Is there any relationship between cardiovascular disease and androgenetic alopecia in men and women?

Background: Worldwide, coronary heart disease is the most important cause of mortality and morbidity. Although numerous studies have documented the relationship between male pattern baldness and cardiovascular disease (CVD), few studies focused on this association in women. This study intended to evaluate the relationship between coronary artery disease and androgenetic alopecia (AGA) in both men and women.

Methods: This case-control study included 200 people, 100 (50 men and 50 women) with coronary heart disease (CHD) and 100 healthy control subjects (50 men and 50 women). Both groups were assessed for grading the severity of their baldness. The collected data were analyzed by the chi-square test.

Results: A total of 74% of participants in this group had hair loss severity of grades IV-VIII, however in the control group, 50% had remarkable hair loss. There was a significant association between coronary artery disease and hair loss grade IV onward in men (\(P=0.038\)) but this relationship was not observed in women.

Conclusion: Male patients with AGA are at greater risk for developing CVD.

Keywords: androgenetic alopecia, cardiovascular disease, male pattern baldness
A number of surveys have reported that AGA is more common in patients with CVD but their exact relationship is still unknown. Accurate and rapid identification of persons at risk and control of risk factors may be helpful in reducing morbidity and mortality associated with CVD. Individuals with AGA are more susceptible to CHD; hence screening people with AGA for CVD at a younger age may be suggested.

PARTICIPANTS AND METHODS

This cross-sectional study enrolled 200 patients (100 males and 100 females) aged between 50-70 years. We chose patients who referred to Afshar Hospital (Yazd, Iran) during the year 2012. Inclusion criteria comprised: all patients with myocardial infarction, individuals who had undergone bypass surgery or angioplasty, and had at least 50% stenosis in one coronary vessel on angiography. The control group consisted of people with normal angiography results. Patients in both groups were examined and we determined the amount of hair loss. The Hamilton-Norwood grading for men and Ludwig scale for women were used to classify baldness.

RESULTS

From 200 people that participated in our study, half suffered from coronary artery disease (CAD); the other half consisted of normal individuals defined as those who did not have a history of myocardial infarction, bypass surgery or angioplasty, and normal angiography results.

Table 1 shows the distribution of male baldness in the study and control groups. Among 50 men with CVD 92% experienced hair loss. This figure was 80% in the control group. Overall, no significant relationship existed between hair loss and CVD in men (odds ratio (OR): 2.87; P=0.148). Chi-square analysis was used to evaluate and compare the severity of hair loss in both groups. A statistical significant association between the severity of hair loss and CAD existed in patients with CAD (P=0.038). A total of 74% of participants in this group had hair loss severity of grades IV-VIII, however in the control group, 50% had remarkable hair loss (Figure 1).

In the CHD group, 66% (32/50) of women had some degree of hair loss upon examination. In the control group, 46% had female pattern baldness (OR: 2.27; P=0.069). This finding showed a non-significant relationship between hair loss and CVD in women (Table 2). Unlike men, we did not observe any statistical significant association between the severity of hair loss and heart disease.

<table>
<thead>
<tr>
<th>Hair loss</th>
<th>No hair loss</th>
</tr>
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<tbody>
<tr>
<td>Frequency (%)</td>
<td>Frequency (%)</td>
</tr>
<tr>
<td>Control group</td>
<td>40 (80)</td>
</tr>
<tr>
<td>Study group</td>
<td>46 (92)</td>
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</tbody>
</table>

Table 1. Distribution of male baldness in the study and control groups.

Figure 1. Comparison of male baldness severity in the study and control groups.
in women ($p=0.966$). Among female patients with 
CVD, 54.5% had grade I, 39.4% had grade II, and 
6.1% had grade III hair loss. In the control group 
there were 47.8% of women with grade I hair loss, 
whereas 52.2% had grade II hair loss. None of the 
women had grade III hair loss (Figure 2).

**DISCUSSION**

Results of this study, as with other studies 
along this line, revealed a significant association 
between CAD and hair loss of grade IV onward. 
The current study, however, was unique because 
of the investigation on both men and women, and 
the use of angiography for selection of the control 
population.

