Dermatology Practical & Conceptual

Videodermoscopy in the Assessment of Patients With Ocular Demodicosis

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ABSTRACT

Introduction: There is growing evidence of the potential uses of dermoscopy in diagnostics of demodicosis. No previous studies have analyzed dermoscopic features in patients with ocular demodicosis.

Objectives: To evaluate the potential usefulness of videodermoscopy in diagnostics of ocular demodicosis.

Methods: It was a single-center prospective observational study in which results of videodermoscopic examination of the eyelids were compared to the results of classic microscopic examination in patients with suspected ocular demodicosis and healthy volunteers.

Results: Study group included 16 women and 15 men. In fifteen (48.4%) patients, microbiological examination of epilated eyelashes was positive. The results of forms filled by the patients concerning known subjective clinical symptoms of ocular demodicosis revealed no significant differences between the group with positive and negative results of microscopic examination. The presence of Demodex tails and madarosis observed during dermoscopic assessment correlated positively with positive results of microscopic examination. At least one Demodex tail was found in 86.7% (13/15) cases with positive results of microscopic examination. In the two remaining cases microscopic evaluation showed the presence of Demodex brevis. In 37.5% (6/16) of patients with negative results of microscopic examination, videodermoscopy showed the presence of Demodex tails.

Conclusions: Videodermoscopy may facilitate the diagnostics of ocular demodicosis. Patients reporting clinical symptoms suggesting ocular demodicosis but negative results of videodermoscopic examination should be referred to classical microscopic examination to exclude the presence of Demodex brevis. In patients with negative microscopic examination results and symptoms suggesting ocular demodicosis, dermoscopy-guided microscopic re-evaluation could be considered.

Introduction

There is growing evidence on the potential role of dermoscopy in diagnosis of demodicosis [1-6]. Dermoscopy proved to be an effective diagnostic tool and to correlate with standard skin surface biopsy results in cases of facial, scalp and truncal disease [4,7,8]. Demodex tails and Demodex follicular openings visualized in dermoscopy have been found to be highly specific diagnostic features. Some reports also showed the utility of dermoscopy in the treatment monitoring [9]. Although ocular demodicosis may affect patients with facial demodicosis, no previous studies have analyzed dermoscopic features in this group of patients. Standardized skin surface biopsy, which is currently a gold diagnostic standard of facial demodicosis, cannot be used to examine the eyelid margin and currently there is no diagnostic standard for ocular demodicosis [2,10].

Objectives

The aim of the study was to evaluate clinical and dermoscopic features of patients with ocular demodicosis and compare these findings with results of classical microscopic evaluation.

Methods

This was a single-center, prospective study performed in the Department of Dermatology and Dermatology Outpatient Clinic, Medical University of Gdańsk (Poland) which concerned patients referred to a dermatology outpatient clinic with suspected ocular demodicosis. Before classical microscopic assessment, videodermoscopic examination was performed. The same assessment was performed in generally healthy volunteers who presented to the dermatology outpatient clinic for dermoscopic evaluation of nevi, with no previous history/clinical signs of demodicosis. All study participants filled in a previously prepared form concerning clinical symptoms and were assessed clinically and dermoscopically by the same dermatologist. In the second step classical microscopic evaluation of the eyelashes was performed by the same laboratory assistant. Only patients who did not wash their face and eyelid area for the previous 12 hours and did not wear make-up at the time of examination were included. Current or previous (within 6 months) history of demodicosis/rosacea treatment and age under 18 were exclusion criteria.

Clinical and dermoscopic pictures were made using FotoFinder videodermoscope (non-polarized dermoscopy; video camera Medicam 800HD) with no immersion fluid (x20 magnification; open front cap). Two dermoscopic pictures of the upper eyelid margin were performed with a closed eye to include the whole eyelid margin; in each studied person, both eyelids were evaluated.

Classical microscopic examination was performed with an MB-100 microscope equipped with a camera. Six upper eyelid eyelashes and six lower eyelid eyelashes were collected from each patient (after clinical assessment from the areas with visible erythema/scaling or randomly when no such symptoms were observed). Eyelashes were placed on a coverslip with a mixture of dimethyl sulfoxide and 20% potassium hydroxide. A criterion for positive result was at least one Demodex mite visible under the microscope (x100 magnification).

