

Dermoscopic characterization and clinical application of four facial erythematous inflammatory dermatoses

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Abstract: Use dermoscope to identify inflammatory dermatoses with facial erythema as the main feature and other atypical clinical manifestations. By reviewing the clinical data and dermoscopic images of outpatients in our hospital, four diseases of rosacea, seborrheic dermatitis, contact dermatitis and atopic dermatitis were screened out, and their dermoscopic characteristics were obtained : Rosacea is a diffuse distribution of polygonal blood vessels on a red or purple background ; SD is an atypical vascularity on a yellow-red background with an oil-drop reddish halo around the hair follicle. Contact dermatitis is linear blood vessels and pleomorphic blood vessels in a light red background ; AD is punctate blood vessels and spherical blood vessels under a light red background with a visible scaly distribution. Honeycomb pigmentation can be seen in seborrheic dermatitis and contact dermatitis. Combined with relevant clinical reports, the application of dermoscope in clinical diagnosis and treatment are discussed.

1. Introduction

Facial erythema, as one of the common symptoms of skin diseases, largely affects the aesthetics of patients and brings great psychological stress to them. Facial erythema is commonly associated with inflammatory skin diseases, such as seborrheic dermatitis, rosacea, contact dermatitis, facial hormone-dependent dermatitis, atopic dermatitis, etc. When these diseases are not obvious in the early stage or have other clinical symptoms, the diagnosis by young doctors with insufficient experience is extremely confusing, which brings some trouble to the treatment.

Dermoscope is a non-invasive diagnostic method based on imaging technology, which can display abnormal pathological changes in the epidermal structure, blood vessels, pigmentation and skin appendages of skin lesions that cannot be observed by the naked eye through optical magnification, infiltration, and polarization techniques. The value of dermoscope as an adjunctive examination has been greatly recognized from its initial use in the observation of pigmented dermatoses to its use in the adjunctive diagnosis of inflammatory dermatoses, gross pathologies, nail diseases, and benign and malignant skin tumors¹. In this review, patients with clinical manifestations of facial erythematous lesions who visited the Department of Dermatology of Wuhan Hospital of Traditional Chinese Medicine between November 2022 and February 2023 were selected and cases with clinical symptoms and specific dermoscopic images were

screened for analysis, aiming to explore the dermoscopic manifestations of four facial erythematous inflammatory diseases, namely rosacea, seborrheic dermatitis, contact dermatitis, and atopic dermatitis, and To provide a basis for clinical diagnosis and treatment by combining with relevant clinical reports.

2. Rosacea

Rosacea is a chronic, recurrent inflammatory disease that affects the facial vasculature, nerves, and sebaceous units of the hair follicles in the cheek, cheek, brow, chin, and nose areas². The main clinical manifestations are paroxysmal flushing, persistent erythema, papulopustules, hyperplasia and hypertrophy³. Some studies indicate that persistent erythema is present in all patients with rosacea⁴. I collected 10 patients with rosacea with facial erythema, and found that the dermoscope showed polygonal blood vessels diffusely distributed in red or purple background. The following are typical case reports.

Typical case: Female patient, 26 years old. She had erythema with papules on her face for more than 3 years. The patient had erythema on her face 3 years ago after frequent facial treatments in a beauty salon, which was sometimes mild and sometimes severe, and the color of the erythema deepened after heat, emotional excitement and high-intensity exercise. The patient complained that the erythema on the face was aggravated after entering the

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warm environment since winter, accompanied by burning sensation, and the erythema subsided after leaving, but did not disappear completely.

Clinical diagnosis: Rosacea.

Dermoscopic presentation: red background with visible reticulated polygonal vessels (red arrows) with purplish-red color, markedly enlarged diameter and variable thickness; non-vascular structures are visible as hair follicle oil overflow in the center of the polygonal vascular network (black arrows).



