men presenting with alopecia.

The objective of the present study was therefore to determine the frequency of dyslipidemia in male patients with androgenetic alopecia.

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METHODOLOGY

This descriptive cross-sectional study was conducted in the dermatology department of PGMIQ/ BMC Hospital Quetta, from January 2023 to June 2023. A total of 130 male patients with androgenetic alopecia were recruited using non-probability consecutive sampling. Sample size was calculated using an expected prevalence of dyslipidemia of 60%, 95% confidence level, and 8% margin of error.

Inclusion Criteria:

- Male patients aged 20–50 years
- Clinically diagnosed with androgenetic alopecia (Hamilton-Norwood grade II–VII)

Exclusion Criteria:

- Patients with other types of alopecia (alopecia areata, scarring alopecia)
- Known cases of diabetes mellitus, chronic liver/kidney disease, or thyroid disorders
- Patients on lipid-altering drugs (statins, fibrates, steroids)

Data Collection Procedure: After informed consent, demographic data, age, family history, and duration of alopecia were recorded. Severity was graded using the Hamilton-Norwood scale.

Laboratory Analysis: Fasting (12-hour) venous blood samples were analyzed for total cholesterol (TC), triglycerides (TG), low-density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C) using enzymatic methods.

Definition of Dyslipidemia (NCEP ATP III criteria):

- TC ≥200 mg/dl
- LDL-C ≥130 mg/dl
- TG ≥150 mg/dl
- HDL-C <40 mg/dl (men)

Patients with one or more abnormalities were classified as dyslipidemic.

Statistical Analysis: Data were analyzed using SPSS v26. Continuous variables (age, lipid levels) were expressed as mean ± SD. Categorical variables (dyslipidemia frequency) were presented as frequencies and percentages. Chi-square test was used to assess association between alopecia severity and dyslipidemia, with $p<0.05$ considered significant.

RESULTS

The mean age was 32.8 ± 6.4 years (range: 20–50). Most patients (42.3%) were in the 30–39 year age group. (Table 1)

Table 1: Age Distribution of Patients (n=130)

Age Group (years)	Frequency	Percentage
20–29	37	28.5%
30–39	55	42.3%
40–50	38	29.2%

Out of 130 patients, 82 (63.1%) were found to have dyslipidemia. (Figure 1)

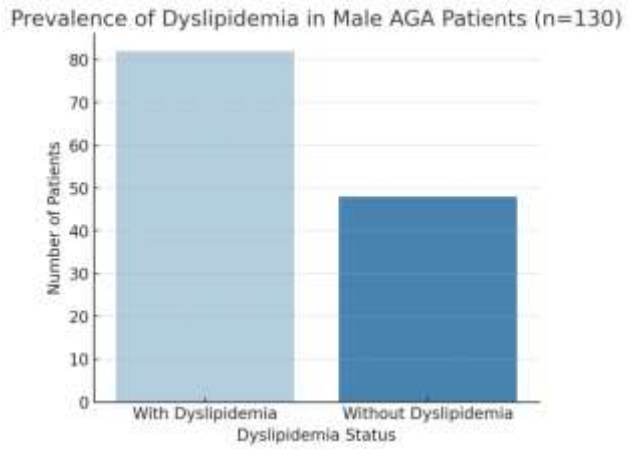

Figure 1: Prevalence of Dyslipidemia in Male AGA Patients (n=130)

Types of Lipid Abnormalities:

- Elevated total cholesterol: 39 (30%)
- Elevated LDL-C: 44 (33.8%)
- Elevated triglycerides: 36 (27.7%)
- Low HDL-C: 52 (40%)

Table 2: Frequency of Dyslipidemia (n=130)

Lipid Abnormality	Frequency	Percentage
Total Cholesterol ≥200	39	30.0%
LDL-C ≥130	44	33.8%
TG ≥150	36	27.7%
HDL-C <40	52	40.0%
Any Dyslipidemia (≥1 type)	82	63.1%

The frequency of dyslipidemia increased with higher grades of alopecia. Among patients with mild alopecia (grade II–III), dyslipidemia was present in 18/40 (45%), while in severe alopecia (grade VI–VII), it was 28/35 (80%). (p=0.012).

