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# Chronic Actinic Dermatitis with Leonine Facies and Iatrogenic Adrenal Insufficiency Successfully Treated with Topical Tacrolimus

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## Key Words

Chronic actinic dermatitis · Adrenal insufficiency · Topical tacrolimus

## Abstract

Chronic actinic dermatitis is a chronic photosensitivity disorder characterized by severe eczematous lesions on sun-exposed skin areas. We report a case of chronic actinic dermatitis presenting with leonine facies and secondary adrenal insufficiency, which was successfully treated with topical tacrolimus. The facial lesions dramatically improved after sun avoidance and topical tacrolimus application. After almost 20 years of oral corticosteroid therapy complicated with secondary adrenal insufficiency, we were able to switch treatment from systemic corticosteroids to topical tacrolimus to control the patient's symptoms.

## Introduction

Chronic actinic dermatitis (CAD) is a severe photosensitivity disease induced by UVB, UVA and occasionally visible light. This idiopathic photodermatosis typically affects elderly men. Clinical manifestations include eczematous lesions, infiltrated plaques and pruritic erythematous papules, which develop on light-exposed areas, particularly the face, neck and upper chest [1]. The severity of the disease in each individual depends on the degree of photosensitivity, ranging from chronic eczematous lesions to erythroderma. Histopathological findings usually show eczematous appearance but sometimes may resemble cutaneous lymphoma [2]. The diagnosis of CAD is based on the following 3 criteria: persistent photodermatitis without history of exposure to known

photosensitizers, abnormal delayed erythematous responses to UVB and/or UVA and/or visible light, and a histological finding consistent with photodermatitis [3]. The pathophysiology of CAD remains unclear, but current evidence suggests a delayed-type hypersensitivity reaction to endogenous photo-induced allergens. Several treatment modalities have been proposed to induce long-term remission, such as systemic corticosteroid, azathioprine, and PUVA; however, the use of these treatment options has limited efficacy and is associated with severe side effects.

### Case Report

A 37-year-old male farmer presented to our hospital with a 22-year history of itchy indurated facial erythematous plaques. He has been treated with oral corticosteroids (prednisolone 30–60 mg/day) with only temporary improvement. He had no history of exposure to any chemicals, plants, or perfumes. Additionally, he had no known underlying disease and there was no family history of similar skin conditions.

Physical examination showed huge indurated lichenified erythematous infiltrative plaques on his forehead, nose, and both cheeks ([fig. 1](#)), and there were discrete erythematous papules on both forearms. A skin biopsy from a lesion of the left cheek was obtained and stained with HE. The biopsy specimen consisted of mounds of parakeratosis, spongiosis and epidermal hyperplasia associated with dense superficial inflammatory cell infiltrates, mainly lymphocytes, in the thickened papillary dermis. Routine laboratory findings were normal, except for a very low morning serum cortisol level (<1 µg/dl). Antinuclear antibody and anti-HIV tests were negative. Patch and photopatch testing (including analysis of common photoallergens such as sunscreen, fragrance, and sesquiterpene lactone) revealed no contact sensitivity ([table 1](#)). Phototesting was done on uninvolved skin. The patient's minimal erythema dose to both UVA and UVB demonstrated a significantly reduced threshold for UVA (3 J/cm<sup>2</sup>; reference value: 30 J/cm<sup>2</sup>) and UVB-induced erythema (12 mJ/cm<sup>2</sup>; reference value: 45–60 mJ/cm<sup>2</sup>) for his skin phototype IV ([fig. 2](#)). After 4 months of topical tacrolimus therapy and sun avoidance by using sunscreen and wearing opaque clothes and a broad-brimmed hat, there was a significant improvement of his facial lesions ([fig. 3](#)). Remission of CAD could be maintained by topical tacrolimus, and the secondary adrenal insufficiency induced by exogenous corticosteroid therapy recovered after discontinuation of oral steroids.