Clinical and dermoscopic pictures were evaluated by consensus of two experienced dermoscopists, blinded to the results of the classical microscopic evaluation, for predefined criteria (Table 1). In case of discrepancy, the final score for a particular case and structure was obtained based on the decision of the third evaluator. The Mann–Whitney U test for comparison of the age distribution between unpaired two groups was applied, and the chi-square test was applied to compare categorical data. The two-tailed tests were carried out at a significance level of $P \leq 0.05$. All statistical analyses were performed using the R statistical package (version 3.6.3; https://www.r-project.org/). The study was approved by the Ethics Committee, Medical University of Gdańsk (NKBBN/606/2018; NKBBN/606-675/2020) and all study participants gave informed consent before participation in the study.

Results

Study group included 16 women and 15 men. In fifteen patients (48.4%), microscopic examination of epilated eyelashes was positive (10 male, 5 female). Mean age was

Table 1. Clinical and dermoscopic features in patients with positive and negative result of microscopic evaluation.

	Patients with a positive result of microscopic evaluation	Patients with a negative result of microscopic evaluation	P
Data obtained from patients history			
Gender, N (%)	female versus males 5 (33.3%) versus 10 (66.7%)	female versus males 11 (68.8%) versus 5 (31.2%)	0.049
Age (mean/median), years	64.5/68.0	49.5/53.5	0.009
Feeling of dry eyes/gritty sensation, N (%)	7 (50.0%)	6 (37.5%)	0.491
Burning/itching within the eyes, N (%)	9 (60.0%)	5 (31.2%)	0.108
Epiphora, N (%)	4 (26.7%)	6 (37.5%)	0.519
Conjunctivitis treatment in the previous 6 months, N (%)	14 (93.3%)	16 (100.0%)	0.294
Eye disease, N (%)	6 (40.0%) [a]	3 (18.8%) [b]	0.193
History of skin disease, N (%)	6 (40.0%) [c]	9 (56.2%) [d]	0.366
Tendency to blush easily, especially after eating, under the influence of temperature, or drinking alcohol, N (%)	2 (13.3%)	3 (18.8%)	0.682
Diabetes, N (%)	4 (26.7%)	1 (6.2%)	0.122
Dermoscopic features			
Demodex tails (at least 1), N (%)	13 (86.7%)	6 (37.5%)	0.005
Demodex tails (median/mean)	6/12.8	0/2.750	0.002
Demodex follicular openings (gray dots), N (%)	3 (20.0%)	1 (6.2%)	0.254
Follicular hypertrophy, N (%)	11 (73.3%)	7 (43.8%)	0.095
Follicular annular pigmentation, N (%)	0	0	-
Yellow dots, N (%)	0	0	-
Red dots, N (%)	0	0	-
Scale, N (%)	13 (86.7%)	9 (56.2%)	0.062
Pustules, N (%)	1 (6.7%)	0 (0.0%)	0.294
Madarosis, N (%)	6 (40.0%)	1 (6.2%)	0.025
Poliosis, N (%)	0	0	-

[a] [cataract, epiretinal membrane, floaters suspected, macular degeneration, myopia, retinal cyst]; [b] [glaucoma] [c] [acne, atopic dermatitis, chronic eczema, previous history of BCC, previous history of melanoma]; [d] [acne, atopic dermatitis, psoriasis, previous history of BCC, previous history of melanoma].

significantly higher in the group with positive microscopic examination results (64.5 versus 49.5 years, P = 0.009). The results of forms filled in by the patients concerning known subjective clinical symptoms of ocular demodicosis, revealed no significant differences between the group with positive and negative results of microscopic evaluation. Previously diagnosed eye disease, skin disease and diabetes also did not correspond with microscopic diagnosis of ocular demodicosis. Table 1 presents details of the evaluated variables in patients with positive and negative results of microscopic evaluation and Figure 1 depicts details of videodermoscopic assessment.

The presence of Demodex tails and madarosis observed during dermoscopic assessment correlated positively with positive results of microscopic examination (P = 0.042 and P = 0.025), respectively). At least one Demodex tail was found in 86.7% (13/15) of cases with positive results from the microscopic examination. In the two remaining cases, microscopic evaluation showed the presence of Demodex brevis (D. brevis). These two patients reported symptoms such as burning/itching within the eyes as well as a feeling of dry eyes/gritty sensation.

