ORIGINAL ARTICLE

Early Androgenetic Alopecia as a Predictor of Ischemic Heart Disease

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ABSTRACT

Aim: To predict the relationship between Androgenetic alopecia and ischemic heart diseases.
Methodology: This case control multicenter study was conducted in Cardiology Department, Sheikh Zayed Hospital, Rahim Yar Khan, Services Hospital, Lahore and Bahawal Victoria Hospital, Bahawalpur. Study was accomplished in 12 months from August 2016 to August 2017, Ethical approval was obtained from all institutions and informed consent was also taken by all patient regarding inclusion in study. Statistical data was analyzed by using Computer software SPSS version 23. Numerical variables age, AGA duration, WC and BMI of the pts were presented as SD and mean.
Results: Overall 184 patients were selected in this study; after dividing them into two equal groups 92(50%) in each, we named them as case (Group A) and control (Group B) respectively. The mean age, AGA duration, WC and BMI of the patients of group A were 23.80±2.12 years, 7.58±2.16, 101.79±2.85cm, and 25.13±2.12 kg/m^{2}respectively. While, the mean age, WC and BMI of the patients of group B was 26.17±1.80 years, 91.84±2.25 cm and 22.97±1.65kg/m^2 respectively. There were 66(71.7%) and 65(70.7%) smokers for the group A and B respectively. There were 65(70.7%) patients of AGA history in group A, while it was only 30(32.6%) in group B. There were 33(35.9%) patients of CVD family history in group A, and only 9(9.8%) in group B.
Conclusion: The results of our study revealed that significantly high incidence of ischemic heart disease was present in individuals with Androgenetic alopecia, similarly SBP, DBP, cholesterol, triglyceride and LDL level were also found high. So it can be concluded that Androgenetic Alopecia is an indicator of ischemic heart disease.
Keywords: Androgenetic Alopecia, Predictor, Ischemic heart disease.

INTRODUCTION

Androgenetic alopecia (AGA) is a very common disease in women and men. In this disease the hair is lost due to genetic disposition in women and men. It starts after puberty. It has various effects on the quality of individual's life[1]. In men; this disease is also called male pattern baldness. The hair begins to fall above both temples. With the passage of time, a receding hairline form "M" shape[2]. This process continues till a person becomes a partial or completely bald. In women the hair loss pattern is different from that of male-pattern baldness[3]. Firstly, overall hair becomes thin in women and Androgenetic alopecia rarely becomes the cause of complete baldness in them[4].

Alopecia increases the risk of many diseases like hypertension, dyslipidemia, metabolic syndrome, insulin resistance, hyperinsulinaemia, and coronary heart disease[5]. The reason for the relationship between CHD and baldness is still unclear. The suggestion has been given that smoking, dyslipidemia, hypertension and age are most influential risk factors for both coronary disease and baldness as well. Chronic inflammation plays a basic role in producing cardiovascular disease, insulin resistance and endothelial dysfunction because it is dominant in those patients who are suffering from Androgenetic alopecia[6].

During pathogenesis of Androgenetic alopecia, androgen is involved that binds to vascular receptors and it causes the hyperaldosteronism and increases blood pressure. In hypertensive patients, both the hyperaldosteronism and raised blood pressure play important role in development of Androgenetic alopecia[7].

Both ischemic heart disease and Androgenetic alopecia (AGA) are linked with each other[8]. In 1972, Cotton et al suggested that hair loss and cardiovascular diseases are associated with each other. So at that time, it was indicated that the male pattern baldness (MPB) might play a vital role in cardiovascular diseases. If androgen level is high, it becomes the cause of atherosclerosis and thrombosis and AGA[9]. According to a study, there is a greater risk of developing IHD in those men with high level of AGA.

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The aim of our study to was analyze that whether androgenetic alopecia association with ischemic heart disease as local literature on this subject is deficient[10]. So our study will provide basis for future research.

MATERIAL AND METHOD

After getting ethical permission from the ethics committee of the institution, this multicenter case control study was conducted in Cardiology Department, Sheikh Zayed Hospital, Rahim Yar Khan, Services Hospital, Lahore and Bahawal Victoria Hospital, Bahawalpur. Study was accomplished in 12 months from August 2016 to August 2017. Informed consent was also taken by all patient regarding inclusion in study, patients were also completely briefed about their participation in study, its procedure and purpose also. Control group contained 92 patients. There age was nearly (20-30 years). The patients which were included in control group were apparently healthy and of almost same age, and with the absence of cardiac disease history. Those patients suffering from liver disease, renal failure, Cushing's disease, Thyroid gland, autoimmune and malignancies diseases were excluded.