Figure 1: Patient photo

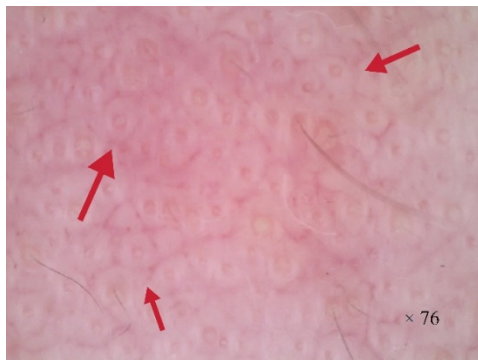


Figure 2: Distribution of polygonal blood vessels in light red background

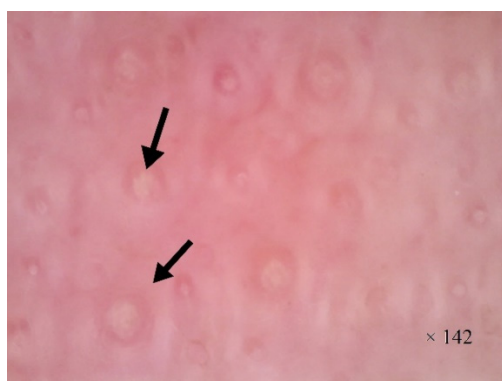


Figure 3: Obvious hair follicle oil overflow

3. Seborrheic Dermatitis

Seborrheic dermatitis is a chronic papulosquamous, superficial inflammatory skin disease that occurs on the scalp, face, trunk and other seborrheic areas⁵. It can be clinically divided into non-inflammatory and inflammatory seborrheic dermatitis⁶, and inflammatory clinical manifestations are typical erythema and covered with furfuraceous scales or greasy crusts, and gradually expands into a large map-like erythema with clear borders, accompanied by mild itching⁷. I collected 15 patients with

seborrheic dermatitis with facial erythema, and found that the dermoscopy showed atypical blood vessels in a yellow-red background, oil droplets around the hair follicles, and honeycomb pigmentation in some patients. The following are typical case reports.

Typical case: Female patient, 73 years old. She had recurrent erythema with pruritus for more than 2 months. The patient complained of scattered erythema and papules with pruritus on the extremities and trunk after infection with Neocoron 2 months ago, which improved after self-administration of "compound cypress lotion", but the rash recurred and worsened after stopping the drug, spreading to the forehead and bilateral nasolabial folds. Now the patient has a light red rash of rice grain to green bean size scattered on the head, face and extremities, fusing in the bilateral nasolabial folds and forehead as well as in well-defined erythematous patches covered with white flakes, with occasional itching, aggravated by heat, and the patient often scratches involuntarily.

Clinical diagnosis: seborrheic dermatitis.

Dermoscopic manifestation: on a yellow-red background, the vascular pattern is predominantly atypical vascular with focal distribution; non-vascular structures are seen as a yellowish halo around the hair follicle with an oil-drop appearance, honeycomb pigmentation (yellow arrow), and a small amount of distributed white scales.

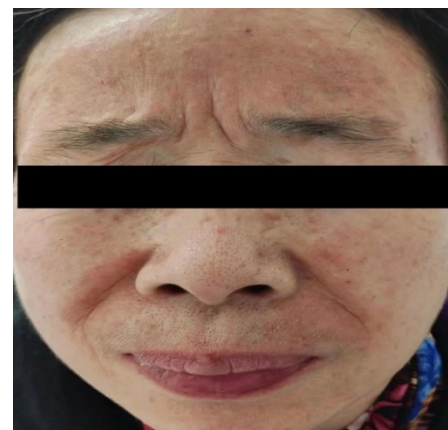


Figure 4: Patient photo



Figure 5: Yellow red, atypical blood vessels, focal distribution ; light yellow halo around the hair follicle, showing an oil droplet appearance, honeycomb pigmentation, a small amount of white scales.

4. Contact Dermatitis

Contact dermatitis is an inflammatory skin reaction caused by the stimulation of external substances, and can be clinically divided into allergic contact dermatitis and irritant contact dermatitis. The acute phase of allergic contact dermatitis is characterized by erythematous papular itchy damage, repeated or continuous exposure to allergens, progressing to chronic patients, skin lesions are dry and hypertrophic, mossy and chapped; irritant contact dermatitis acute light clinical manifestations of erythematous papular damage, severe cases can have blisters, blisters and vesicles and other manifestations⁸. Many patients with irritant contact dermatitis have recurrent disease, with recurrent facial erythema or even resulting in hyperpigmentation, and dermoscope can be used to assist in clinical diagnosis. I collected 10 patients with contact dermatitis with facial erythema, and found that the dermoscope showed linear blood vessels and polymorphic blood vessels in the light red background, and some patients showed honeycomb pigmentation. The following are typical case reports.

