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Trichoscopic Findings in Androgenetic Alopecia

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ABSTRACT

Background: Androgenetic alopecia (AGA) is an androgen-related condition that develops in genetically predisposed individuals. The condition is characterized by the progressive loss of terminal hairs on the scalp in a characteristic distribution. Trichoscopy represents the dermoscopy imaging of the scalp and hair. Structures which may be visualized by trichoscopy include hair shafts, hair follicle openings, perifollicular epidermis and cutaneous microvessels. **Objective:** The aim of this prospective study was to identify the trichoscopic features of androgenetic alopecia. **Methods:** Hundred-four patients with AGA and 80 healthy subjects were enrolled in this study. Data on age, gender, personal and family history, clinical type and duration of disease were collected and analyzed. Control group consisted of 80 generally healthy subjects. Trichoscopic examination was performed using either videodermatoscope or handheld dermatoskope. Trichoscopy results were obtained in frontal, occipital and both temporal areas of the scalp, including number of yellow dots and vellus hairs, number of hairs in one pilosebaceous unit and percentage of follicular ostia with perifollicular hyperpigmentation. The data were statistically evaluated. **Results:** The number of yellow dots, pilosebaceous units with only one hair and with perifollicular hyperpigmentation was significantly increased in androgenetic alopecia ($p<0.05$). The percentage of thin hairs (<0.03 mm) in AGA was significantly higher than in healthy controls ($p<0.05$). **Conclusion:** Our study has shown the significances of trichoscopy of patients with AGA. Regular clinical and trichoscopical follow-ups are very important to monitor disease activity and treatment tolerance.

Keywords: androgenetic alopecia, hair, trichoscopy, videodermoscopy.

1. BACKGROUND

Androgenetic alopecia (AGA) is an androgen-related condition that develops in genetically predisposed individuals. The disease affects up to 80% of Caucasians man and no less than 42% of women (1). AGA is characterized by stepwise miniaturization of the hair follicle, resulting from alteration in the hair cycle dynamics, leading to vellus transformation of terminal hair follicle (2). The result is a progressive decline in visible scalp hair density.

The clinical presentation of AGA can be different in men and women, sharing the same pathogenesis. While male androgenetic alopecia (MAGA) is characterized by its typical bitemporal recession of hair and balding vertex, female androgenetic alopecia (FAGA) is set apart by its more diffuse thinning of the crown area with an intact frontal hairline.

Standard methods used to diagnose hair disorders are clinical inspection, pattern of hair loss, pull test, trichogram, biopsy and screening blood tests. They vary in sensitivity, reproducibility and invasiveness. Trichoscopy is very useful for *in vivo* diagnosis of scalp and hair disorders and can greatly improve clinical management (3). Both handheld dermatoscope and videodermatoscope can be utilized. The basic principle of dermatoscopy is transillumination of a lesion and studying it with high magnification to visualize subtle features. Structures which may be visualized by trichoscopy include hair shafts, hair follicle openings, perifollicular epidermis and cutaneous microvessels. Trichoscopy allows analyzing acquired and congenital hair diseases.

More recent studies have accumulated evidence that the use of trichoscopy in the clinical evaluation of hair disorders improves diagnostic capability beyond simple clinical inspection (4-7).

2. OBJECTIVE

The aim of this study was to identify the trichoscopic features of androgenetic alopecia.

3. PATIENTS AND METHODS

A case-control study was conducted and all patients were from Department of Dermatovenerology, University Clinical Centre Sarajevo. After informed consent, relevant history was taken and clinical examination was performed. The following factors were considered: sex, age, personal and family history, severity and duration of disease.

The study included 104 patients with AGA (44 female and 60 male). The diagnosis of AGA was based on clinical examination. Patients with any scalp disorders such as irreversible alopecia, trichotillomania, alopecia areata and scalp psoriasis were excluded from the study. Control group consisted of 80 generally healthy subjects (35 female and 45 male). Trichoscopic examination was performed using either MoleMax II videodermatoscope or handheld dermatoskope DermLite II pro (3Gen, San Juan Capistrano, Ca USA).

Trichoscopy results were obtained in frontal, occipital and both temporal areas of the scalp, including number of yellow dots and vellus hairs, number of hairs in one pilosebaceous unit and percentage of follicular ostia with perifollicular hyperpigmentation.

The data were statistically evaluated. Statistical significance for variables relationship was considered when $p<0.05$.

4. RESULTS

Among the 104 patients included in this study, 60 (57.69%) patients were men and 44 (42.31%) patients were women. The male /female ratio was 1:0.73. The average age of the patients was 41, varying from 22 to 69 years old. There was no statistically significant difference between genders with respect to age ($p>0.05$). Family history was positive for AGA in 61 of 104 (58.65%) patients. The duration of AGA ranged from 2 to 105 months. The patients enrolled in our study had mostly type II Fitzpatrick's skin phenotype. The control group consisted of 80 generally healthy participants: 45 (56.25%) men and 35 (43.75%) women with an age range of 20-71 years, 42 years on average (table 1).