For thorough study, data of the included patients was collected including their family history of AGA and smoking habit. Similarly dermatological examination of all the patients was done completely for proper diagnosis of Androgenetic alopecia (AGA). Complete medical examination' including ("BMI") and blood pressure measurement were recorded properly. All the lab measurements such as serum level of (TC), Triglyceride (TG), (HDL-C), (LDL-C), 12 leads EGG Alcoa were done.

All the statistical data was analyzed by using Computer software SPSS version 23.2. Numerical variables like age, BMI, duration of AGA, WC, SBP, DBP, TC, LDL, HDL, triglyceride level were presented as SD (standard deviation) and mean. To find the significance among groups statistical test ANOVA was applied. Frequency and percentage was calculated for categorical variables like family history of IHD, smoking, ECG changes for ischemia and Echo findings for Ischemia. Chi square test was used to analyze the categorical variable among groups. P value $\leq$0.05 was considered as significant.

RESULTS

Overall 184(100%) patients were selected in this study; after dividing them into two equal groups 92(50%) in each, we named them case (Group A) and control (Group B) respectively for convenience. The mean age, AGA duration, WC and BMI of the patients of group A were 23.80±2.12 years, 7.58±2.16, 101.79±2.85cm, and 25.13±2.12kg/m^2 respectively. While, the mean age, WC and BMI of the patients of group B was 26.17±1.80 years, 91.84±2.25 cm and22.97±1.65kg/m^2 respectively. There were 66(71.7%) and 65(70.7%) smokers for the group A and B respectively. There were 33(35.9%) patients of CVD family history in group A, and only 9.8% (n=9) in group B. (Table. 1).

The mean Systolic BP, Diastolic BP, Cholesterol, Triglycerides (mg/dl), HDL and LDL of the patients of group A was 124.49±6.40, 81.08±2.66, 190.66±10.22, 147.38±11.90, 39.52±10.47 and 126.08±12.39 respectively. While, the mean Systolic BP, Diastolic BP, Cholesterol, Triglycerides (mg/dl), HDL and LDL of the patients of group B was 117.90±4.65, 80.15±2.14, 180.01±5.93, 125.95±3.76, 40.08±2.11 and 118.04±15.07 respectively. ECG findings in cases and control groups were abnormal 9(9.8%) and 2(2.2%) respectively (Table. 2). Echo finding for ECG positive cases was noted as abnormal in 4(44.4%) and 50% (n=1) for case and control respectively (Table.3). Comparison between different degrees of AGA of patient groups regarding risk factors (Table 4).

Significant differences were found between age (p=0.000), BMI (p=0.000), WC (p=0.000), systolic BP (p=0.000), diastolic BP (p=0.010), cholesterol (p=0.000), triglycerides (p=0.000), and LDL (p=0.000), in groups. Significant differences were found between different degrees of AGA of patient groups regarding risk factors, except TG (p=0.298).Association was found between CVD family history (p=0.000), ECG (p=0.030), in groups (Table1-4).

Table 1: Demographic variables

Variable	Case Group A n=(92)	Control Group B n=(92)	Test of Sig.
Age	23.80±2.12 years	26.17±1.80 years	t=-8.162, p=0.000
BMI	25.13±2.12 kg/m^2	22.97±1.65 kg/m^2	t=7.67, p=0.000
AGA duration	7.58±2.16	-----	-----
CVD Family History	Yes=35.9%, No=64.1%	Yes=9.8%, No=90.2%	χ^2=17.77, p=0.000
Smoking Status	Smoker=71.7%	Smoker=70.7%	χ^2=0.027, p=0.871
WC	101.79±2.85	91.84±2.25	t=26.30, p=0.000

AGA: Androgenetic alopecia.**BMI:** body mass index. **WC:** waist circumference. **CVD:** cardiovascular diseases. **Kg/m2:** kilogram per square meter. **cm:** centimeter.

Table 2:

Variable	Case Group A n=(92)	Control Group B n=(92)	Test of Sig.
Systolic BP	124.49±6.40	117.90±4.65	t=7.98, p=0.000
Diastolic BP	81.08±2.66	80.15±2.14	t=2.59, p=0.10
Cholesterol	190.66±10.22	180.01±5.93	t=8.64, p=0.000
Triglycerides(mg/dl)	147.38±11.90	125.95±3.76	t=16.47, p=0.000
HDL	39.52±10.47	40.08±2.11	t=-0.508, p=0.612
LDL	126.08±12.39	118.04±15.07	t=3.95, p=0.000
ECG Changes	Abnormal=9.8%, Normal=90.2%	Abnormal =2.2%, Normal=97.8%	χ^2=4.74, p=0.030

Table 3: Echo finding for ECG positive cases

Echo	Case %	Control %	Test of Sig.
Normal	5, 55.6%	1, 50%	χ^2 =2.45 p=0.484
Abnormal	4, 44.4%	1, 50%	
Total	9, 100%	2, 100%	

Table 4: Comparison between different degrees of AGA of patient group regarding risk factors

