Original Article

Frequency of Dyslipidemia in Male Patients of Androgenetic Alopecia

Afshan Ashiq[1], Sara Mubeen[2], Arooba Iftikhar[3], Muhammad Imtiaz[4], Hina Sarwar[5], Noshi Ilyas[6]

Abstract

Background: Among prevalent forms of non-scarring alopecia is androgenetic alopecia (AGA), triggered by androgens, causing gradual, symmetrical hair loss in genetically predisposed individuals. Blood lipids (BDL) in the bloodstream can be free or bound to other molecules, with the research focusing on abnormal levels in men with AGA to explore their potential link to the condition.

Objective: The present study aimed to determine the frequency of dyslipidemia in male patients with androgenetic alopecia (AGA) and its potential association with abnormal lipid profile.

Methods: The research was carried out at Department of Dermatology Unit-I, Jinnah Hospital Lahore from July 20, 2020 to Jan 20, 2021. A total of 150 patients meeting the selection criteria were chosen for the study. Fasting blood samples were collected for lipid profile analysis (following a fasting period of 9 to 12 hours). The lipid profile analysis was performed at the same laboratory. Factors such as age, BMI, type of hair loss, and duration of alopecia were recorded using a predefined form.

Results: The mean age of patients was 35.01±8.29 years. The mean serum cholesterol was 211.31±37.04, the mean triglycerides was 195.60±54.95, the mean low density lipoprotein cholesterol (LDL-C) was 155.05±56.50 and mean high-density lipoprotein cholesterol HDL-C was 55.94±16.50. There were 94(62.7%) cases who had deranged blood lipids and 56(37.3%) had normal lipid profile.

Conclusion: A high percentage of male androgenetic alopecia cases, around 62.7%, showed abnormal blood lipid levels. Assessing lipids in these individuals is crucial for early detection of cardiovascular and metabolic risks, that will help in improving health outcomes.

Keywords: Androgenetic Alopecia, Deranged Blood Lipids, Serum Cholesterol, Triglycerides, LDL-C, HDL-C.

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Correspondence

[1,5]Department of Dermatology, Jinnah Hospital, Lahore;[2]Department of Dermatology, Sughra Shafi Medical Complex/ Sahara Medical College, Narowal;[3]Department of Dermatology, Bahawal Victoria Hospital/ Quaid-e-Azam Medical College, Bahawalpur; [4]Imperial College Healthcare NHS Trust, Charing Cross Hospital, London, UK; [6]Department of Dermatology, Mayo Hospital, Lahore

Corresponding Author: Dr. Sara Mubeen, Senior Registrar, Department of Dermatology, Sughra Shafi Medical Complex/ Sahara Medical College, Narowal

Email: saramubeen142@gmail.com

Introduction

Androgenetic alopecia (AGA) is a common non-scarring hair loss condition linked to genetics and androgens, with men showing higher prevalence compared to women. Black and Asian men tend to have lower rates of AGA than Caucasian men. By age 30, around 30% of men are affected, increasing to 50% by age 50. Early detection and intervention are crucial due to AGA's progressive nature. Further research is needed to develop effective treatments and prevention strategies for AGA in different demographic groups.[1-2]

Androgens play a vital role in causing Androgenetic Alopecia (AGA) by affecting epithelial cells in hair follicles, leading to follicular miniaturization. AGA is associated with early coronary artery disease onset and other conditions like hypertension, cardiovascular diseases, and insulin resistance.[3-4] Blood lipids, including HDL-C, LDL-C, STC, and TG, play a vital role in assessing

an individual's lipid status. Dyslipidemia, an abnormality in lipid levels, can lead to health risks by elevating STC, LDL-C, and TG or lowering HDL-C.[4]

The connection between androgenetic alopecia (AGA) and blood lipids remains unclear, with studies showing conflicting results. Despite this, lipid imbalances have been observed in male AGA patients, suggesting a potential link that requires further research for a deeper understanding.[5] Kumar KCD et al, found metabolic syndrome in 53% of cases with significant increase level of TG in AGA patients.[6] Similarly Qazi I et al, also found high level of triglycerides with low level of HDL in men suffering from AGA.[7] Bilqees et al, reported that 87.3% patients of AGA had high TG and 69.3% had low HDL.[8]

Internationally, there are numerous reports available that confirm a connection between male pattern hair loss and abnormal blood lipid levels. However, in Pakistan, there have been limited research studies conducted to explore the correlation between abnormal blood lipid levels and androgenetic alopecia (AGA) in male patients. The outcomes of our research could potentially contribute to the establishment of a link between AGA in male patients and abnormal blood lipid levels. By assessing serum lipids in men with AGA, it may be possible to identify individuals who are at a higher risk of developing cardiovascular diseases and metabolic syndrome, thus aiding in early intervention and prevention strategies.