Typical case: Female patient, 38 years old. Recurrent facial rash with pruritus for six months, with recurrence aggravated for 5 days. The patient complained of sudden onset of red rash on both eyelids with itching and discomfort after using eye cream six months ago (details unknown), with pinpoint-sized blisters that broke down and exuded plasma, and was diagnosed with "dermatitis" at an outside hospital. The rash was accompanied by periorbital eyelid redness and swelling. The rash was accompanied by periorbital eyelid erythema. Now, diffuse dark red patches with clear boundaries are seen on the face, mainly around the eyes and on both cheekbones.

Diagnosis: contact dermatitis

Dermoscopic manifestation: pale red background, periorcular vascular pattern with markedly dilated linear and polymorphic vessels, non-vascular structures with foveal pigmentation network, and yellow structureless areas; cheeks with diffusely distributed polymorphic vessels, non-vascular structures with follicular sebum overflow and a small amount of yellow halo around the hair follicles.



Figure 6: Patient photo



Figure 7: Periorcular : pale red background, linear vessels, polymorphic vessels ; honeycomb pigmented webs ; yellow unstructured area ;

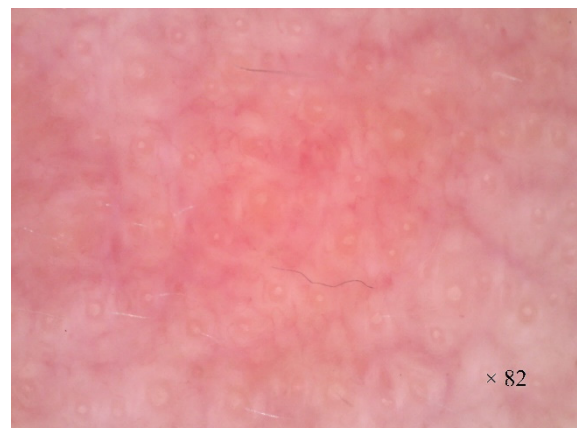


Figure 8: Cheek : light red background, pleomorphic blood vessels ; follicle sebum overflow, a small amount of hair follicles around the yellow halo.

5. Atopic Dermatitis

Atopic dermatitis is a chronic, recurrent, inflammatory disease with a close genetic relationship, most often occurring in children, but also in adults⁹. In the acute phase, the clinical manifestations are erythema, papules and pronounced itching, and after scratching, there may be ulceration and exudation, and even erosion¹⁰. Patients with AD usually have a history of asthma, allergic rhinitis, or a family history of related allergies. I collected 8 patients with specific dermatitis with facial erythema, and found that the dermoscopy showed punctate blood vessels and spherical blood vessels in the light red background, with scales distributed. The following are typical case reports.

Typical case: Female patient, 13 years old. She had erythema and papules on her face with generalized dryness for 2 years. Two years ago, the patient had small erythematous patches on her face and elbow fossa with no obvious cause, dry and flaky skin all over the body, and mild itching, and was diagnosed as "atopic dermatitis" when she went to an outside hospital. The patient has been treated with oral Chinese medicine, anti-allergic drugs and topical hormonal creams for several times in the dermatology department, but the condition has been improving from time to time. The patient has a history of allergic rhinitis. Presenting symptoms: symmetrically

distributed red patches with clear boundaries on the cheeks and around the eyes, with pinpoint to corn-like red papules and white scales, and mild itching.

Diagnosis: Atopic dermatitis

Dermoscopic manifestation: uniformly distributed punctate and bulbous vessels are seen against a light red background, on which white scales are focally distributed; non-vascular structures are seen as brown patchy deposits covered with scales.



Figure 9: Patient photo



Figure 10: Pale red background, punctate blood vessels and spherical blood vessels, evenly distributed ; white scales focal distribution ; brown patches are calming

6. CONCLUSIONS

Rosacea is a diffuse distribution of polygonal blood vessels on a red or purple background; SD is an atypical vascularity on a yellow-red background with an oil-drop reddish halo around the hair follicle; Contact dermatitis is linear and polypoidal vessels on a pale red background; AD is punctate blood vessels and spherical blood vessels under a light red background with a visible scaly distribution; Honeycomb pigmentation can be seen in SD and contact dermatitis.