In 37.5% (6/16) of patients with negative results of microscopic examination, videodermoscopy showed the presence of Demodex tails. In these patients, the most common clinical symptom was epiphora (present in 3/6 patients), followed by burning/itching within the eyes (1 patient) as well as a feeling of dry eyes/gritty sensation (1 patient).

No significant correlation was found for other analyzed dermoscopic features (Demodex follicular openings,

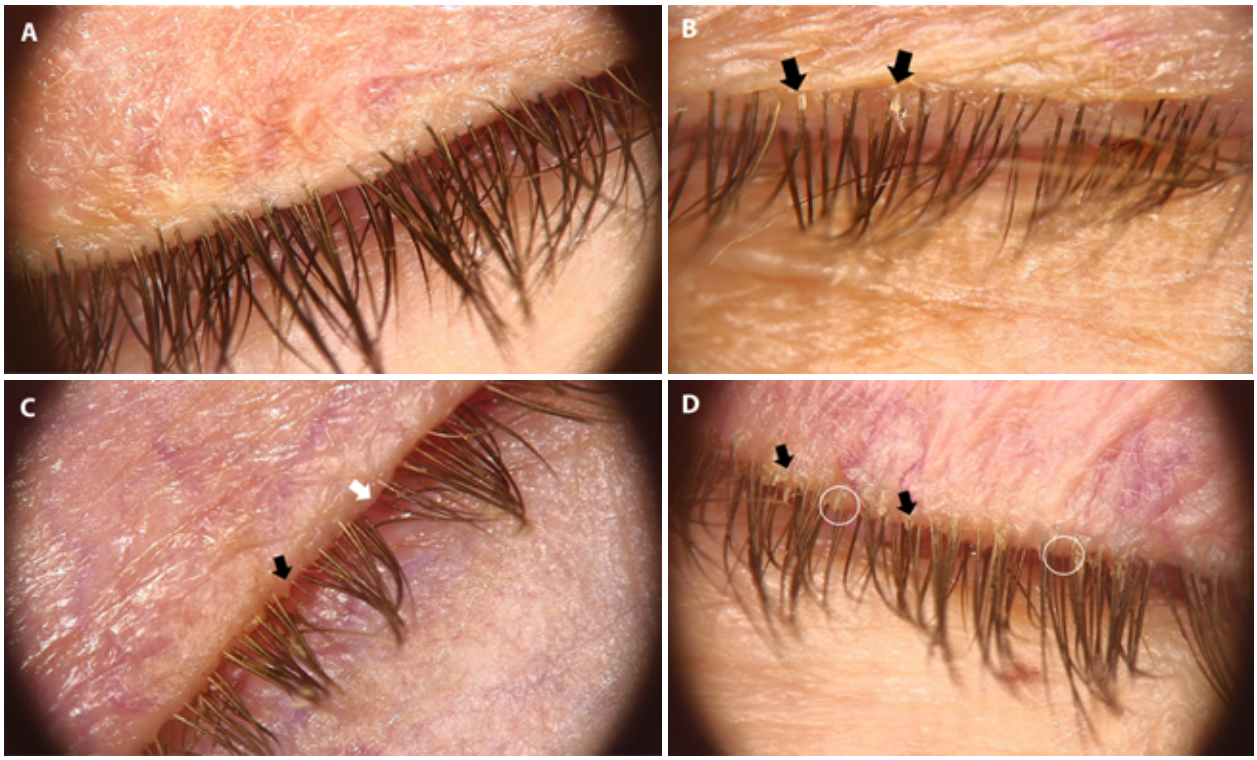

Figure 1. Dermoscopic assessment of the upper eyelid region may facilitate the assessment of a patient with clinical suspicion of ocular demodicosis. (A) Dermoscopic presentation in a healthy person – no signs of the presence of *Demodex spp*. (B) Dermoscopy shows two Demodex tails (black arrows) and mild madarosis. (C) Dermoscopy shows areas of madarosis (white arrow) as well as the presence of Demodex tails. (D) Dermoscopy shows the presence of multiple Demodex tails (black arrows), mild madarosis and follicular hypertrophy (white circles) (all pictures made with FotoFinder, Medicam 800HD, x20 magnification, no immersion fluid).

follicular hypertrophy, follicular annular pigmentation, scales, pustules, poliosis).

