ORIGINAL RESEARCH PAPER
Volume - 9 | Issue - 12 | December - 2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CORRELATION BETWEEN ANDROGENIC ALOPECIA AND CORONARY ARTERY DISEASE SEVERITY ON CORONARY ANGIOGRAPHY AMONG YOUNG MALES IN CENTRAL INDIA

Cardiology

Dr.Amit Bhanudas Kinare Assistant Professor in Department of Cardiology, NSCBMC and Superspeciality Hospital, Jabalpur, Madhya Pradesh, India.

Dr.Pradeep Kumar Jain Assistant Professor in Department of Cardiology, NSCBMC and Superspeciality Hospital, Jabalpur, Madhya Pradesh, India.

Dr.Nimish Rai Associate Professor, Department of CTVS, NSCBMC and Superspeciality Hospital, Jabalpur, Madhya Pradesh, India.

Dr.Vishwa Deepak Tripathi* Assistant Professor, Department of Cardiology, SSMC Rewa and Associated Superspeciality Hospital, Rewa, Madhya Pradesh, India. *Corresponding Author

ABSTRACT

Androgenic alopecia (AGA) is a hereditary androgen-dependent disorder, characterized by gradual conversion of terminal hair into miniaturized hair and defined by various patterns. This was a hospital-based observational study done on men in the age group of 18–45 years. Thirty cases each, with clinically diagnosed early onset androgenic alopecia (Norwood Grade III or above) (Group A) and without androgenic alopecia (Group B), along with evidence of coronary artery disease (CAD) on coronary angiography (CAG) report were included in the study. Correlation between Male androgenic alopecia grades and coronary artery disease severity in group A was statistically significant in patients with androgenic alopecia when compared to that in group B. Patients presenting with myocardial infarction who had concurrent AGA were evaluated by coronary angiography and found to have comparatively more severe form of coronary artery disease.

KEYWORDS

Androgenic alopecia, cardiovascular disease, coronary angiography.

INTRODUCTION:

Androgenic alopecia (AGA) is an emotionally distressing and therapeutically frustrating dermatological problem characterized by frontal and vertical hair thinning with receding anterior hairline or loss of all hairs. Hamilton proposed a mutual interplay of genetic factors, androgens, and age factor as the cause of AGA. It is a genetically determined disorder in which there is gradual conversion of terminal hair into intermediate hair and finally into vellus hair.[1]

It can have a significant adverse effect on quality of life and its prevalence in Asian men is probably higher than often suspected.[2,3] AGA has been found to be associated with coronary artery disease (CAD)and enlargement of prostate.[4,5] The well-known risk factors of CAD are family history (FH) of CAD, hypertension, increased body mass index (BMI), central obesity, metabolic syndrome, hyperglycemia, and dyslipidemia.[6-10] The newer risk factors are serum lipoprotein-a (Lp-a) serum homocysteine (SH),and serum adiponectin (SA).[4, 11-13]. The mode of inheritance is polygenic and occurs under the influence of androgens in genetically predisposed individuals. Metabolic syndrome (MetS) is a cluster of inter-related risk factors that increase the risk of coronary artery disease (CAD) and includes central obesity, hypertension, hyperglycemia, and dyslipidemia [4]. Several recent studies have shown that AGA is associated with increased risk of CAD, but pathophysiology has been poorly understood. To establish a better relation between AGA and CAD, we have studied the correlation between androgenic alopecia and CAD severity on coronary angiography (CAG) among young males with androgenic alopecia.

MATERIALS AND METHODS

This is an observational study conducted in NSCBMC and Super Specialty hospital Jabalpur, India during the period of June 2019 to February 2020. Thirty young males with age less than 45 years with androgenic alopecia with a previously done CAG (group A) were compared with age matched control (group B) who didn't suffer androgenic alopecia. Hamilton–Norwood classification is commonly used system for grading AGA. AGA developing before 36 year of age and reaching at least Stage III of Hamilton–Norwood classification is termed as early onset AGA. [15] The study was limited to men because of the possible differences in pathogenesis and the controversial role of androgens in female pattern hair loss. Ethical approval for the study was taken from the Institutional Ethics Committee. After obtaining written informed consent from each subject, detailed history and clinical examination was conducted and the details were entered in a pre-designed proforma. The history included age, occupation, duration of alopecia (based on patient history), family history of androgenic alopecia, hypertension, diabetes mellitus and dyslipidemia, history of smoking and alcohol consumption and treatment details for alopecia and CAD.