Methods

A cross-sectional study was carried out at the Department of Dermatology Unit-I, Jinnah Hospital Lahore over the period from July 20, 2020, to January 20, 2021. A total of 150 individuals who met the specified selection criteria were chosen to participate in the study. The determination of the sample size, which comprised 150 participants, was achieved through the utilization of the WHO calculator, with a confidence level set at 95%, an absolute precision of 8%, and an anticipated percentage of HDL standing at 69.3%.[8]

The criteria for inclusion in this study were individuals falling within the age range of 20 to 50 years. Specifically, the study focuses on male patients exhibiting any form of androgenetic alopecia, commonly known as male pattern hair loss, as defined by the operational parameters established. On the other hand, exclusion criteria encompassed individuals with a medical history of hyperlipidemia, metabolic syndrome, diabetes mellitus, and prostate cancer. Additionally, patients who are currently undergoing treatment with lipid-lowering medications are also excluded from participation in the study.

Total 150 eligible patients participated in the research study after consent and ethical approval. Detailed medical history was recorded and hair loss patterns were categorized using the Hamilton-Norwood scale post examination. Blood samples were collected after a 9 to 12-hour fast for lipid profile assessment in the same laboratory. The data collected was meticulously recorded for review in a standardized proforma.

Patients with androgenetic alopecia exhibit hair loss in specific patterns like frontotemporal recession (temples), bi-temporal thinning (latero-temporal area), and vertex balding (head crown). Blood Lipid Derangements show deviations from normal fasting lipid levels per National Cholesterol Education Program's ATP III Guidelines: Serum Cholesterol <200mg/dl, Triglycerides < 150mg/dl, LDL-C: 70-129mg/dl, and HDL-C: 40-60mg/dl.

The statistical software SPSS version 25.0 was utilized to conduct an analysis of the data obtained. In order to provide a comprehensive overview, the mean and standard deviation were computed for quantitative variables such as age, lipid profile, and duration of alopecia. The examination extended to nominal variables like the presence of deranged lipid profile, for which frequencies and percentages were calculated. Furthermore, the data was stratified based on various factors including age, duration of alopecia, pattern of hair loss, and BMI. Following the stratification process, a Chi-square test was employed to evaluate the statistical significance,

with a predetermined threshold of p≤0.05 to determine statistical significance.

Results

The average age of the patients in the study was recorded at 35.01 years with a standard deviation of 8.29 years, showcasing a range from 20 to 50 years. Among the participants, 70 individuals, constituting 46.7% of the cases, fell within the age group of 20 to 34 years, while 80 cases (53.3%) were aged between 35 and 50 years. Analysis of the hair loss patterns revealed that 51 cases (34%) exhibited Frontotemporal recession, 47 cases (31.3%) showed Bi-temporal thinning, and 52 cases (34.7%) displayed vertex balding. Furthermore, 70 patients (46.7%) reported experiencing hair loss for less than 2 years, whereas 80 individuals (53.3%) had been dealing with hair loss for 2 years or more.

