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Seborrheic Dermatitis: Three Novel Trichoscopic Signs and Its Correlation to *Malassezia* sp. Colonization

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Abstract
Seborrheic dermatitis (SD) is a chronic recurrent erythemato-squamous condition that affects seborrheic areas causing flaking, erythema, and pruritus. Etiology is multifactorial and the role of *Malassezia* sp. remains controversial. We present a series of 12 patients with trichoscopic and direct microscopic exams. We analyzed the presence of the already known SD trichoscopic signs and its correlation to the amount of *Malassezia* sp. in the scalp. We describe three novel signs: the "dandelion" vascular conglomerate, the "cherry blossom" vascular pattern, and the intrafollicular oily material; of which the "dandelion" vascular conglomerate was the only trichoscopic sign to correlate with *Malassezia* colonization. This study correlates trichoscopic signs in SD and the quantity of *Malassezia* sp. We describe three new signs that can be useful to determine indirectly the fungal colonization of the scalp in SD.

Introduction

Seborrheic dermatitis (SD) or seborrheic eczema is a chronic recurrent erythemato-squamous condition that affects seborrheic areas (scalp, face, chest) causing flaking, erythema, and pruritus. The etiology is multifactorial, and it is closely related with the presence of *Malassezia* sp. SD is a cosmopolitan disease, affects children and young adults, and is more frequent in males than females. It is a common reason for medical consultation (adults 1–6% and newborns 12%) [1].

SD presents as erythemato-squamous patches with greasy-looking, yellow to white scales, generally symmetrically distributed on seborrheic areas such as scalp, face, chest, and back, with a seasonal pattern (more frequent during winter). In immune-suppressed patients, it is more extensive, severe, and refractory to usual treatment; it may be an early sign of AIDS.

Pityriasis capitis or dandruff is a variant of SD. It is a chronic disease restricted to the scalp, involving flaking skin without inflammation signs and pruritus [2].

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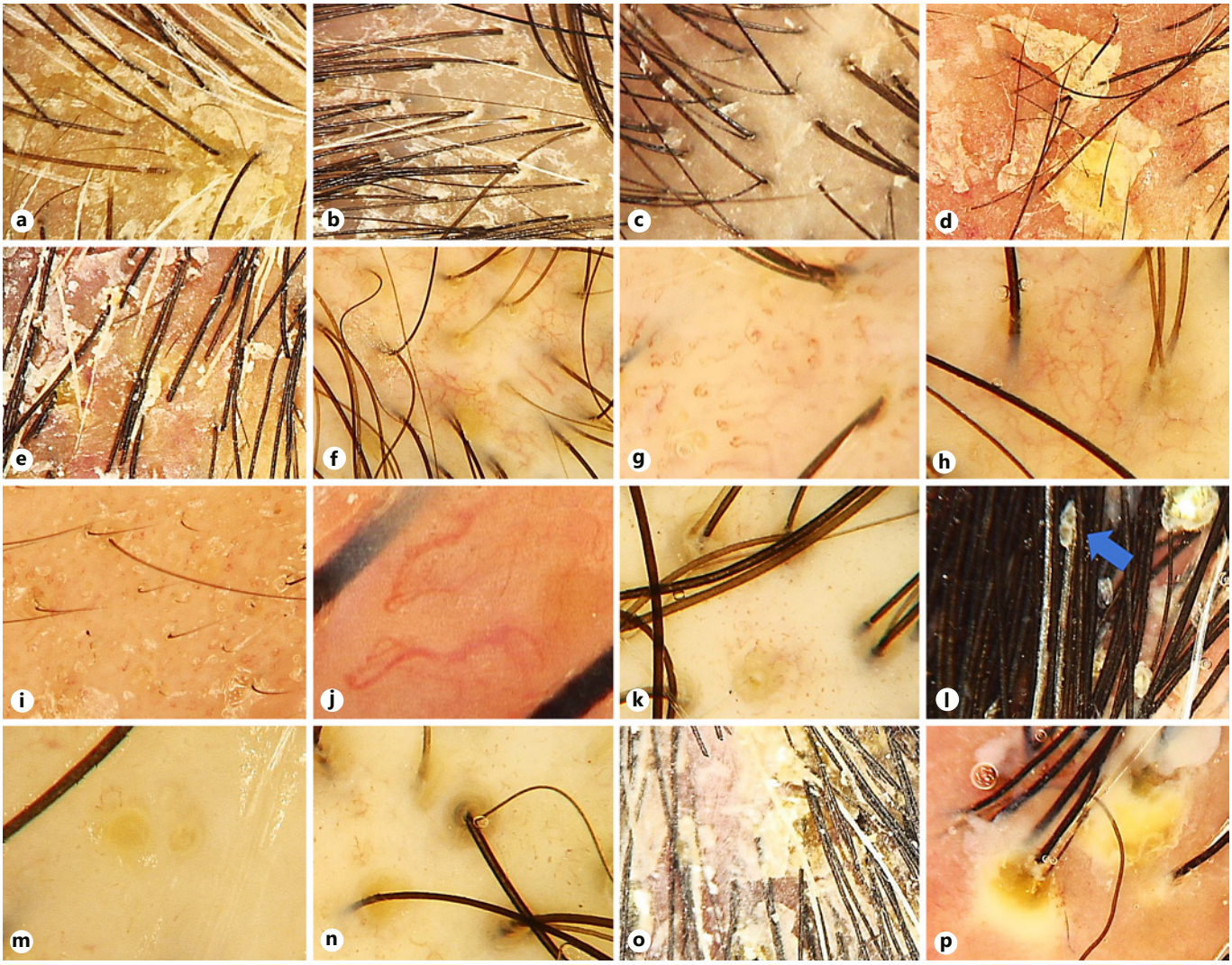