Cases	Grading			Test of Sig.
	Mild	Moderate	Severe	
SBP	117.50±2.88	125.90±6.38	132.19±5.47	t=-6.57, p=0.000
DBP	77.90±2.44	81.13±6.34	84.87±3.79	t=-2.605, p=0.012
Ch	185.47±9.11	190.07±11.93	192.78±12.11	t=-1.67, p=0.099
TG	139.37±12.63	143.03±14.34	150.97±8.20	t=-1.05, p=0.298
HDL	41.36±2.74	39.03±1.79	36.84±8.04	t=3.89, p=0.000
LDL	133.20±23.24	116.97±12.07	134.31±24.22	t=3.35, p=0.001

DISCUSSION

It has been found that male pattern baldness (MPB) or Androgenetic alopecia (AGA) increases the risk of coronary heart disease. There are many prominent risk factors such as hyperglycemia, dyslipidemia, family history, central obesity, increased body mass index (BMI) and hypertension[11]. It has been found there is also a relationship between meningeal disorder and AGA as well as Cardio vascular disease but the underlying cause of this relationship is still unclear[12].

Some studies indicates that obesity might be an additional factor in the development of AGA .It has been reported that baldness is associated to CHD, with the help of different mechanism like increased peripheral sensitivity to androgens, chronic inflammation and hyperinsulinaemia. That is why we have done this study to explain the data that is concerned with traditional cardio vascular risk factor. So that the relationship between cardiac disease and androgenic alopecia can be predicted easily. The risk factors of cardiac disease are different in different people. Risk factors depend on the age and sex. So, here in our case we have selected those whose age and sex match with control group.

In present study it was found that 2/3 patients of androgenic alopecia had habit of smoking. However, the difference in smoking habit of control and cases is not recognized by us . IT is because smoking plays a basic role in cardio vascular disease. The enrollment of smoker is a form of limitation in this study. In this study the waist and BMI were significant among cases as compared to control. Obesity was also prominent. All this shows that androgenic alopecia patients had redistributed abdominal fat. This is risky factor of cardio vascular disease .It is linked with insulin resistance. Obesity which is also linked with hyperandrogenism, increases hirsutism, androgenic alopecia and acne vulgarus[13]. Many previews studies show that obesity is visual in androgenic alopecia patients. For example, the study was done by Gonzale.z.et al[17]. He took 80 young males of (18-35) years.

In another study done by Diane et al obesity is one of cause factor of AGA[18]. The study was done by Starka et al showed that obesity is additional factor to AGA for cardiac disease[19].

Shrine et al performed a study in which, 60 men were enrolled, they were small in number (as 30 were included in control group).here in this study controversy was found[14].· Another such kind of study was done by Arias Santiago et al support this observation that effect of AGA is not sufficient for the identification of patients in clinical practice. But it could be helpful in epidemiological research.

In our study, there was not a greater level in DBP, but there was a greater level in SBP in AGA comparing with the control group. The study done by Shrine et al and Sharma et al showed that those patients suffering from androgenic alopecia has high level of blood pressure and aldosterene level. The study of Ahouansou et al indicated that androgen is

present in AGA pathogenesis. This androgen attaches itself with the vascular receptors. In this way it helps in increasing the blood pressure. Two anti-hypertensive medications are used to increase minoxidil, spironolactone and hair growth. Similar to our study, it has been informed by Sherine, Arias Santiago and Matllainen that hypertension is associated with Androgenetic alopecia[16]. Ahouansou et al. found that out of all 82% of patients with blood pressure (140/90 mmhg) had alopecia as compared to persons with normal blood pressure and this relationship was totally independent of age factor)[15].

Airsso et al performed his study [[20]].He did not get any prominent difference between DBP and SBP levels in patients (age less than 35 years) as compared to control group. The pathogenic relation between atherosclerosis and alopecia is still unclear, but pathological mechanism of atherosclerosis is completely known. Greater levels of TG and TC, with the help of other mechanism, take part in starting atheromatous plaque. We also found that TG level increases with increase in alopecia's severity. This was supported by Arias- Santiago et al. Mean HDL-C is found by Arias and all. But it is lower in patient suffering with alopecia. Contrary to this, it has been reported by Sharma et al that there was biggest difference of LDL between studied group.LDL was taken as a basic risk factor of CAD and HDL level was also inversely proportion to risk. The consequences of our study finished on restricted stage approximately look a lot like and these outcomes are comparable with studies done recently on larger scale and higher level.

CONCLUSION

The results of our study revealed that significantly high incidence of ischemic heart disease was present in individuals with Androgenetic alopecia , similarly SBP, DBP , cholesterol, triglyceride and LDL level were also found high. So it can be concluded that Androgenetic Alopecia is an indicator of ischemic heart disease.

Finding Source: Nil
Conflict of Interests: Nil

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