Table 1: *Frequency distribution of demographic variables.*

Age Groups	Frequency	Percent
20-34 years	70	46.7
35-50 years	80	53.3
Total	150	100.0
Body mass index		
Obese	82	54.7
Non-obese	68	45.3
Total	150	100.0
Pattern of hair loss		
Frontotemporal recession	51	34.0
Bi-temporal thinning	47	31.3
Vertex balding	52	34.7
Total	150	100.0
Duration of hair loss		
<2 years	70	46.7
≥2 years	80	53.3
Total	150	100.0
Deranged blood lipids		
Yes	94	62.7
No	56	37.3
Total	150	

In terms of obesity status, 62 cases (41.3%) were classified as obese, while 88 cases (58.7%) were deemed non-obese. The mean levels of serum cholesterol, triglyceri-des, low density lipoprotein cholesterol (LDL-C), and high density lipoprotein cholesterol (HDL-C) was documented as 211.31 ± 37.04, 195.60 ± 54.95, 155.05 ± 56.50, and 55.94 ± 16.50, respectively. A majority of the participants, 94 individuals (62.7%), exhibited blood lipid levels, whereas 56 cases (37.3%) displayed a normal lipid profile. Stratification of the data based on age, hair loss pattern, duration of hair loss, and BMI indicated that the prevalence of abnormal blood lipids remained consistent across all strata, with a statistically significant p-value of ≤0.05 observed in each subgroup.

Table 2: *Stratification of deranged blood lipids with respect to different variables.*

Variables		Deranged blood lipids Yes	Deranged blood lipids No	p-value
Age groups	20-34 years	44(62.9%)	26(37.1%)	0.964
	35-50 years	50(62.5%)	30(37.5%)	
Pattern of hair loss	Front temporal recession	26(56.9%)	22(43.1%)	0.572
	Bi-temporal thinning	31(66.0%)	16(34.0%)	
	Vertex balding	34(65.4%)	15(34.6%)	
Duration of hair loss	<2 years	48(68.6%)	22(31.4%)	0.162
	≥2 years	46(57.5%)	34(42.5%)	
Body mass index	Obese	31(50.0%)	31(50.0%)	0.896
	Non-obese	63(71.6%)	25(28.4%)	

Discussion

The present study aimed to determine the frequency of dyslipidemia in male patients with androgenetic alopecia (AGA) and its potential association with abnormal lipid profiles. Our findings revealed that a significant proportion of AGA patients (62.7%) exhibited dyslipidemia, characterized by elevated levels of total cholesterol (211.31±37.04 mg/dL), triglycerides (195.60± 54.95 mg/dL), and LDL-C (155.05±56.50 mg/dL), alongside a mean HDL-C level of 55.94±16.50 mg/dL. In contrast, 37.3% of participants had a normal lipid profile. These results suggest a possible link between AGA and lipid metabolism abnormalities, highlighting the importance of lipid screening in individuals with AGA to assess potential cardiovascular risks.

Hamilton's research shows that hair loss rates are 30% at age 30, rising to 50% at age 50. Hair loss typically starts in the third or fourth decade of life, but can begin soon after puberty, progressing gradually. Men and women exhibit

different patterns of hair loss - women may have generalized thinning, maintaining their front hairline, whereas men start with receding hairlines at the temples, leading to baldness on top. While presentations differ, the underlying causes of hair loss are consistent across genders.[2]

Although the impact of environmental factors on Androgenetic Alopecia (AGA) severity is not fully understood, studies suggest that being overweight and smoking can worsen the condition.[9] Family history plays a crucial role, with men and women experiencing more hair loss if it runs in the family. AGA is not purely cosmetic; it's linked to cardiovascular risk factors. Considering genetics and lifestyle is vital in managing AGA and its broader health implications.[9]

In this particular cohort of individuals, there have been documented occurrences of concurrent medical conditions including hypertension, obesity, irregular lipid levels, resistance to insulin, the presence of atherosclerotic plaque in the carotid artery, as well as the development of diabetes, all of which have been associated with heightened probabilities of mortality due to cardiovascular ailments.[10]

In a recent investigation, serum triglyceride (TG) and high-density lipoprotein (HDL) cholesterol levels were compared between male patients with and without androgenetic alopecia (AGA), a criterion for metabolic syndrome. The study included 40 patients with AGA stage 2 or above and 40 controls. Results showed no significant differences in TG and HDL cholesterol between the groups. TG mean values were 89.60 in the study group versus 85.40 in controls, with 5 (12.5%) patients in the study group and 3 (7.5%) in the control group above 150 mg/dL. HDL mean values were 52.67 in the study group compared to 52.62 in controls, with 4 (10%) patients in the study group and 1 (2.5%) in the control group below 40 mg/dL. The study concluded no substantial variations in TG and HDL cholesterol levels among male patients with or without AGA.[11]

