A Case of Chronic Actinic Dermatitis Treated with 0.03% Topical Tacrolimus

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Chronic actinic dermatitis is an idiopathic photodermatoses presenting as severe persistent eczematous skin eruptions on sun-exposed skin, with an enormous itching sensation. The treatment includes photoprotective measurements, topical or systemic corticosteroids and other immunosuppressive agents. However, occasionally, the condition is resistant to these therapies and results in a significant disabling of the involved individuals. We tried 0.03% topical tacrolimus ointment on a chronic actinic dermatitis patient who had previously been treated with conventional steroid therapy with no improvement. Two weeks after application of the topical tacrolimus ointment, the itching sensation was significantly improved and in 4 weeks, the skin lesions began to improved with no other side effects.
(Ann Dermatol (Seoul) 18(1) 24～28, 2006)

Key Words: Chronic actinic dermatitis, Topical tacrolimus

INTRODUCTION

Chronic actinic dermatitis (CAD) is a persistent, generally eczematous, sometimes pseudolymphomatous eruption, which becomes worse especially in summer, with corresponding histologic findings. It is defined on the basis of 3 criteria, including a clinically persistent eczematous eruption on sun-exposed skin, histological consistency with chronic eczema and photobiologically decreased minimal erythema doses (MED) to UVB. It is induced mainly by UVB, often by UVA and rarely by visible light. But the exact mechanism of CAD remains unclear. For the diagnosis of CAD, phototesting is essential and should reveal abnormally decreased MED in affected patients[1,2]. The quality of life is greatly impaired because the treatment is usually difficult and ineffective. Topical and sometimes systemic corticosteroids can be used, but prolonged use of corticosteroids often induces cutaneous and systemic adverse effects. We report a case of chronic actinic dermatitis successfully treated with 0.03% tacrolimus ointment, without significant side effects.

Received September 23, 2005
Accepted for publication December 12, 2005
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CASE REPORT

A 55-year-old male patient presented with a 2-year history of multiple, lichenified erythematous papules and plaques on the face, neck and dorsa of the hands, accompanied by a severe itching sensation. Physical examination revealed that the skin lesions were mainly distributed on the sun exposed areas (Fig. 1A, B). The patient had a 2-year history of recurrent symptoms and was intermittently treated with systemic corticosteroids, topical corticosteroids and antihistamines without satisfactory results. Laboratory investigations including complete blood cell count, peripheral blood smear, serum IgE, VDRL and routine urinalysis were all within normal limits, except a slightly elevated liver function test. To differentiate porphyria cutanea tarda, we tried the urine wood lamp test, uroporphyrin, corproporphyrin and urine porphobilinogen, which proved to be within normal limits. A photoprovocation test showed decreased MED to UVB (Dermalight 6000® chamber, range of wave length: 295-400 nm, peak

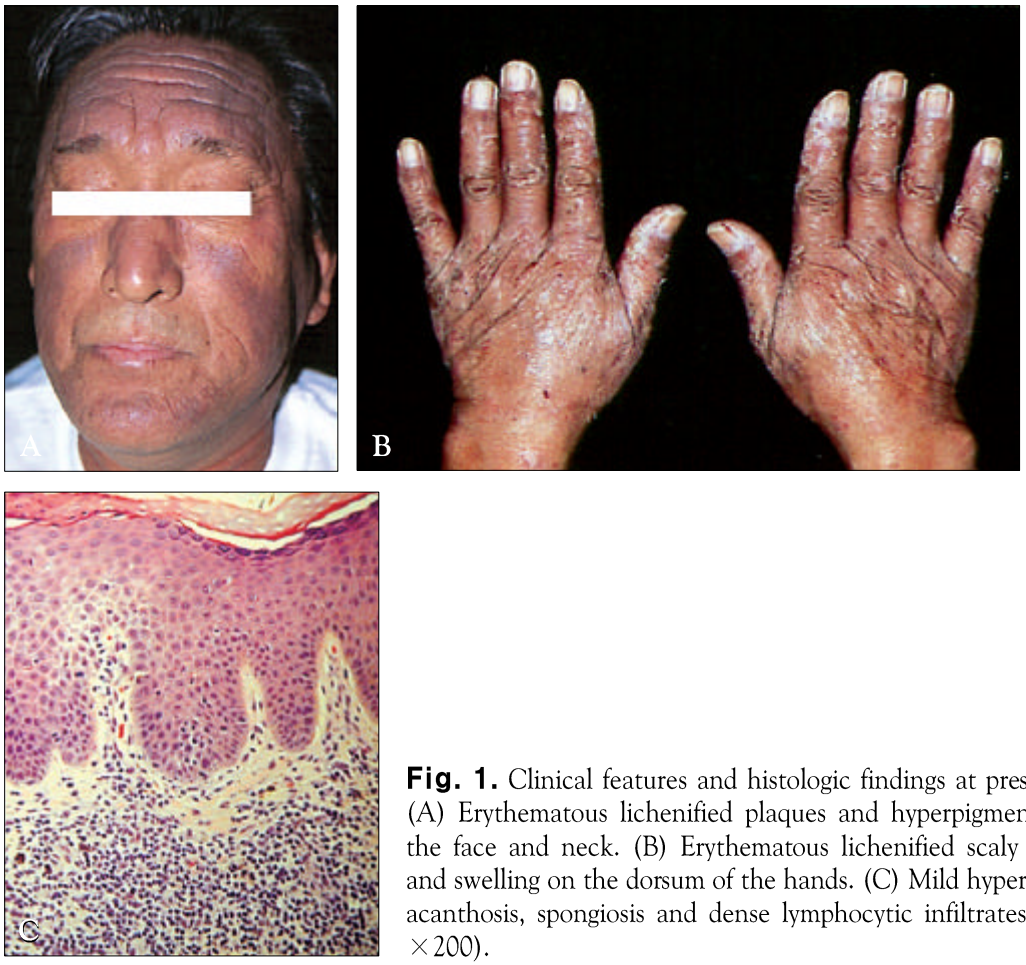

Fig. 1. Clinical features and histologic findings at presentation. (A) Erythematous lichenified plaques and hyperpigmentation of the face and neck. (B) Erythematous lichenified scaly pathches and swelling on the dorsum of the hands. (C) Mild hyperkeratosis, acanthosis, spongiosis and dense lymphocytic infiltrates (H & E, ×200).

