its potential for spontaneous resolution, the assessment of different treatment modalities has been difficult.

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Dyshidrotic Eczema Giving Rise to Painful Lower Leg Ulceration as a Result of Smoking?

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Sir,

Dyshidrotic eczema is frequent in the hands and feet, and is associated with allergic contact eczema (Ni, Cr), irritant contact dermatitis, atopy, mycotic infection and emotional distress. The more severe forms of dyshidrosis (pompholyx) may give rise to oozing and secondary infection, but these lesions often heal without any problems, along with amelioration of the eczema (1).

Foot ulcers are also common in dermatological practice. Causes of foot and leg ulceration are chronic venous insufficiency and stasis, diabetes mellitus, hypertension, arterial insufficiency, infections and other underlying systemic diseases (2).

A combination of dyshidrosis and lower leg ulceration at the same site has not been described in the literature so far.

In this clinical report we present four young patients with dyshidrotic eczema followed by very painful ulceration of the feet. The ulcers required hospitalization with bed-rest in all four patients. Besides smoking, no other risk factors for ulceration could be distinguished.

CASE REPORTS

Case 1

A 43-year-old man had suffered from recurrent mycosis of the feet for years and dyshidrotic eczema on the hands and feet for a few months. During a holiday to the Maldives, the eczema of the feet exacerbated with vesicles, secondary infection, followed by ulceration interdigitally and on the dorsal side of the left forefoot at the site of the eczema. The ulcers were superficial, covered an area of approximately 4 cm^2 and were painful. Because of the pain, the patient developed post-traumatic dystrophy of the left leg. He had no atopy and no relevant contact factors were involved in the patient history. He smoked more than 25 cigarettes per day.

Cultures of the ulcer showed growth of pseudomonas and staphylococcus aureus. Histological investigation showed a non-specific ulcerating dermatitis with several bacterial colonies. Contact allergies for lanolin, epoxy resin, parabenes, fragrance-mix, cocamidopropylbetaine were found, although no relevance for the perseverance of the complaints could be established. No arterial insufficiency could be established (toe-brachial pressure index = 1).

The patient was admitted to our inpatient department and bed-rest was given. Treatment of the eczema with a potent topical corticosteroid combined with acetic acid topically for the secondary infected ulcer was instituted. The painful ulcer showed a tendency to recur. Continuous therapy with topical corticosteroids was required to prevent exacerbation of the eczema and subsequent ulceration. The patient temporarily stopped smoking.

Recently, an arterial insufficiency was discovered and treated by PTCA. Although we could not establish arterial insufficiency 2 years earlier, the episode of dyshidrosis and ulceration was probably an indication of a developing arterial insufficiency.

Case 2

A 33-year-old man had a history of dyshidrotic eczema of the hands 7 years earlier. His complaints were partly job-related (rose-grower), although no specific contact allergies were established. He changed jobs and became a truck driver. After 6 years, the dyshidrotic eczema relapsed on the hands and mainly the feet, giving rise to very painful ulceration of the feet at the site of the eczema (plantar and also interdigitally). The ulcer was of intermediate depth, with a diameter of 1.5 cm. Arterial pulsation was intact. The patient was not able to work as a truck driver because the ulcer was located just at the ball of the foot, where pressure was required for the accelerator pedal. He had no atopic constitution. The patient smoked 15 cigarettes per day.

Cultures of the ulcer showed growth of pseudomonas. There were no signs of a herpes infection. Histological investigations showed changes compatible with non-specific ulceration. We found no contact allergies after elaborate testing. A roentgenogram did not show osteomyelitis.

Treatment was started with topical corticosteroids combined with acetic acid topically for the secondary infected ulcer. The ulcer healed, but the eczema and subsequently the ulcers relapsed after the patient returned to work. The patient was hospitalized for bed-rest and treated with topical corticosteroids and coal tar and analgesics, a regime that was continued after discharge from hospital. In the following 2 years, the lesions appeared and disappeared, requiring another episode of hospitalization. The patient stopped smoking and the eczema has remained abated until now (for 2 years) with intermittent treatment of topical corticosteroids.

Case 3

A 36-year-old woman with a history of dyshidrotic eczema of the lateral sides of the feet for 6 years was treated by a dermatologist in another hospital. Besides itching of the affected skin, the ankles showed painful ulcers that did not respond to topical treatment and cyclosporine. The ulcers were superficial and covered an area of approximately 4 cm^2. She had no atopy. Arterial pulsation was intact. She smoked 15 cigarettes per day.

Cultures of the wounds did not show growth of pathogenic microbes. The patient was known to have a contact allergy for nickel and rubber. Further tests revealed contact allergies for glues, rubber and topical corticosteroids, and showed delayed reactions to the material of her own shoes.

Treatment with topical corticosteroids combined with coal tar was started at our day-care centre. Initially, the result was good. Cyclosporine was reduced and stopped, and an exacerbation of the eczema and ulceration followed. The patient was hospitalized for bed-rest and treated with a short course of oral prednisone and later with a combination of topical corticosteroids and coal tar. The effect was temporary; moderate dyshidrotic eczema along with painful ulcers recurred. The patient was again admitted to our clinic and treated topically in combination with UVB phototherapy. She temporarily stopped smoking. At the same time "hypoallergenic" shoes were made. Two years after her last admission to hospital, the patient has only a mild eczema without ulceration.

