Two different trichoscopic patterns of mid-frontal scalp in patients with frontal fibrosing alopecia and clinical features of androgenetic alopecia

Dwa różne wzory trichoskopowe okolicy czołowej u pacjentek z łysieniem czołowym bliznowaciejącym i klinicznymi objawami łysienia androgenowego

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frontal fibrosing alopecia, androgenetic alopecia, trichoscopy, hair loss, cicatricial alopecia.

SŁOWA KLUCZOWE:
łysienie czołowe bliznowaciejące, łysienie androgenowe, trichoskopia, łysienie, łysienie bliznowaciejące.

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ABSTRACT

Introduction. Frontal fibrosing alopecia is a primary lymphocytic cicatricial alopecia with progressive frontotemporal hairline recession. In some cases, hair loss in the mid-frontal scalp, similar to female pattern hair loss, may be observed.

Objective. Assessment of the trichoscopic pattern of mid-frontal scalp hair loss in patients diagnosed with frontal fibrosing alopecia.

Material and methods. The retrospective analysis included 31 women diagnosed with frontal fibrosing alopecia and hair loss in the mid-frontal scalp and 36 women diagnosed with female pattern hair loss.

Results. In patients with frontal fibrosing alopecia two different trichoscopic patterns in the mid-frontal scalp were identified. In 68% of patients (21/31) we observed a diffuse fibrotic pattern. It was characterized by irregular arrangement of follicular units with small areas with loss of follicular units, an increased percentage of follicular units with one hair and a decreased percentage of follicular units with three hairs, normal hair shaft thickness and presence of mild perifollicular scaling. The androgenetic alopecia pattern was present in 32% of patients (10/31). It was characterized by hair shaft thickness diversity (20% or more), a percentage of vellus hairs higher than 10%, presence of yellow dots, an increased percentage of follicular units with one hair and a decreased percentage of follicular units with three hairs.

Conclusions. In patients with frontal fibrosing alopecia and coexisting mid-frontal scalp hair loss, we identified two different patterns of this area in trichoscopy: the diffuse fibrotic pattern (more common) and the androgenetic alopecia pattern. This observation may have therapeutic and prognostic implications.

STRESZCZENIE

Wprowadzenie. Łysienie czołowe bliznowaciejące jest pierwotnym, limfocytarnym łysieniem bliznowaciejącym, w którym dochodzi do przesuwania się linii czołowo-skroniowej owłosienia ku tyłowi. U dużego odsetka pacjentek z rozpoznanym łysieniem czołowym bliznowaciejącym występuje także przerzedzenie włosów w okolicy czołowej, przypominające klinicznie łysienie androgenowe.

Cel pracy. Ustalenie trichoskopowego wzoru łysienia w okolicy androgenozależnej u pacjentek z rozpoznanym łysieniem czołowym bliznowaciejącym.

Materiał i metodyka. Do retrospektywnej analizy (oceny obrazów trichoskopowych) włączono 31 kobiet z łysieniem czołowym bliznowaciejącym i 36 kobiet z łysieniem androgenowym.

Wyniki. Ustalono dwa różne wzory trichoskopowe. U 68% (21/31) pacjentek stwierdzono wzór rozlanego łysienia bliznowaciejącego charakteryzującego się nieregularnym rozkładem jednostek włosowych, małymi obszarami pozbawionymi jednostek włosowych, brakiem trichoskopowych objawów miniaturyzacji mieszków włosowych, zmniejszonym odsetkiem jednostek włosowych z trzema łodygami, zwiększonym odsetkiem jednostek włosowych z jedną łodygą oraz obecnością okołomieszkowego złuszczania. U 32% (10/31) pacjentek wykazano wzór łysienia androgenowego, który charakteryzował się obecnością powyżej 10% włosów meszkowych, heterogenicznością grubości łodyg włosów (> 20%), obecnością żółtych kropek, zwiększonym odsetkiem jednostek włosowych z jedną łodygą oraz zmniejszonym odsetkiem jednostek włosowych z trzema łodygami.