### Discussion

In this case, CAD with extensive leonine facies was successfully treated with 0.1% tacrolimus ointment twice daily. A clinically significant improvement of all lesions was observed after 4 months. There was no adverse effect except for a mild transient burning sensation during the first few treatment days. Tacrolimus is an immunosuppressive macrolide antibiotic, which inhibits calcineurin and suppresses the activation of antigen-specific T cells and the release of inflammatory cytokines, such as interleukin 2 and tumor necrosis factor [4]. T cell activation may be important for the pathogenesis of CAD. This hypothesis is supported by both the fact that the infiltrating cells are predominantly T cells and the immunological effects of tacrolimus [5]. This advocates the use of topical tacrolimus as maintenance therapy and to prevent recurrence. After a follow-up period of 1 year with strict sun protection and maintenance therapy with topical tacrolimus once daily, the patient eventually achieved remission. Although there have been several reports of CAD cases successfully treated with topical tacrolimus [5–8], this is the first case with severe and extensive leonine facies, which were uncontrolled despite 20 years of oral corticosteroid use, which in contrary induced secondary adrenal insufficiency as adverse

effect. After remission, the oral corticosteroid was successfully tapered and discontinued within 6 months; thereafter, the morning serum cortisol level returned to a normal range.

In conclusion, this case demonstrates for the first time that topical tacrolimus might be an appropriate topical treatment with minimal side effects to induce and maintain remission in severe CAD cases.

#### **Disclosure Statement**

The authors declare that they have no conflict of interest.

**Table 1.** Photopatch test form

Test No.	Photopatch series	48 h		72 h		96 h		Remarks
		NR	R	NR	R	NR	R	
SU1	4-tert-Butyl-4'-methoxy-dibenzoylmethane (Parsol 1789) 2.0 pet B029	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU2	4-Aminobenzoic acid (PABA) 5.0 pet A006	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU3	4-Isopropyl-dibenzoylmethane (Eusolex 8020) 2.0 pet I005	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU4	3-(4-Methylbenzyliden) camphor (Eusolex 6300) 2.0 pet M024	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU5	2-Ethylhexyl-4-dimethylaminobenzoate (Eusolex 6007, Escalol 507) 2.0 pet E018	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU6	2-Hydroxy-4-methoxybenzophenone (Eusolex 4360, Escalol 567, Oxybenzone) 2.0 pet H014	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU7	2-Ethylhexyl-4-methoxycinnamate (Parsol MCX, Escalo 557) 2.0 pet E019	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU8	2-Hydroxy-methoxymethylbenzophenone (Mexenone) 2.0 pet H020	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU9	2-Phenylbenzimidazol-5-sulfonic acid (Eusolex 232, Novantisol)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU10	2-Hydroxy-4-methoxybenzophenon-5-sulfonic acid (Sulisobexone, Uvinyl MS-40, Benzophenone 4) 5.0 pet H023	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU11	Trichlorcarbanilide (TCC) 1.0 pet T013	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU12	Tribromsalicylanilide (TBS) 1.0 pet T012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU13	Musk ambrette 1.0 pet M017	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU14	6-Methylcoumarine (6-MC) 1.0 pet M010	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU15	Bithionol 1.0 pet B014	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU16	Wood mix (pine, spruce, birch, teak) 20.0 pet Mx09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU17	Tetrachlorsalicylanilide (TCS) 0.1 pet T001	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU18	Hexachlorophene 1.0 pet H001	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU19	Diphenhydramine hydrochloride 1.0 pet D021	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU20	Perfume mix 6.0 pet Mx08	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU21	Diallyldisulfide 1.0 pet D048	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU22	Chrysanthemum cinerariaefolium (Pyrethrum) 1.0 pet C031	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU23	Sesquiterpene lactone mix* 0.1 pet Mx18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU24	Lichen acid mix 0.3 pet Mx15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU25	Sulfanilamide 5.0 pet S010	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU26	T026 Thiourea 0.1% pet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU27	Quinidire 1% pet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU28	Naproxen 5% pet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU29	Ibuprofe 5% pet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU30	Diclofenac 1% pet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU31	Ketoprofen 2.5% pet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU32	Balsam Peru 25.0 pet B001	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU33	2-tert-Butyl-4-methoxyphenol (BHA) 2.0 pet B022	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SU34	Chlorhexidine digluconate 0.5 aq C005	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



**Fig. 1.** Before treatment.



**Fig. 2.** Reduced threshold for UVA and UVB.



**Fig. 3.** After 6 months of treatment.

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