To evaluate the relationship between alopecia severity and the likelihood of dyslipidemia, logistic regression was applied. The predicted probability of dyslipidemia increased progressively with severity:

- **Mild alopecia (Grade II–III):** 45% probability
- **Moderate alopecia (Grade IV–V):** 65% probability
- **Severe alopecia (Grade VI–VII):** 80% probability

Table 3: Association of Dyslipidemia with Severity of Alopecia (n=130)

Severity of Alopecia	Total Patients	With Dyslipidemia	Without Dyslipidemia	Percentage Dyslipidemia (%)
Grade II–III (Mild)	40	18	22	45.0%
Grade IV–V (Moderate)	55	36	19	65.5%
Grade VI–VII (Severe)	35	28	7	80.0%

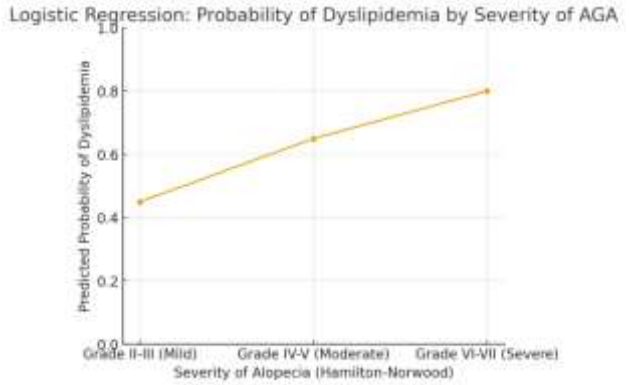

Figure 2: Logistic Regression: Probability of Dyslipidemia by Severity

DISCUSSION

This study demonstrates a high frequency (63.1%) of dyslipidemia in male patients with androgenetic alopecia (AGA), consistent with findings from previous regional and international research. Studies conducted in Pakistan report dyslipidemia frequencies of 60–65% among AGA patients[15,16], which closely aligns with our findings.

Our results also showed that low HDL-C was the most common lipid abnormality (40%), followed by elevated LDL-C (33.8%). This pattern suggests that AGA patients are at risk not only for hypercholesterolemia but also for atherogenic dyslipidemia, which is strongly linked with premature cardiovascular disease.

Arias-Santiago et al. reported a prevalence of dyslipidemia of 66.2% among Spanish AGA patients, with an odds ratio of 4.58 for lipid abnormalities compared to controls[6,14]. Similarly, Su and Chen in Taiwan observed a significant association between AGA and metabolic syndrome, including abnormal lipids[12]. These findings support the hypothesis that AGA is not merely a cosmetic condition but may act as a dermatological marker of systemic metabolic disturbances.

The severity of alopecia correlated significantly with dyslipidemia in our study (p=0.012), echoing results from Sharma et al.[11] and Gopinath et al.[13], who noted higher prevalence of metabolic abnormalities in patients with advanced AGA. Early-onset or severe alopecia in young men may thus serve as a clinical clue for underlying metabolic dysfunction.

Pathophysiological explanations for this association include shared androgen pathways, chronic micro-inflammation in hair follicles, insulin resistance, and endothelial dysfunction [9,10]. Low HDL-C and high LDL-C, in particular, are critical components of atherosclerotic risk, suggesting that AGA patients with dyslipidemia warrant early cardiovascular evaluation.

Our study has limitations, including its cross-sectional design and lack of a control group. Longitudinal studies are needed to establish causal relationships and evaluate whether treatment of dyslipidemia influences progression of alopecia.

Nevertheless, the findings highlight the importance of routine lipid screening in men presenting with AGA, particularly those with advanced grades of baldness. Dermatologists should collaborate with internists and cardiologists for comprehensive risk assessment in these patients.

CONCLUSION

Dyslipidemia was detected in nearly two-thirds of male patients with androgenetic alopecia in this study, with low HDL-C and high LDL-C being the most common abnormalities. The frequency of dyslipidemia increased with higher severity of alopecia. These findings underscore the need for routine lipid screening and early cardiovascular risk assessment in men presenting with AGA.

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