Wnioski. W badaniu trichoskopowym okolicy androgenozależnej u pacjentek z rozpoznanym łysieniem czołowym bliznowaciejącym oraz przerzedzeniem włosów w okolicy czołowej stwierdzono dwa różne wzory trichoskopowe: wzór rozlanego łysienia bliznowaciejącego (występujący częściej) oraz wzór łysienia androgenowego. Przedstawione wyniki mogą w przyszłości znaleźć zastosowanie w ocenie rokowania i optymalizacji leczenia łysienia czołowego bliznowaciejącego.

INTRODUCTION

Frontal fibrosing alopecia (FFA) is a primary lymphocytic cicatricial alopecia with progressive frontotemporal hairline recession. It was first described by Kossard in 1994 [1]. Histological examination of the affected area of the scalp reveals perifollicular lymphocytic infiltrate, reduction in the number of hair follicles and replacement by fibrous tracts [2]. Currently FFA is considered to be a variant of lichen planopilaris (LPP) with the lymphocytic infiltrate and fibrosis affecting selectively the vellus and the intermediate hair follicles of the frontotemporal margin [3].

The pathogenesis of FFA is still unknown, but involvement of the autoimmune reaction [4] and hormonal factors [3, 5] have been discussed. It is hypothesized that an estrogen and androgen imbalance can trigger the inflammatory scarring reaction in FFA [6]. The role of hormones in FFA pathogenesis is supported by the higher frequency of the disease in postmenopausal women and improvement of the disease course after antiandrogenic treatment with finasteride or dutasteride [6]. The disease predominantly occurs in postmenopausal women, but men and premenopausal women may also be affected [6].

The FFA is characterized by slowly progressive and symmetrical recession of the frontotemporal hairline [2]. Eyebrow loss is observed in 50–75% of patients [7, 8]. Facial papules, nail involvement and diffuse hair loss at other sites of the body have been described less frequently [9–11].

In our observations the majority of patients diagnosed with FFA complain not only of recession of the frontotemporal hairline but also mid-frontal scalp hair loss. Clinical examination may suggest that FFA frequently coexists with female pattern hair loss (FPHL).

OBJECTIVE

The aim of the study was to assess the trichoscopic pattern of mid-scalp hair loss in patients diagnosed with FFA and coexisting clinical features of FPHL.

MATERIAL AND METHODS

This retrospective analysis included 31 women diagnosed with FFA associated with mid-frontal scalp hair loss and 36 women diagnosed with FPHL. The FFA patients with mid-frontal effluvium were select-

ed from 59 patients diagnosed with FFA (patients with no features of mid-scalp hair loss and with focal alopecia caused by LPP were excluded).

All of the patients were examined in our outpatient department between 2012 and 2017. The group was adjusted for age and number of patients. The mean age of women in the FFA group was 52 years (range: 38–68) and 46 years in the FPHL group (range: 35–59).

The diagnosis of FFA and FPHL was established on the basis of a detailed medical history, clinical examination and trichoscopy. The severity of hair loss was assessed according to the Ludwig scale. In the FFA group: Ludwig 1: 5 (16%) patients, Ludwig 2: 23 (74%) patients, Ludwig 3: 3 (10%) patients. In the FPHL group: Ludwig 1: 8 (22%) patients, Ludwig 2: 22 (61%) patients, Ludwig 3: 6 (17%) patients (Figure 1).

In every case, as a routine procedure, trichoscopy using Fotofinder II (10 images at 20- and 70-fold magnification) was performed. The trichoscopy images were assessed according to the scheme presented in Table 1.

Statistical analysis

Statistical analysis of the data was conducted using Statistica software, version 12.0 (StatSoft, Krakow, Poland). Comparisons between parameters were evaluated by one-way repeated-measures analysis of variance (ANOVA), followed by *post-hoc* analysis using Dunnett's test. Statistical significance was considered for p-values less than 0.05.