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Fig. 1. Trichoscopic signs found in our study. **a** Adherent scale. **b** Interfollicular white scale. **c** Peripilar white scale. **d** Interfollicular oily scale. **e** Peripilar oily scale. **f** Arborizing vessels. **g** Glomerular vessels. **h** "Cherry blossom" vascular pattern. **i** Comma vessels. **j** Serpentine vessels. **k** "Dandelion" vascular conglomerate. **l** Concretion (blue arrow). **m** Yellow dots. **n** Intrafollicular oily material. **o** Clusters of scales. **p** Interfollicular pustules.

SD is associated with sex hormones (androgens), neurological disorders, psychiatric disease, chronic alcoholic pancreatitis, hepatitis C virus, and Down syndrome.

Trichoscopic Signs

Multiple trichoscopic signs of SD have been described, the most important findings are: diffuse yellowish scales, single and clusters of scales on an erythematous background distributed among the follicular units, peripilar casts, thin arborizing vessels increased in number compared with healthy controls, multicomponent vascular pattern – constituted by multiple dotted, comma, linear, and small arborizing vessels – and simple reed loops [3, 4].

Material and Methods

We searched for cases of SD of the scalp at "Dr. Manuel Gea Gonzalez" General Hospital, mycology section database in Mexico City, Mexico. Only cases with trichoscopic images were included. Fotofinder Dermoscope® was used to take the trichoscopic images. Direct microscopic examination was performed in order to quan-

tify *Malassezia* sp. Diagnostic and trichoscopic findings were corroborated by two dermatologists, experts in trichoscopy (Fig. 1).

Descriptive statistics were used for the analysis. Pearson correlation coefficient was used to analyze the trichoscopic signs and the amount of *Malassezia* sp. We used R version 3.4.2 for the statistical analysis.

Additionally, we set up a control group with patients diagnosed with androgenetic alopecia in order to search for SD trichoscopic signs and to compare *Malassezia* sp. colonization.

Results

We found 16 cases of patients diagnosed with SD with trichoscopic examination. The clinical variables analyzed were adherent scale, interfollicular white scale, interfollicular oily scale, peripilar white scale, peripilar oily scale, arborizing vessels, glomerular vessels, comma vessels, serpentine vessels, concretions, yellow dots, clusters of scales, interfollicular pustules, and the amount of *Malassezia* sp.