Case 4

A 25-year-old man suffered from dyshidrotic eczema on the hands and feet for 6 months – on the feet giving rise to painful ulcers at the site of the eczema (Fig. 1). The ulcers were superficial and covered an area of approximately 40 cm^2. He had no atopy. Treatment was instituted with topical corticosteroids. A concomitant mycosis was treated with oral terbinafine and itraconazol. The patient smoked 15 cigarettes per day. Arterial pulsation was intact.

Cultures of the ulcers showed growth of staphylococcus aureus and streptococcus. No indications of a persistent mycological infection were seen. In an epicutaneous test (European standard series, plastic and glue series), no relevant contact allergies were found.

The patient was treated with oral corticosteroids in combination with topical corticosteroids. The ulcers persisted and the patient was admitted to our hospital for bed-rest and treated with topical corticosteroids, coal tar and immobilization for 2 weeks. Analgesics were required to treat the pain. Prednisone was reduced and stopped. The patient stopped smoking and eventually the ulcers responded to this combined approach. The patient has been free of lesions for 2 years.

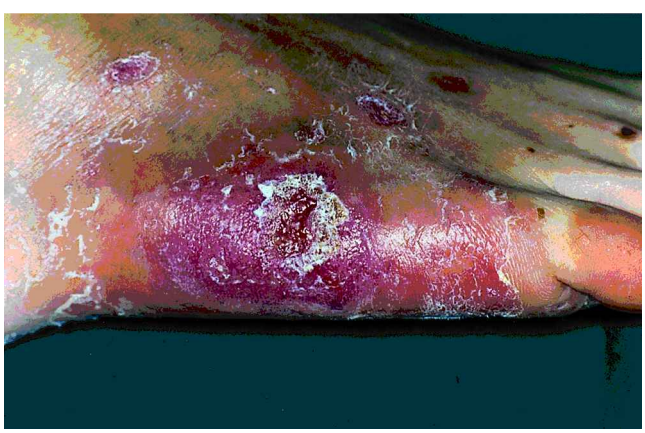

Fig. 1. Ulcer in eczematous lesion in the lateral side of the foot in case 4.

There were no varicose veins or signs of chronic venous insufficiency in any of the patients. Neither were there other causes of lower extremity ulcers (e.g. orthopaedic foot problems, neuropathy or nutritional deficiency).

DISCUSSION

When searching for mutual characteristics in the patients, the most striking symptoms that come to light are painfulness of the ulcers, a relatively young age of the patients and the fact that they were moderate to heavy smokers. It has been stated that smoking might be a risk factor for palmar vesicular eczema (3) and dermatosis such as palmoplantar pustulosis (4).

Many factors may contribute to the development of foot ulcers, and eczema makes the skin more sensitive to external trauma and can result in a wound. In our patients, however, wound-healing seemed disturbed, leading to painful ulceration without apparent risk factors for disturbed wound-healing, such as chronic venous insufficiency, arterial insufficiency, hypertension or diabetes mellitus except for smoking. However, in one patient (case 1) arterial insufficiency was established 2 years later.

Wound-healing in general and after surgery is impaired as a result of smoking. That is why surgical and ulcer patients are advised to stop smoking, at least temporarily (5, 6). Cigarette smoking has a direct influence on blood flow, because of the direct vasoconstrictory effect of nicotine, and diminishes tissue oxygenation (7, 8). In one study in healthy volunteers, subcutaneous wound-tissue oxygen tension fell rapidly and significantly in response to smoking and remained low for 30–50 min (7). Our patient group smoked at least 15 cigarettes per day, causing decreased blood flow for a significant part of the day. Wound re-epithelialization may be delayed owing to inhibitory effects on keratinocyte migration via the nicotinic receptor mediated pathway (9). Furthermore, nicotine increases platelet adhesives, giving rise to thrombotic microvascular occlusion and tissue ischaemia. Nicotine also reduces proliferation of red blood cells, fibroblasts and macrophages. In addition to nicotine, carbon monoxide and hydrogen cyanide also have their effects, mainly on oxygen transport and metabolism (5). Chronic smoking is associated with an increased risk of atherosclerotic disease that may also decrease blood flow in tissues in the long run (8).

In three of our patients the ulcers showed overgrowth of pathogenic micro-organisms. Aerobic as well as anaerobic pathogens were found. Wound-care in our patients was intended to optimize the local situation,

for hygiene, and was also aimed at decontamination of the wound. In general, however, contamination or colonization with bacteria seldom affects ulcer healing (10, 11). Therefore bacterial contamination was probably not significant in relation to cause or course of the ulceration in our patients.

Dyshidrosis of the feet often goes together with dyshidrosis of the hands. However, ulceration was not seen on the hands of our patients. The feet are probably more prone to ulceration because of orthostasis, which explains the favourable effect of bed-rest during hospitalization, an effect that is well known for leg ulcer patients in general.

Painful ulcers in young smoking patients are also seen in thromboangiitis obliterans (M. Buerger) (12). In M. Buerger the ulceration results in mutilation and in contrast to our patients distal arteries are diffusely affected. A skin biopsy in one of our patients showed non-specific dermatitis; M. Buerger shows a more specific involvement of vessel walls and nerves in the inflammatory process. It may be concluded from this that the two disorders are of different origin (12).

We therefore believe that the combination of dyshidrosis with painful ulceration in otherwise healthy young smoking patients is a distinct combination of symptoms that requires recognition by the practitioner. Besides the usual diagnostic and therapeutic measures for eczema, the explicit advice for the patient to stop smoking should be given. In therapy-resistant cases, hospitalization (bed-rest with thrombosis-prophylaxis) may be considered. Although it is tempting to suggest that smoking is the most important causal factor, larger studies should be performed to establish the contribution of smoking in the healing of patients with this kind of pathology.

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