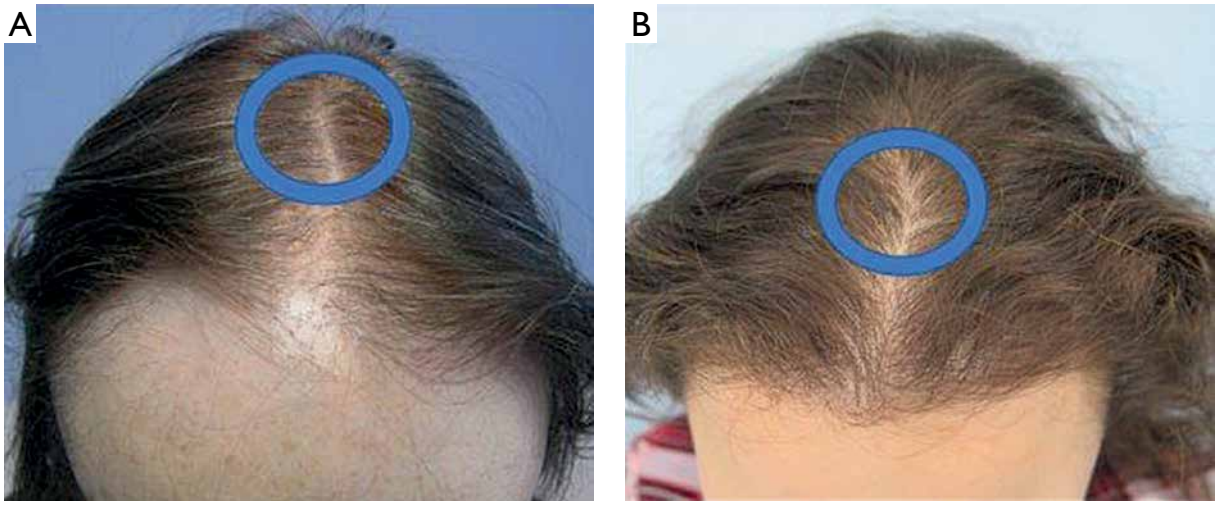

Figure 1. Similar clinical presentation of mid-frontal scalp hair loss in patients diagnosed with: **A**) frontal fibrosing alopecia – typical frontotemporal hairline recession may be observed, **B**) female pattern hair loss. The exact place of trichoscopy examination is marked by a blue circle (**A**, **B**)

Rycina 1. *Podobny obraz kliniczny przerzedzenia włosów w okolicy czołowej u pacjentek z rozpoznanym:* ***A****) łysieniem czołowym bliznowaciejącym – na rycinie można zaobserwować typowe przesunięcie linii czołowo-skroniowej,* ***B****) łysieniem androgenowym. Miejsce wykonania trichoskopii oznaczono niebieskim okręgiem (****A****,* ***B****)*

Table 1. Scheme of the trichoscopy image evaluation in the present study

Tabela 1. *Protokół przeprowadzanego badania trichoskopowego*

Parameter	Method of evaluation
Distribution of hair thickness	Variability in the hair shaft diameter of more or less than 20% of hair shafts
	Percent age of vellus hair (higher or lower than 10%)
Pilosebaceous units	Percentage of single-hair units (at 20-fold magnification)
	Percentage of double-hair units (at 20-fold magnification)
	Percentage of triple-hair units (at 20-fold magnification)
Yellow dots	Number of yellow dots per field of vision calculated in four fields of vision at 70-fold magnification
Perifollicular yellow discoloration (hyperpigmentation)	Percentage of follicular ostia with perifollicular yellow discoloration calculated at 20-fold magnification
Other	Loss of single follicular units
	Presence of mild perifollicular scaling

RESULTS

In 52% (16/31) of patients with FFA disturbance in the normal arrangement of follicular units was observed as small areas with loss of follicular units. Yellow dots, corresponding to the kenogen phase in the hair cycle, were more commonly found in the FPHL group compared to the FFA group (83%, 30/36 and 45%, 14/31, respectively) ($p < 0.001$). Hair shaft thickness diversity was more often observed in the FPHL group than in the FFA group (97%, 35/36 and 32%, 10/31, respectively) ($p < 0.001$). A percentage of vellus hairs higher than 10% was observed more commonly in FPHL patients than in the FFA group (78%, 28/36 and 26%, 8/31, respectively) ($p < 0.001$). In FFA patients compared to FPHL patients a higher percentage of follicular units with one hair (30% and 15%, respectively) ($p < 0.05$) and a lower percentage of follicular units with three hairs (10% and 30%, respectively) ($p < 0.05$) were observed. Incidence of peripilar sign was comparable in the two groups. Mild perifollicular scaling was present in 42% (13/31) of patients with FFA and was not seen in the FPHL group ($p < 0.001$). Detailed results are presented in Table 2.