Diagnosis of androgenic alopecia After the clinical examinations of the participants, they were grouped using degree of androgenic alopecia based on the Hamilton Norwood scale (III–VII).

INCLUSION CRITERIA: Male patients with age less than 45 yrs and having documented angiography report with evidence of CAD.

EXCLUSION CRITERIA: Subjects with the presence of chronic telogen effluvium, history of thyroid disorder (hypo/hyper), on chemotherapy drugs, patients with connective tissue disorder, and those unwilling to participate were excluded from the study. The participants were divided into two groups on the basis of presence of Androgenic Alopecia as case group A (n =30) and age matched control group B (n=30) with no evidence of AGA. Coronary angiography data were obtained from the respective databases. Significant lesions were defined as those with ≥70% diameter narrowing of non-left main coronary arteries; left main CAD was defined as ≥50% stenosis of the left main coronary artery.

All patients were subjected to detailed clinical history, clinical examination & Dermatology assistance was sought for confirmation of AGA and CAD (CAG) reports with separate categorization for both the groups.

STATISTICAL ANALYSIS: Chi-square test for univariate analysis and descriptive statistics were used.

RESULTS:

Table.1 Demographic data between Group A and Group B

	Group A (n=30)	Group B (n=30)
Age mean	34.93±4.17	37.42±4.92
BMI mean	26.78±3.47	21.13±2.47
Smoking	21/30	5/30
Alcohol	14/30	4/30
DM	12/30	8/30
HTN	15/30	10/30
Dyslipidemia	5/30	2/30

Table.2 Clinical presentation of Coronary Artery Disease in Group A and Group B

CAD type	Group A (n=30)	Group B (n=30)
TMT positive	16	10
Unstable angina	08	08
STEMI	03	07
N-STEMI	03	05
Total	30	30

(TMT – Treadmill Test; STEMI – ST segment elevation myocardial infarction; NSTEMI – Non-STEMI)

Table.3 Grades of Androgenic Alopecia

	Group A	Group B
Grade III	10	-
Grade IV	07	-
Grade V	04	-
Grade VI	04	-
Grade VII	03	-
No alopecia	-	30

Table.4 Baseline diseased vessels

	Group A	Group B
SVD	14	25
DVD	10	05
TVD	06	-
Total	30	30

(SVD – Single vessel disease; DVD – Double vessel disease; TVD – Triple vessel disease)

Table.5 Lesion location of Angiogram characteristics

	Group A	Group B
LM	06	14
LAD	07	05
LCX	04	04
RCA	13	07
Total	30	30

(LM – Left main; LAD – Left anterior descending; LCX – Left circumflex artery; RCA – Right coronary artery.)

Table.6 Association between male androgenic alopecia grade and coronary artery disease in the study group

	SVD		DVD		TVD	
	Group A	Group B	Group A	Group B	Group A	Group B
Grade III	05	-	04	-	02	-
Grade IV	03	-	02	-	02	-
Grade V	03	-	02	-	01	-
Grade VI	02	-	01	-	01	-
Grade VII	01	-	01	-	-	-
Total	14	-	10	-	06	-

(SVD – Single vessel disease; DVD – Double vessel disease; TVD – Triple vessel disease)

Table.7

	Group A	Group B	p value
SVD	14	25	0.0428
DVD	10	05	0.0243
TVD	06	-	0.00174

(SVD – Single vessel disease; DVD – Double vessel disease; TVD – Triple vessel disease)