Most common trichoscopic finding was hair thickness heterogeneity seen in 104 (100%) patients, followed by yellow dots seen in 55 (52.88%) patients and vellus hairs seen in 51 (49.03%) patients. Perifollicular hyperpigentation had 42 (40.38%) patients. In the control group, only yellow dots were found in two patients. The number of yellow dots, pilosebaceous units with only one hair and with perifollicular hyperpigmentation was significantly increased in androgenetic alopecia ($p<0.05$). The percentage of thin hairs (<0.03 mm) in AGA was significantly higher than in healthy controls ($p<0.05$). No significant differences in trichoscopy are observed between female and male androgenic alopecia (table 2).

	AGA group n (%)	Control Group n (%)
Men	60 (57.69)	45 (56.25)
Women	44 (42.31)	35 (43.75)
Age range, years	22-69	20-71
The average, years	41	42

Table 1. Demographic data of patients (AGA-androgenetic alopecia) and volunteers (control group)

Trichoscopic structures	n (%)
Hair diversity	104 (100)
Yellow dots	55 (52.88)
Vellus hairs	51 (49.03)
Perifollicular hiperpigmentation	42 (40.38)

Table 2. Trichoscopic findings seen in patients with AGA

5. DISCUSSION

Trichoscopy corresponds to scalp and hair dermatoscopy and has been increasingly used as an aid in the diagnosis, follow-up, and prognosis of hair disorders. Trichoscopic evaluation of the scalp is based on the observation of follicular patterns, interfollicular patterns, hair shaft characteristics and vascular patterns.

Today, trichoscopy is the most important tool for diagnosis androgenetic alopecia and it completely substituted the scalp biopsy. Trichoscopy reflects the pathophysiology of AGA because it shows the follicular miniaturization where the hair became shorter, thinner and paler, the diameter variability and a shorter anagen phase and it explains the empty follicle phenomenon due to the prolongation of kerogen phase (8).

Male and female AGA share similar trichoscopic features, including hair shaft thickness, heterogeneity, thin hairs, yellow dots, perifollicular discoloration, an increased proportion of vellus hair, and a large number of follicular units with only one emerging hair shaft (9). In AGA, trichoscopic abnormalities are more pronounced in the frontal than in the occipital area.

Hair thickness heterogeneity is characterized by the simultaneous presence of hairs in different thicknesses: vellus, thin intermediate, and thick. In androgenetic alopecia a variation of the diameter that affects more than 20% of the hair of the androgen-dependent region is considered a major diagnostic criterion of androgenetic alopecia. This sign is very useful for diagnosis initial AGA. Hair diameter diversity or anysotrichosis has been shown to reflect follicle miniaturization in AGA (10). Similar to previous studies, all of our patients demonstrated hair diameter diversity, confirming that this sign is the main criterion in AGA (11-13).

Trichoscopy of AGA shows an increased proportion of vellus hairs. Up to 10% of normal human scalp hairs are vellus hairs, defined as hypopigmented, nonmedullated hairs less than 30 μm thick and less than 2-3 mm long (14). The presence of more than 10% of thin hair, below than 0.03 mm, in the frontal area is considered a major diagnostic criterion of AGA. In our study, the percentage of thin hairs in AGA was significantly higher than in healthy controls.

The term "dots" refers to the small, round follicle openings seen on trichoscopy. Trichoscopy may distinguish whether hair follicle openings are normal, empty, fibrotic or containing biological material, such as hyperkeratotic plugs or hair residues. Yellow dots are follicular infundibula with keratotic material or sebum. They vary

in color, shape and size. In severe AGA, the presence of yellow dots in androgen-dependent areas is characteristic: they correspond to empty follicles or they contain completely miniaturized hairs. It is believed that, in this condition, yellow dots results from the presence of engorged sebaceous glands that remain functioning despite the progress of the miniaturization process of the follicles, leading to the formation of intraepidermal sebaceous lakes (9). Such findings are observed in both male and female forms of the disease.

In various studies, yellow dots were observed in 92.4% (15), 66% (9), 30.5% (16) and 7% (17) of patients with AGA. This disparity in findings can be explained by the difference in ethnic group enrolled in studies which implies variation in sebaceous gland activity as well as in the degree of pigmentation of the scalp in late stages. Yellow dots found in 55 (52.88%) of patients, in our study were seen in both early and advanced stages of AGA. On the other hand, Ross et al. emphasized yellow dots being higher in late AGA in their study (17).

A decreased number of hairs per follicular unit is a characteristic but nonspecific feature of AGA. Normally 2-3 hairs of the same follicular unit emerge in the ostium, in AGA an increased percentage of single-hair per pilosebaceous units emerge in the ostium especially in the frontal area.

Trichoscopy can also show peripilar depressions, which appear as brown, slightly depressed halos, which extend for about 1 mm in diameter around the emergence of the hair shaft (18). This sign is linked to superfitial perifollicular infiltrates composed mainly of lymphocytes. In AGA, brown perifollicular discoloration is observed in 20-66% of patients (10, 19). In our study, peripilar sign was seen in 42(40.38%) cases. It is found more often in patients with initial forms and in the frontal area.

6. CONCLUSION

Hair loss can have significant effects on patient's quality of life, and a prompt diagnosis of the different types of alopecias and an early intervention is needed. Trichoscopy represents a non-invasive technique for the evaluation of patients with hair loss that allows magnified visualization of the hair and scalp skin. Alopecia androgenetica is the most common form of hair loss both in men and women. Regular clinical and trichoscopical follow-ups are very important to monitor disease activity and treatment tolerance.

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- **Author's contribution**: The author was involved in all steps of the preparation of this study including final proofreading.
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