Conclusions

Patients with suspected/confirmed facial demodicosis should be assessed for ocular demodicosis. Clinical symptoms that may indicate involvement of the ocular region include eyelid erythema, eyelid itching, eyelid burning sensation, ocular foreign body sensation, conjunctival injection, epiphora, dry eye sensation, increased sensitivity to light, smoke and dust, mucus discharge and contact lens intolerance [1,11].

Most patients in the studied group reported at least one symptom and the frequency of the reported symptoms did not differ between groups of patients with positive and negative results of microscopic examination. Therefore, the decision to refer to microscopic examination based only on clinical symptoms may be difficult. The authors hypothesized that videodermoscopy could be helpful in initial evaluation of patients and in some cases could be an alternative method used to confirm the diagnosis of ocular demodicosis.

Evaluation of the eyelid margin with a classical dermoscope is possible, unless the front cap is too wide. Videodermoscopic assessment with an open front cap provides precise and non-contact evaluation of the eyelid region [13].

We have found two dermoscopic features that have been observed significantly more often in patients with positive microscopy, namely Demodex tails and madarosis.

Demodex tail is defined as a gelatinous, whitish, creamy thread, 1–3 mm in length, indicating a mite protruding from the follicular orifice [14]. It has been previously identified as a feature typical of demodicosis on the face, scalp and trunk and found in 20-100% of patients with a positive result of microscopic examination [2,4,6,9,14,15].

As mentioned previously, in two patients from our study in whom dermoscopic assessment did not show the presence of Demodex tails, D. brevis could be found in microscopic evaluation. According to the literature, this species is smaller in size (about 190 micrometers), compared to D. folliculorum (about 290 micrometers) [16]. Therefore, when present in deep parts of the sebaceous glands, can potentially be invisible on the body surface and therefore beyond the scope of videodermoscopic assessment. Both species can be present in the same patient. None of the previous studies assessed the correlation between dermoscopic presentation and D. brevis. In microscopic studies, D. brevis was found to be the only species in 0.7%–31.7% of patients [17,18].

Based on that, it can be concluded that the patients reporting clinical symptoms suggesting ocular demodicosis with negative result of videodermoscopic examination should be referred to classical microscopic examination to exclude the presence of D. brevis.

Importantly, a relatively high percentage of patients with negative results of microscopic examination upon videodermoscopic examination showed the presence of Demodex tails. This could be explained by the fact that classical microscopic examination allows for the assessment of a limited number of eyelashes only. In these patients, videodermoscopy-guided microscopic re-evaluation could be considered, especially in case of persisting clinical symptoms. An ideal scenario would be videodermoscopy-assisted microscopic examination, that could potentially help to detect these patients, especially in cases clinically symptomatic but with negative results of classical microscopic examination.

Madarosis is defined as a loss of eyelashes and/or eyebrow hair. It was also significantly more common in patients with ocular demodicosis, however it is a non-specific symptom that may be also a result of numerous skin diseases, infectious diseases, endocrine disorders, drugs, trauma, tumors, congenital diseases (eg lamellar ichthyosis, monilethrix, Ehlers-Danlos syndrome), contact allergy, alopecia areata or trichotillomania [19,20].

A limitation of the study is the lack of evaluation of the lower eyelid margin. Nevertheless, the aim was to develop a quick, non-invasive and non-contact evaluation of the eyelid area. Another limitation is lack of evaluation with polarized light, which could allow for vessel morphology assessment. Finally, a relatively low number of patients were studied.

To sum up, based on our experience, videodermoscopy may facilitate the diagnosis of ocular demodicosis. Patients reporting symptoms suggesting ocular demodicosis with negative results of videodermoscopic examination should be referred to classical microscopic examination to exclude the presence of D. brevis. In patients with negative microscopic examination and symptoms suggesting ocular demodicosis, videodermoscopy-guided microscopic re-evaluation could be considered.

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