DISCUSSION

Androgenic alopecia (AGA) is an androgen-induced disorder that is characterized by hair loss in genetically predisposed persons. AGA is the most common type of alopecia. AGA as a risk factor for coronary artery disease (CAD) was first suggested by Cotton *et al*. [13] AGA is manifested by androgen-dependent miniaturization of dermal papillae, a process regulated by complex hormonal mechanisms controlled by local genetic codes. It is not clear whether androgenic alopecia is genetically homogeneous, and some authorities have suggested that the early onset of alopecia before the age of 36 year is genetically different from the late onset alopecia.[14] The current study included 30 cases (Group A) and 30 controls (Group B). The mean age of onset of alopecia in our study was 34.93 years. When compared with other studies, we found that the mean age of onset was 28.61 years in Sharma *et al*.,[15] 26.44 years in Chakrabarty *et al*.,[16] 27.03 years in Banger *et al*.,[17] and 40.81 years in Gopinath and Upadya[18]. The mean BMI was found in case and control group were 26.78±3.47 and 21.13±2.47 respectively. It was observed that 21/30 in group A and 5/30 in group B had a history of Smoking. Similarly, alcoholism was found 14/30 in group A and 4/30 in group B. Diagnosis of the heart condition in the group A, majority of the participants were TMT positive followed by participants with unstable angina. Grade III AGA was found to be most common and was seen in 10 (38%) patients followed by Grade IV in 9 (32%), Grade V in 04 (26%), Grade VI in 04 (4%) and Grade VII in 03. Family history of AGA and cardiovascular risk factors was positive in other studies also.[14-18] Grade III AGA was found to be most common in other studies as well like 44% in Chakrabarty *et al*.,[16] 29% in Banger *et al*.,[17] and 38% in Gopinath and Upadya.[18] Baseline angiographic characterization of the case group A revealed no adverse hospital outcome. However, Single Vessel Disease (SVD) vessel involvement was the most common, with the lesion location in Left Anterior Descending (LAD). Several studies had indicated that androgenic alopecia had a higher than normal risk for CAD, but few studies focused specifically on lipid profiles[19] which were important in the pathogenesis of CAD such as total cholesterol, Triglycerides (TGL, HDL-cholesterol and LDL-cholesterol in patients with androgenic alopecia. Many studies had shown a strong association between HDL levels and AGA. [14-18] Most studies uniformly concluded that there was certain evidence associating AGA with Metabolic syndrome. However, data are scarce to have evidence of association linking the severity of AGA and that of CAD demonstrated using CAG; hence we took up the study. In our study we demonstrated a strong correlation of AGA with CAD severity which was statistically significant. To the best of our knowledge, this is the first of its kind study demonstrating a strong correlation of AGA with CAD. We have a similar demonstration in a Study done by Lata Sharma et al, which stated that patients with AGA are at an increased risk of developing CAD, and hence proposed that clinical evaluation of cases with AGA of grade II and above may be of help in preventing CAD in future [20]. Rita V Vora et al, demonstrated a higher prevalence of cardiovascular risk factors was seen in men with early-onset androgenic alopecia [21]. Paulo A Lotufo et al [22] in his study identified vertex pattern baldness appears to be a marker for increased rate of CHD events. Kamal H Sharma et al, demonstrated statistically significant association of AGA in young Asian Gujarati men with CAD and the prevalence of AGA in young CAD patient is 37.73%.[23] It is interesting to note that a study done by Sonali Pechlivanis et al suggest a weak association between male pattern baldness (MPB) and a few CHD risk factors (CAC, DM and BMI) but do not point to MPB as a strong surrogate measure for CHD and CHD risk factors in general. [24]

CONCLUSION

Patients presenting with documented CAD (especially in MI scenario) who had concurrent AGA were evaluated by coronary angiography and found to have severe coronary artery disease. Though this a unique study, further large-scale data studies would be required to endorse their findings.