"Dandelion" vascular conglomerate, "cherry blossom" vascular pattern, and intrafollicular oily material were the three newly described signs (Fig. 2).

We described "dandelion" vascular conglomerate as a yellow dot surrounded by glomerular and comma vessels (Fig. 2a). The "cherry blossom" vascular pattern is a conglomerate of arborizing vessels with multiple glomerular and comma vessels surrounding them (Fig. 2b). Intrafollicular oily material, as the term suggests, is a cumulus of sebum and keratin in the hair infundibulum (Fig. 2c).

Twelve cases were females and 4 males (3:1 ratio); mean age was 44.18 years. According to Fitzpatrick skin type, 11 cases were type 4 and 5 were type 3; 13 cases had a direct microscopical examination.

The clinical variables and their frequencies are presented in Table 1.

Quantity of *Malassezia* sp. correlated only with one clinical sign, the "dandelion" vascular conglomerate (p = 0.05) (Fig. 2) (Table 2). Three patients were excluded from this correlation because of the lack of direct microscopical examination; comma vessels, serpentine vessels, and interfollicular pustules were spotted in those 3 patients, that is why they could not correlate with the quantity of *Malassezia* sp. (Table 2).

After comparing the three novel trichoscopic signs in SD with the control group, we found that only the "dandelion" vascular conglomerate was statistically significant (p = 0.045).

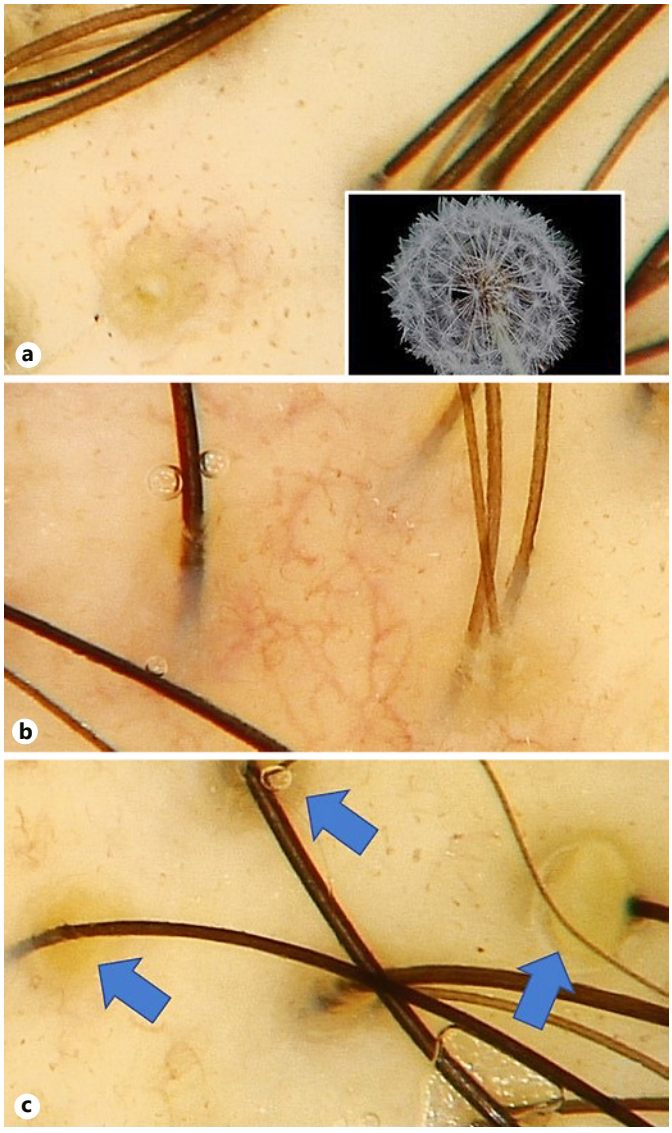

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Fig. 2. Novel trichoscopic signs. **a** "Dandelion" vascular conglomerate. **b** "Cherry blossom" vascular pattern. **c** Intrafollicular oily material (blue arrows).