7. Discussion

Rosacea is an inflammatory disease characterized by transient facial flushing or persistent facial erythema due to vasodilatation. With chronic inflammatory cell infiltration around blood vessels or the formation of abscesses in hair follicles, clinical lesions such as papular pustules and hyperplasia may appear. Lallas et al.¹¹ found

that patients with erythematous capillary dilated rosacea typically exhibit a linear network of horizontally and vertically aligned vessels on dermoscope and named them as polygonal vessels. More studies have subsequently demonstrated this specificity in all patients with rosacea facial erythema, while the papulopustular type emphasizes the presence of microscopic papulopustules, and the granulomatous type of rosacea has "rosette-like structures"¹² in addition to polygonal vessels. The current expert consensus on dermoscopic rosacea is a polygonal blood vessels on a red or purple background¹³. The patient in this case was seen to have only mild facial flushing at the time of consultation, and the dermoscopic presentation still showed an expanded polygonal pattern of vascular network against a red background, suggesting that the patient had significant vasodilation in the superficial layers of the facial epidermis and dermis, which, combined with the clinical presentation, was consistent with the diagnosis of rosacea. Through clinical observation, I found that patients with early disease or late stable disease without obvious papules and pustules only show paroxysmal flushing after emotional excitement, entering a warm environment, eating spicy stimulation, drinking alcohol, or strenuous exercise, which are often mistaken for skin allergy or barrier damage, and often buy their own drugs or functional redness skin care products for external rubbing, or blindly diagnose themselves at the time of consultation, which affects the doctor's diagnosis and treatment. I found through several cases that in patients with paroxysmal flushing, the distribution of polygonal blood vessels under the skin microscope is still visible when there is no obvious erythema or burning sensation on the face. This is also of guiding significance for the early diagnosis of paroxysmal flushing rosacea and can be used for clinical guidance of medication and patient education.

As an inflammatory skin disease prone to recurrence, seborrheic dermatitis has distinct clinical features: light red or yellow-red patches of varying size, and greasy flaking. The early foreign literature reports that the dermoscopic features of SD are irregular punctate vessels and yellow scales¹⁴. Chen Dian et al.¹⁵ concluded from their study that the dermoscopic features of SD were specific for a yellowish-red oil-drop halo around the hair follicle, in addition to vascular changes. The current dermoscopic consensus of SD is a focal distribution of atypical blood vessels on a red or pale red background with a yellowish halo around the hair follicle and an oil-drop appearance with scaling¹⁶. In this case, at the time of consultation, the patient's nose and forehead were markedly erythematous and covered with white lineae. In addition to the atypical blood vessels and the yellowish halo around the hair follicle with an oil-drop appearance, the dermoscope also observed a honeycomb pigmentation network at the forehead lesion, ROSS believes that the honeycomb pigmented network mostly represents a long duration of the disease and is associated with hyperpigmentation after inflammation or injury, so it is presumed that the manifestation of hyperpigmentation is due to the patient's long duration of the disease and repeated scratching. However, in this case, only a small amount of distributed white scales were seen under the

skin microscope, which may be related to the use of cotton swabs dipped in ethanol to wipe before the examination, affecting the microscopic presentation. According to clinical observation, I found that many patients did not adhere to the medication due to the lack of medical knowledge or the lack of obvious changes in skin lesions after the hospital prescribed medication, and often repeatedly changed the medication, and even some patients used glucocorticoid-containing drugs for a long time on the face, thus causing facial hormone-dependent dermatitis and aggravating the disease. In using dermoscope to observe the clinical efficacy of tacrolimus in the treatment of seborrheic dermatitis, Song Ying et al. found that patients showed changes in both the lesions and dermoscope after short-term administration of the drug by the naked eye, but after long-term administration, the lesions did not improve, but the dermoscopic vessels and scales basically disappeared, and the yellow halo around the hair follicle was significantly reduced in diameter compared to the previous changes¹⁷. Zhang Jinglong et al.¹⁸ found that patients using hormonal drugs on the face should discontinue the drugs or switch to non-hormonal drugs when branched blood vessels and irregular blood vessels with disorganized distribution were observed on dermoscope. I have observed clinically that dermoscope is more advantageous in seborrheic dermatitis and alopecia areata on the scalp than on the face, and can clearly compare the changes in hair follicles and hair before and after medication of patients, facilitating clinical guidance of medication. The above can show that dermoscope is more objective and realistic in the evaluation of efficacy in the treatment of seborrheic dermatitis, and it is also more conducive to disease monitoring, medication guidance, and research and development of new clinical drugs or new treatment techniques as an efficacy evaluation standard.