In the present investigation, the average age of the individuals under observation was 35.01± 8.29 years, ranging from a minimum of 20 to a maximum of 50 years. A separate study indicated a slightly elevated average age, with mean ages of 46.87±10.58 years and 42.32±11.29 years for patients with high and low triglyceride levels, respectively. Likewise, the mean ages (in years) for individuals with normal and low HDL levels were 42.17±10.87 years and 48.13±10.21 years, respectively. Among the participants, 131 individuals (87.3%) exhibited elevated triglyceride levels, while 19 individuals (12.7%) had normal triglyceride levels.[8]

In the present investigation, it was observed that the average serum cholesterol level was 211.31 ± 37.04, the average triglycerides level was 195.60 ± 54.95, the average LDLC level was 155.05 ± 56.50, and the average HDLC level was 55.94 ± 16.50. Among the participants, 94(62.7%) individuals exhibited abnormal blood lipid levels while 56(37.3%) showed a normal lipid profile. These results align well with previous research, such as the study by Bilquees et al, which indicated that 87.3% of patients with AGA had elevated TG levels and 69.3% had reduced HDL levels.[8]

A hospital study looked at the link between male-pattern baldness (AGA) and high cholesterol. The study involved 100 men with AGA matched by age and gender with a control group over a year. Lipid profiles were compared, showing higher dyslipidemia rates in AGA patients, especially in severe cases. Severe AGA patients, aged 21 to 50 on average, had more severe dyslipidemia than those with mild to moderate AGA. The study highlighted the increased risk of abnormal lipid levels and recommended dyslipidemia screenings for severe AGA patients due to the cardiovascular risk.[12]

In a case-control study of 300 participants, 150 with early androgenetic alopecia (80 male, 70 female) and 150 controls, females with alopecia showed higher triglycerides (123.8 vs. 89.43 mg/dl, $p = 0.006$), total cholesterol (196.1 vs. 182.3 mg/dl, $p = 0.014$), and LDL-C (114.1 vs. 98.8 mg/dl, $p = 0.0006$). Females also had lower HDL-C (56.8 vs. 67.7 mg/dl, $p < 0.0001$). Men with

alopecia had elevated triglycerides (159.7 vs. 128.7 mg/dl, p = 0.04), total cholesterol (198.3 vs. 181.4 mg/dl, p = 0.006), and LDL-C (124.3 vs. 106.2 mg/dl, p = 0.0013). Both genders with alopecia displayed a higher risk of dyslipidemia, potentially contributing to cardiovascular risks.[13]

A key strength of this study is its contribution to the limited research on the link between androgenetic alopecia (AGA) and dyslipidemia in Pakistan. The use of standardized lipid profile testing ensures accuracy, and the relatively large sample size enhances statistical reliability. Additionally, data stratification by age, BMI, and hair loss pattern allows for a more detailed analysis.

However, as a cross-sectional study, it cannot establish causality between AGA and dyslipidemia. Being single-center, its findings may not be fully generalizable. The study also lacks consideration of potential confounding factors such as diet, physical activity, and genetics. Moreover, the absence of a control group limits direct comparison, and long-term cardiovascular risks in AGA patients remain unassessed.

Conclusion

It was determined that a significant proportion of male patients with androgenetic alopecia, specifically 62.7%, exhibited abnormalities in their blood lipid levels. Therefore, the assessment of serum lipids in individuals experiencing AGA could serve as a valuable tool in identifying those who are more susceptible to developing cardiovascular conditions and metabolic syndrome. This highlights the importance of incorporating lipid evaluation into the routine care of men with AGA to potentially mitigate the risks associated with these systemic disorders.

Ethical Approval: The study was approved by Research Evaluation Unit of CPSP vide Ref No. CPSP/ REU/DER-2019-055-1105.

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Author's Contribution

AA: Conception & design, drafting of article.

SM: Conception & design, analysis & interpretation, final approval of the version to be published

AI: Drafting of article, final approval of the version to be published.

MI: Acquisition of data, critical revision of the article.

HS: Acquisition of data, drafting of article.

NI: Analysis & interpretation of data, drafting of article.

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