Discussion

Scalp SD has been associated with white-skinned people and high body mass index [2]; 5 of our patients were phototype 3, and 11 were phototype 4.

The link between SD and *Malassezia* sp. is supported by the favorable evolution of the symptoms with antifungal treatment and a decreasing count in *Malassezia* yeasts; nevertheless, the role of *Malassezia* stays controversial. Paulino [5] did not found any relation between *Malassezia* and SD, neither on the species level nor on the subspe-

Table 1. Trichoscopic signs presented in patients diagnosed with seborrheic dermatitis

Variable	Number of cases that presented it	Percentage
Adherent scale	2	12.50
Interfollicular white scale	5	31.25
Interfollicular oily scale	6	37.50
Peripilar white scale	3	18.75
Peripilar oily scale	8	50.00
Arborizing vessels	11	68.75
Glomerular vessels	10	62.50
"Cherry blossom" vascular pattern	1	6.25
Comma vessels	1	6.25
Serpentine vessels	1	6.25
"Dandelion" vascular conglomerate	4	25.00
Concretions	2	12.25
Yellow dots	4	25.00
Intrafollicular oily material	5	31.25
Clusters of scales	4	25.00
Interfollicular pustules	1	6.25

Table 2. Correlation between trichoscopic signs and *Malassezia* sp. amount

Variable	*p* value
Adherent scale	0.45
Interfollicular white scale	0.27
Interfollicular oily scale	0.11
Peripilar white scale	0.67
Peripilar oily scale	0.47
Arborizing vessels	0.54
Glomerular vessels	0.65
"Cherry blossom" vascular pattern	0.21
Comma vessels	NA
Serpentine vessels	NA
"Dandelion" vascular conglomerate	0.05
Concretions	0.45
Yellow dots	0.67
Intrafollicular oily material	0.27
Clusters of scales	0.29
Interfollicular pustules	NA

NA, not available.

cies level. She performed an in vivo analysis where she determined the amount of *Malassezia* cells before and after the treatment with topical ketoconazole; no decrease of fungal cell was seen, but there was symptomatic improvement, suggesting that this may be the consequence of an anti-inflammatory effect [5]. According to our analysis, there was no correlation between global clinical severity of the patient's SD and quantity of *Malassezia* cells, but individual analysis on each trichoscopic sign differed from this in one variable.

Fungal colonization, sebaceous gland activity, and factors conferring individual susceptibility have been previously analyzed [2, 6]. We only focused in the trichoscopic description and the severity of those signs related to *Malassezia* sp. quantity, and no association was found.

Previous trichoscopic signs associated with SD are yellow scaling (single and clusters), yellowish areas in the immersion trichoscopy, arborizing vessels, dotted, comma, linear, and small arborizing vessels, simple reed loops, peripilar casts, yellow dots, perifollicular pigmentation, multi-hair follicular unit, and hidden hair [3, 4, 7, 8].

Almost all of these signs were spotted in our cases, the most frequent being the arborizing vessels (68.75%), similar to the previous results published by Kibar et al. [8], where they found it in 82% of the cases.

We describe three new signs: the "dandelion" vascular conglomerate – the only trichoscopic sign corelated to high quantity of *Malassezia* sp. – present in 4 patients (25%), the "cherry blossom" vascular pattern, present in one case (6.25%), and the intrafollicular oily material, present in 5 patients (31.25%).

Conclusion

This is the first study that correlates the trichoscopic findings in SD with the quantity of *Malassezia* sp. "Dandelion" vascular conglomerate could be a good clinical indicator to estimate *Malassezia* colonization and could be the only trichoscopic sign that justifies the use of antifungal therapy intended to eradicate it.

Statement of Ethics

This study was approved by the Hospital ethics and investigation committee; all patients gave their approval to use the information and images taken during the protocol in an informed consent declaration.

Disclosure Statement

The authors declare no conflict of interest.

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