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The Association between Metabolic Syndrome Components and Hair Loss both Male and Female Individuals

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Abstract

In last decade studies have noted that hair loss could be a manifestation of metabolic abnormalities including increased insulin resistance, blood pressure, total cholesterol, triglyceride and decreased insulin sensitivity and HDL-C. Additionally, the recent studies have shown that hair loss have an increased risk for mortality from cardiovascular disease accompanied with metabolic syndrome both in male and female adults. Therefore the patients with hair loss should be detected for metabolic syndrome and metabolic syndrome components and those with metabolic syndrome should be followed up for cardiovascular disease risk.

Keywords: Hair loss; Insulin resistance; Metabolic syndrome; Cardiovascular disease risk

The Association between Metabolic Syndrome Components and Hair Loss

Hair grooming practices, chemotherapy and genetic has been reported to be associated with hair loss [1-4]. However, there are few studies about the association between hair loss and metabolic syndrome components.

Metabolic syndrome (MetS) was defined according to the revised National Cholesterol Education Program Adult Treatment Panel III criteria. The individual components were as following; waist circumference ≥ 88 cm for women or ≥ 102 cm for men, glucose ≥ 100 mg/dL, blood pressure ≥ 130/85 mmhg or on medication for hypertension, HDL<40 mg/dL in men or <50 mg/dL in women, and triglycerides ≥ 150 mg/dL [5].

There is growing evidence on the relationship between hair loss and metabolic syndrome components since 2000. First of all, insulin resistance accepted as a marker of metabolic syndrome has been evaluated in male patients with early androgenic alopecia. In Matilainen et al. study, early androgenetic alopecia (AGA) was suggested as a marker of insulin resistance as well [6]. In relation to this study the AGA seen in young aged men below 30 years, was found to be associated with reduced insulin sensitivity and was characterized by altered the sexual hormone binding globulin levels and the follicle stimulant hormone levels accompanied with the increased free androgen index [7]. The authors concluded that men with premature AGA could be considered as a male equivalent of the polycystic ovary syndrome of the women. These premature balding men represent a risk group for the development of impaired glucose tolerance or diabetes mellitus type 2. In a Finnish population based study, low insulin sensitivity was seen in 55-year-old males with an AGA and this study has demonstrated that the presence of insulin resistance in elderly men with AGA just as young male patients with AGA [8].

Matilainen also studied insulin resistance and hair loss in middle-aged women and concluded some markers of insulin resistance had significantly higher risk for female AGA [9]. The Finnish study reported the same region with the previous study the prevalence rates of impaired glucose regulation and insulin resistance were found to be significantly higher among the women with hair loss compared to women with normal hair [10]. However, on contrary these studies in case controlled study from Egypt no association was observed between AGA and insulin resistance in young aged group including both gender [11]. In relation to this study in Nabaie et al. study there was no difference in individual components of metabolic syndrome including serum fasting insulin level, fasting blood glucose, serum total cholesterol, triglyceride, high density cholesterol levels (HDL-C) and insulin resistance between the AGA and a control group [12].

The relationship between alopecia and individual components of MetS has been initially evaluated in around 2010. In case controlled study insulin, the insulin resistance using the homeostasis model assessment of insulin resistance (HOMA-IR) index, lipids and free testosterone were found to have additive effect on AGA in young men aged 18-35 years old. Diastolic blood pressure was observed to be significantly higher and HDL-C levels were determined to be significantly lower in young men with AGA [13]. The study from Turkey conducted also in young male participants the MetS components including blood pressure and total cholesterol was significantly higher in AGA group. Additionally, HOMA-IR was significantly higher in AGA group. Increased fasting glucose, insulin, triglyceride and decreased HDL-C levels were also observed, however they were not reach the statistical significance [14]. In the community based study, a significant association was found between AGA and the presence of MetS [odds ratio (OR 1.67) and also metabolic syndrome components (OR 1.21) after controlling for age, family history of AGA and smoking status in men. Among the MetS components, HDL-C (OR 2.36, P=0.001) was found to be revealed as the most important factor associated with AGA [15].

As mentioned various studies in recent years have associated male AGA with the risk of metabolic syndrome and cardiovascular disease. However, only a few studies have addressed this association in female patients.

In Yi et al. population-based study the prevalence of MetS was found to be positively associated with AGA in the female group, while no relationship was observed in male group. Author concluded that

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different mechanisms might have been played role on the development of alopecia between male and female [16]. In the population based study investigating risk factors for central hair loss, presence of diabetes mellitus type 2 was significantly higher among the other environmental and medical factors in patients with central hair loss in African women [17].

In around 2010, the relationship between MetS components and hair loss has been evaluated in both gender groups. In recent case control study patients with AGA had significantly higher hyperglycaemia (>110 mg/dL) ratio (39.1%) compared to controls in both gender group (12.5%) [18]. In case controlled study from Spain MetS was found to be significantly higher in patients with AGA in both gender group (60% of male patients with AGA, 48.6% of female patients with AGA, 12.5% of male control subjects, and 8.1% of female control subjects ($P<0.0001$) (odds ratio [OR] was 10.5 in male patients, OR was 10.73 in female patients). Atheromatous plaques, the aldosterone and insulin levels were also significantly higher in patients with AGA [19].

In recent population-based prospective cohort study, it has been evaluated the association of the rate of mortality from DM and heart disease and the severity of AGA in 7252 participants. After about 5 years follow-up period a significantly higher risk of mortality from DM and heart disease has been observed in moderate to severe AGA compared to normal or mild AGA in both gender group after adjusting for age, family history of DM or heart disease, and MetS (Adjusted Hazard Ratio; 2.97, 2.28, respectively) [20]. These studies emphasizes that even different mechanisms have played roles on the development of alopecia in male and female, the rate of cardiovascular disease and mortality from these cardiovascular disease has shown to increase in both gender group.

As mentioned hair loss could be a manifestation of metabolic abnormalities including increased insulin resistance, blood pressure, total cholesterol, triglyceride and decreased insulin sensitivity and HDL-C. In recent studies it has been shown that hair loss has an increased risk for mortality from cardiovascular disease. Therefore patients that admitted the hospital with hair loss should be screened for MetS and MetS components. Hair loss increasing cardiovascular disease risk and worse metabolic profile have to be determined and the patients either men or women with hair loss should be followed up for cardiovascular disease risk. It has been needed further studies to evaluate the relationship between MetS and hair loss.

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