In the FFA group during mid-frontal scalp examination two different trichoscopic patterns of hair loss were identified. In 68% (21/31) of patients the diffuse fibrotic pattern was observed. It was characterized by disturbance in normal follicular arrangement with small areas lacking follicular units and yellow dots, predominance of follicular units with one or two hairs, no features of follicular miniaturization (percentage of vellus hairs higher less 10%, no signs of hair shaft thickness diversity) and presence of mild perifollicular scaling. The androgenetic alopecia pattern was observed in 32% (10/31) of patients. It was characterized by hair shaft thickness diversity (20% or more), vellus hairs in a percentage higher than 10%, presence of yellow dots, an increased percentage of follicular units with one hair and a decreased percentage of follicular units with three hairs. Figure 2 presents trichoscopic images representative for FPHL and FFA (two different patterns). Comparison between trichoscopic patterns of the mid-frontal scalp area in FFA is presented in Table 3.

DISCUSSION

Trichoscopy findings of the frontotemporal line in patients with FFA include minor perifollicular scaling, areas with a lack of follicular units (these

Table 2. Features observed in mid-scalp trichoscopy in patients diagnosed with frontal fibrosing alopecia and female pattern hair loss
Tabela 2. *Cechy trichoskopowe okolicy czołowej u pacjentek z rozpoznanym łysieniem czołowym bliznowaciejącym oraz łysieniem androgenowym*

Trichoscopic feature	FFA	FPHL	*P*-value
Diversity of hair shaft diameter > 20%	32% (10/31)	97% (35/36)	< 0.001
Vellus hairs > 10%	26% (8/31)	78% (28/36)	< 0.001
Yellow dots (more than 4 in 4 fields of vision)	45% (14/31)	83% (30/36)	< 0.001
Peripilar sign	10% (3/31)	14% (5/36)	
Small areas with loss of follicular units	52% (16/31)	0	< 0.001
Mild perifollicular scaling	42% (13/31)	0	< 0.001
Mean % of triple-follicular units	10% (0–40)	30% (0–50)	< 0.05
Mean % of single-follicular units	30% (20–60)	15% (5–40)	< 0.05

Table 3. Comparison of two trichoscopic patterns (androgenetic alopecia pattern and diffuse fibrotic pattern) of mid-scalp in FFA patients
Tabela 3. *Porównanie dwóch wzorów trichoskopowych (wzór łysienia androgenowego i wzór rozlanego łysienia bliznowaciejącego) okolicy czołowej u pacjentek z rozpoznanym łysieniem czołowym bliznowaciejącym*

Trichoscopic feature	Diffuse fibrotic pattern	Androgenetic pattern	*P*-value
Diversity of hair shaft diameter > 20%	9.5% (2/21)	80% (8/10)	< 0.001
Vellus hairs > 10%	19% (4/21)	90% (9/10)	< 0.001
Yellow dots (more than 4 in 4 fields of vision)	14% (3/21)	100% (10/10)	< 0.001
Small areas with loss of follicular units	100% (21/21)	0% (0/10)	< 0.001
Mild perifollicular scaling	57% (12/21)	10% (1/10)	< 0.001
Mean % of triple-follicular units	10% (0–30)	10% (0–50)	
Mean % of single-follicular units	30% (20–60)	30% (20–50)	