REFERENCES

1. Thomas J. Androgenetic alopecia – Current status. Indian J Dermatol 2005; 50:179-90.
2. Paus R, Olsen EA, Messenger AG, Hair Growth Disorders. In: Wolff K, Goldsmith LA, Katz SI, Gilchrest BA, Paller AS, Leffell DJ, editors, Fitzpatrick's Dermatology in General Medicine. 7th ed. New York: McGraw Hill; 2008. p. 753-72.
3. Pathomvanich D, Pongratananukul S, Thienthaworn P, Manoshai S. A random study of Asian male androgenetic alopecia in Bangkok, Thailand. Dermatol Surg 2002; 28:804-7.
4. Trevisan M, Farinaro E, Krogh V, Josssa F, Giumetti D, Fusco G, *et al*. Baldness and coronary heart disease risk factors. J Clin Epidemiol 1993; 46:1213-8.
5. Chen W, Yang CC, Chen GY. Patients with a large prostate show a higher prevalence of androgenetic alopecia. Arch Dermatol Res 2004; 296:245-9.
6. Guttmacher AE, Collins FS, Carmona RH. The family history-more important than ever. N Engl J Med 2004; 351:2333-6.
7. Borghans L, Golsteyn BH. Time Discounting and the Body Mass Index: Evidence from the Netherlands. Econ Hum Biol 2006; 4:39-61.
8. Seidell JC, Pérusse L, Després JP, Bouchard C. Waist and hip circumferences have independent and opposite effects on cardiovascular disease risk factors: The Quebec Family Study. Am J Clin Nutr 2001; 74:315-21.
9. Nielson C, Lange T, Hadjokas N. Blood Glucose and Coronary Artery Disease in Non-diabetic Patients. Diabetes Care 2006:29:998-1001.
10. Wranicz JK, Cygankiewicz I, Rosiak M, Kula P, Kula K, Zareba W. The relationship between sex hormones and lipid profile in men with coronary artery disease. Int J Cardiol 2005; 101:105-10.
11. Kamstrup PR, Tybjaerg-Hansen A, Steffensen R, Nordestgaard BG. Genetically elevated lipoprotein(a) and increased risk of myocardial infarction. JAMA 2009; 301:2331-9.
12. Sinclair RD, Dawber RP. Androgenetic alopecia in men and women. Clin Dermatol 2001; 19:167-78.

13. Cotton SG, Nixon JM, Carpenter RG, Evans DW. Factors discriminating men with coronary heart disease from healthy controls. Br Heart J 1972; 34:458-64.
14. Matilainen VA, Mäkinen PK, Keinanen-Kiukaanniemi SM. Early onset of androgenetic alopecia associated with early severe coronary heart disease: A population-based, case-control study. J Cardiovasc Risk 2001; 8:147-51.
15. Sharma L, Dubey A, Gupta PR, Agrawal A. Androgenetic alopecia and risk of coronary artery disease. Indian Dermatol Online J 2013; 4:283-7.
16. Chakrabarty S, Hariharan R, Gowda D, Suresh H. Association of premature androgenetic alopecia and metabolic syndrome in a young Indian population. Int J Trichology 2014; 6:50-3.
17. Banger HS, Malhotra SK, Singh S, Mahajan M. Is early onset androgenic alopecia a marker of metabolic syndrome and carotid artery atherosclerosis in young Indian male patients? Int J Trichology 2015; 7:141-7.
18. Gopinath H, Upadya GM. Metabolic syndrome in androgenic alopecia. Indian J Dermatol Venereol Leprol 2016; 82:404-8.
19. Arias-Santiago S, Gutierrez-Salmeron MT, Buendia-Eisman A, Giron-Prieto MS, Naranjo-Sintes R. A comparative study of dyslipidaemia in men and woman with androgenic alopecia. Acta Derm Venereol 2010; 90:485-7.
20. Sharma L, Dubey A, Gupta PR, Agrawal A. Androgenetic alopecia and risk of coronary artery disease. Indian Dermatol Online J. 2013;4(4):283-287. doi:10.4103/2229-5178.120638.
21. Vora RV, Kota RS, Singhal RR, Anjaneyan G. Clinical profile of androgenic alopecia and its association with cardiovascular risk factors. Indian J Dermatol 2019; 64:19-22.
22. Lotufo PA, Chae CU, Ajani UA, Hennekens CH, Manson JE. Male Pattern Baldness and Coronary Heart Disease: The Physicians' Health Study. Arch Intern Med. 2000;160(2):165–171. doi:10.1001/archinte.160.2.165.
23. Sharma KH, Jindal A. Association between androgenetic alopeciaand coronary artery disease in young male patients. Int J Trichology.2014;6:5–7.
24. Pechlivanis S, Heilmann-Heimbach S, Erbel R, Mahabadi AA, Hochfeld LM, Jo¨ckel K-H, et al. (2019) Male-pattern baldness and incident coronary heart disease and risk factors in the Heinz Nixdorf Recall Study. PLoS ONE 14(11): e0225521.