Contact dermatitis is an inflammatory reaction of the skin and mucous membranes following single or repeated exposure to exogenous substances. Goncharova et al.¹⁹ summarized the dermoscopic features of spongiform edematous dermatitis as regular or irregular punctate vessels on a light red background; Lallas et al.²⁰ summarized the dermoscopic features of chronic dermatitis as punctate vessels. Jin Ke²¹ studied 31 cases of acute contact dermatitis dermoscope yielded irregular distribution of punctate or polymorphic vessels on a pale red or red background, with a high degree of specificity for irregular distribution and punctate vessels. In this paper, the patient's periocular area and cheeks were observed separately during the dermoscopic image taking of the patient, the background color of the two skin areas differed significantly, in which the periocular skin showed a yellow-red background microscopically, with linear and polymorphic vascular dilatation and foveal pigmentation visible in non-vascular structures, which was considered to be due to the patient's frequent rubbing around the eyes. Additional yellow structureless areas were seen, and the presence of a lid xanthoma was considered. The irregular distribution of polymorphic vessels against a red background was seen in the cheek, and the dermoscopic presentation was generally consistent with the findings of JinKE's study. In addition to this, seborrhea is visible at

the mouth of the hair follicle, and a small amount of yellow halo around the hair follicle, which is considered to be due to the patient's oily skin. I have found from clinical observation that some contact dermatitis attacks without a clear cause and without significant symptoms such as blisters and blisters, patients often mistake it for sensitive skin and do not treat it or rely excessively on the efficacy of allergy-relieving skin care products, resulting in delays. W.F. Zha et al.²² performed dermoscope on 20 patients with sensitive skin and showed tortuous dilated capillaries, chapped stratum corneum, and hyperpigmented patches with varying degrees of vasodilation, with the specific manifestation of chapped stratum corneum facilitating the differential diagnosis of sensitive skin from seborrheic dermatitis.

Atopic dermatitis usually begins in infancy and has a chronic course with a variety of clinical manifestations. Foreign scholars have concluded from their findings that there are multiple manifestations of skin damage in atopic dermatitis on dermoscope²³. Silverberg²⁴ observed dermoscopic manifestations of dermal vasodilation, hyperkeratosis, and prominent cortical formation gaps in pediatric patients with AD. There are few reports on the dermoscopic manifestations of atopic dermatitis in China. The patient in this paper has a typical clinical presentation of facial erythema, which is indicative. During the examination, the skin of the cheeks and the hairline of the frontal corners were taken respectively, and uniformly distributed punctate and globular vessels against a light red background were visible under dermoscope, and white scales were visible, both suggesting the presence of facial inflammation, while uniformly distributed punctate and globular vessels are also specific in plaque psoriasis, and attention should be paid to the differential diagnosis in combination with clinical manifestations. I found that AD patients often have intense itching, coupled with skin lesions on the face and extremities often bring great negative impact on patients' lives and psychology, most patients expect to eliminate clinical symptoms in a short period of time. The new therapeutic drug dupleximab, with its rapid effect and mild adverse effects, has greatly met the needs of patients and is being widely used in the clinic as a new treatment option. However, foreign scholars have found that in about 10% of patients treated with dupleximab, facial erythema is ineffective or even worsens, and this group of patients is called dupleximab-resistant facial erythema (DRFE) patients²⁵. These patients are very similar to those with rosacea in their clinical presentation. Takeshi²⁶ collected patients with DRFE for dermoscopy and did not find typical manifestations of polygonal vasodilatation, but also did not summarize the dermoscopic features of atopic dermatitis. AD is prevalent in young children, and many clinical evaluations of efficacy cannot be successfully carried out due to the special characteristics of children. Dermoscopy, however, is a non-invasive test that is more easily accepted by children and their families, and holds a wide range of promise as a tool for evaluating dermatological conditions and changes in skin lesions in children.

Dermoscopy has been widely used in many dermatological diseases since its introduction. Skin

lesions that are not visible to the naked eye can be observed by a dermatologist's third eye to aid in clinical diagnosis. For diseases with the manifestation of facial erythema lesions, there are many kinds of diseases involved clinically. The dermoscope is simple and quick to operate, and can be used to clinically track changes in patient lesions and observe clinical outcomes. Compared with the "Persistent Erythema Assessment Scale²⁷", it is more objective and does not be influenced by the subjective judgment of patients and physicians, and more objectively and truly reflects the changes of patients' skin lesions. The sample size of this case study is small, so the conclusions obtained still need a large sample size to verify. The use of dermoscope in erythematous inflammatory dermatoses is still in the exploratory stage in China. Dermoscopy is gradually being chosen as a means of evaluating the efficacy of clinical drugs, but there is still a lack of unified standards regarding the evaluation means. It is believed that as the research on dermoscope increases, it will continue to be improved, and dermoscope technology will play a greater advantage in clinical and scientific research.

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