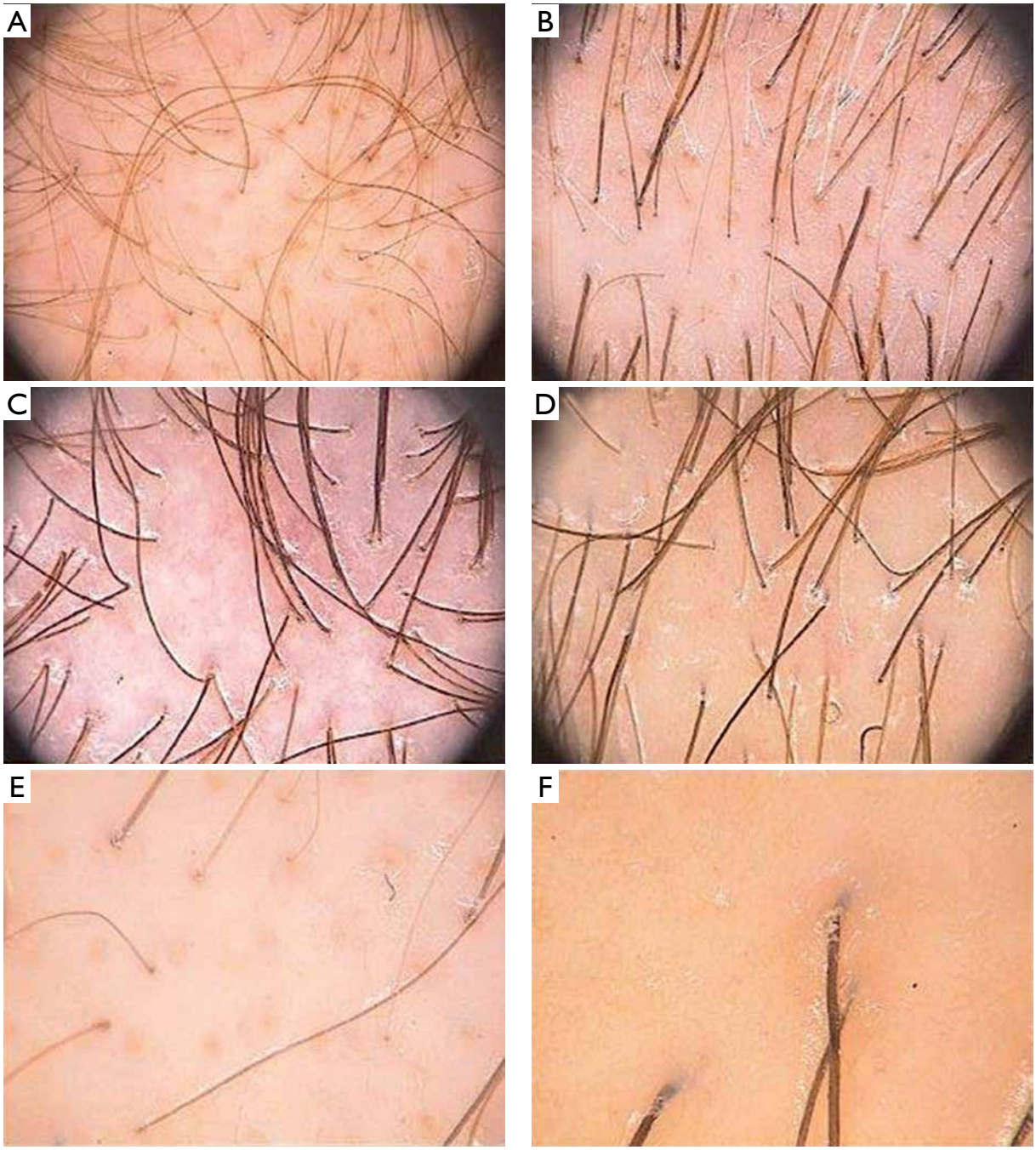

Figure 2. Trichoscopy images taken from mid-frontal scalp in patients with frontal fibrosing alopecia (**B**–**D**, **F**) and female pattern hair loss (**A**, **E**). **A** – female pattern hair loss: hair shaft thickness diversity, vellous hairs, yellow dots, 30% of follicular units with one hair and 10% of follicular units with three hairs (20×), **B** – androgenetic alopecia pattern: hair shaft thickness diversity, presence of vellous hairs, yellow dots, 30% of follicular units with one hair and 10% of follicular units with three hairs (20×), **C** – diffuse fibrotic pattern: irregular arrangement of follicular units with loss of follicular units, normal hair shaft thickness, no vellous hairs, an increased percentage of follicular units with one hair and a decreased percentage of follicular units with three hairs (20×), **D** – diffuse fibrotic pattern: small areas with loss of follicular units, normal hair shaft thickness, mild perifollicular scaling, no presence of vellus hairs (20×), **E** – female pattern hair loss: hair shaft thickness diversity, vellus hairs, yellow dots and follicular units with one hair (70×), **F** – diffuse fibrotic pattern: normal hair shaft thickness, follicular units with only one hair and small areas lacking follicular units (70×)