Coronary heart disease is increasing daily 
and this disease is the most important cause of 
mortality. Accurate diagnosis of at risk people and 
control of risk factors may be helpful in decreasing 
complications. However because people with AGA 
appear to be at risk for CVD, it may be suggested 
that screening of people with AGA for CVD at a 
younger age may reduce the mortality rate of this 
disease.

The major difference between our study and 
previous studies was the simultaneous investigation 
on both men and women. Most surveys only 
studied males $^{13-18}$. Mansouri et al. and Farajzadeh 
et al. only investigated females $^{3,19}$.

Among 200 patients in our study, there were 
100 men and 100 women. We selected 100 patients 
without CAD and 100 patients with CAD. A study 
performed by Arias–Santiago et al. divided 154 
patients into two groups of 77 subjects (40 males 
and 37 females) with or without AGA $^1$. Another 
study enrolled 50 men with AGA and 31 with 
normal hair growth $^{13}$. In one study, Moravej et al. 
investigated 200 patients with CHD as defined by 
50% stenosis in at least one of the large epicardial 
vessels. The control group comprised 200 people 
with normal angiography results (less than 50% 
stenosis in coronary vessels) $^{15}$.

Both men and women were investigated 
simultaneously in two studies. Arias–Santiago 
et al. investigated the relationship between AGA 
and risk factors for CVD. Results of this study 
revealed that carotid ultrasound and metabolic 
syndrome assessment could be useful screening 
methods to detect the risk of developing CVD in 
males and females with early-onset AGA and 
signal a potential opportunity for early preventive 
treatment $^1$.

In a cohort study, Schnohr et al. studied 13000 
males and females who initially had no evidence of 
CHD. During the 12-year follow up, 750 participants 
suffered from myocardial infarction. Schnohr et 
al. found a significant relationship between male 
baldness and myocardial infarction, however
this association was not statistical significant for women. Results of this study agreed with our investigation where we found a significant relationship between male baldness and CAD. In the current study, this association was not meaningful for women. However, in some studies that enrolled only females, the results differed compared to the current study.

Mansouri et al. studied the association between AGA and CVD in women. A total of 106 women under 55 years of age underwent coronary angiography. They suggested that female pattern hair loss was a possible risk factor for CHD.

Farajzadeh et al. assessed lipid profiles in 82 people with or without female pattern alopecia. They concluded that lipid profiles, especially lipoprotein (a), were the most important risk factor for CAD. Thus, lipid profiles in women with female pattern hair loss should be investigated. In cases of abnormal test results, they should be referred to a cardiologist.

Most previous studies have focused on this association in men. The majority have stressed that bald men are at higher risk for CHD compared to men who are not bald. Moravej et al. studied 400 men who underwent angiography procedures for diagnosis of CAD. They concluded that patients who have AGA grade III and above were at greater risk for CHD compared to people without AGA.

Matilainen et al. investigated the relationship between early onset AGA and CVD. In this case-control study, 85 men who underwent coronary revascularization enrolled. Their results confirmed the relationship between early onset AGA and severe CHD. Lotufo et al. evaluated the association between AGA and risk factors for CVD. The vertex type of AGA and CAD had the highest correlation.

Although most studies supported the positive association between AGA and CVD, some investigations had results. Shahar et al. examined the relation of baldness pattern to carotid intimal-medial thickness. They suggested that male pattern baldness was not associated with elevated CHD risk.

Although previous articles concluded that a relationship existed, but in some cases conflicting results were reported. In our study we observed a meaningful association between the severity of baldness and CAD in male patients ($P=0.038$) but this relationship did not exist among women with hair loss. We enrolled 200 patients aged 50–70 years in this study, however most studies revealed that younger patients with severe early onset AGA have at higher risk of CHD. Hence, if we had considered younger people in our investigation, the results of this study would have been more practical, especially because age alone is a risk factor for CVD and in men CAD occurs at a younger age.

The $P=0.069$ suggested that if the sample size had been bigger, we could have detected a significant relationship between hair loss and CVD in women.

In conclusion, we observed a statistical significant association between severity of male baldness and CVD. However, this relationship was not observed among women with AGA. The latter finding contrasted other studies that focused on this association in women. As with most previous studies, we have suggested that the presence of AGA may help identify men at risk of CHD.

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REFERENCES