Rycina 2. *Obrazy trichoskopowe okolicy czołowej pacjentek z łysieniem czołowym bliznowaciejącym (**B**–**D**, **F**) oraz łysieniem androgenowym (**A**, **E**). **A** – łysienie androgenowe: heterogeniczność grubości łodyg, włosy meszkowe, żółte kropki, 30% jednostek włosowych z jedną łodygą, 10% jednostek włosowych z trzema łodygami (20×), **B** – wzór łysienia androgenowego: heterogeniczność grubości łodyg, obecne włosy meszkowe, żółte kropki, 30% jednostek włosowych z jedną łodygą oraz 10% jednostek włosowych z trzema łodygami (20×), **C** – wzór rozlanego łysienia bliznowaciejącego: zaburzenie układu jednostek włosowych, małe obszary pozbawione jednostek włosowych, prawidłowa grubość łodyg, brak włosów meszkowych (20×), **D** – wzór rozlanego łysienia bliznowaciejącego: małe obszary pozbawione jednostek włosowych, prawidłowa grubość łodyg, złuszczanie okołomieszkowe, brak włosów meszkowych (20), **E** – łysienie androgenowe: heterogeniczność grubości łodyg, włosy meszkowe, żółte kropki, jednostki włosowe z jedną łodygą (70×), **F** – wzór rozlanego łysienia bliznowaciejącego: prawidłowa grubość łodyg, jednostki włosowe z jedną łodygą oraz małe obszary pozbawione jednostek włosowych (70×)*

features are characteristic for LPP) and presence of lonely hairs [12–14]. Perifollicular erythema was described as a direct marker of FFA activity [13].

According to our results, in patients with FFA, mid-frontal scalp hair loss with clinical presentation similar to FPHL is observed (53% of FFA patients in our study). To the best of our knowledge, this is the first study evaluating trichoscopy of the mid-frontal scalp in patients diagnosed with FFA. In our study two different trichoscopic patterns were identified in this area of the scalp: the diffuse fibrotic pattern and the androgenetic alopecia pattern.

The FPHL is a common non-scarring alopecia with widening of the midline hair-part at the crown. Trichoscopy abnormalities in FPHL of the mid-frontal scalp include: more than 10% thin hairs (below 0.03 mm), hair shaft thickness diversity 20% or more, more than four yellow dots in four images (70-fold magnification), lower average hair thickness in the frontal area than in the occiput, an increased number of follicular units with one hair, a decreased number of follicular units with three hairs and presence of peripilar sign [15–17]. Androgenetic alopecia pattern in the mid-frontal scalp was only observed in 32% of FFA patients in this study. It was characterized by vellus hairs in a percentage higher than 10%, hair shaft thickness diversity (more than 20%), yellow dots, an increased percentage of follicular units with one hair and a decreased percentage of follicular units with three hairs.

Fibrosing alopecia in a pattern distribution classified as a subtype of LPP is a form of progressive scarring alopecia [18]. In histopathology miniaturization of hair follicles and lichenoid type of follicular inflammation may be found. There is no detailed information about trichoscopy in fibrosing alopecia in a pattern distribution: in one case report description of perifollicular erythema, small areas with loss of follicular units and perifollicular scaling in the mid-scalp area were observed [18].

In our study in 68% of patients with FFA a diffuse fibrotic pattern in the mid-frontal scalp was observed. In contrast to female pattern hair loss, it may be considered as an effect of minimal fibrosis that mainly involves miniaturized hairs (intermediate and vellus hairs) and results in loss of follicular units and vellus hairs. It can be suspected that in some patients with FFA the lymphocytic inflammatory infiltrate affects intermediate and vellus hair follicles in the whole androgen-dependent scalp, not only at the border of the frontal area. According to this observation, irregular arrangement of follicular units with areas lacking hair shafts and vellus hairs as well as normal hair shaft thickness may be noted.

These two different trichoscopic patterns may affect the choice of therapy and prognosis for hair regrowth. It is considered that patients with the androgenic alopecia pattern in the mid-frontal scalp may improve with antiandrogenic treatment, whereas in patients with the diffuse fibrotic pattern only a reduction of disease activity may be achieved.

CONCLUSIONS

We suggest that mid-frontal scalp hair loss in patients with frontal fibrosing alopecia is more commonly diffuse fibrosing alopecia than androgenetic alopecia. Distinguishing the two trichoscopic patterns established in this study may be of prognostic value and have therapeutic implications.

Conflict of interest

The authors declare no conflict of interest.

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