wave length: 310 nm, Medizintechnik, Germany), 20 mJ/cm^2 (normal; 50-70 mJ/cm^2) without abnormal response to both UVA and visible light (Fig. 2). A biopsy specimen sampled from the lesions on the face revealed acanthosis and dense perivascular lymphocytic infiltrates with mild spongiosis (Fig. 1C). Patch tests with European standard series 21 allergens produced no abnormal reaction. On the basis of clinical features, the reduction in MED to UVB irradiation and histologic findings, the diagnosis of CAD was made. Only 0.03% tacrolimus ointment without topical or systemic corticosteroid therapy was applied on the skin lesions of the face and dorsa of hands twice daily. We recommended rigorous avoidance of sun light with regular application of broad-spectrum topical sunscreens. Within 2 weeks after application, the pruritus reduced significantly and skin lesions of erythematous papules and plaques began to improve in the 4th week of the treatment without other side effects (Fig. 3A, B).

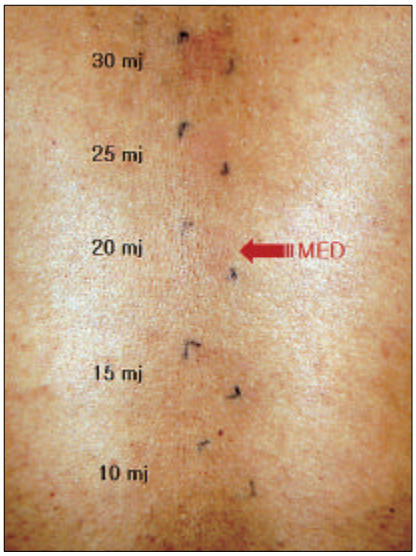

Fig. 2. Result of the phototest. Erythematous changes appeared from a 20 mJ UVB dose on the the patient's back.

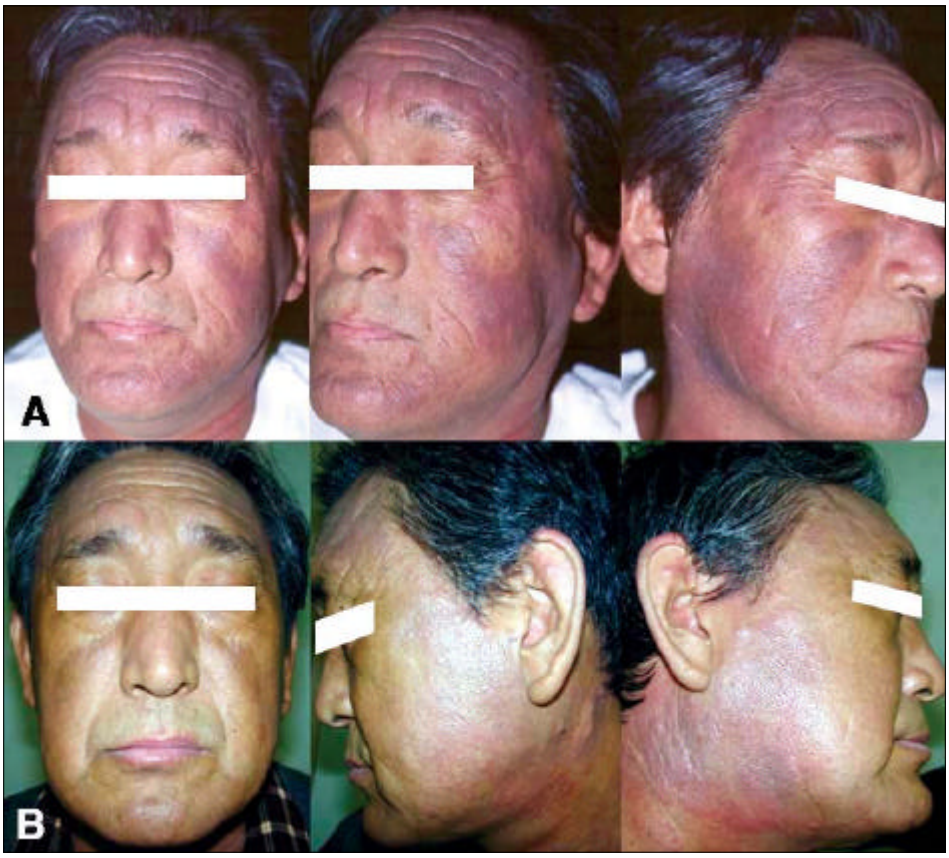

Fig. 3. Before (A) and after (B) treatment for 4 weeks with 0.03% topical tacrolimus ointment.

Table 1. Reports of chronic actinic dermatitis successfully treated with topical tacrolimus ointment

Reports (number of cases)	Concentration of tacrolimus applied	Mean age (year)	Time required for symptom relieve	Clinical results
Uetsu et al.[3] (6 cases)	0.1%	63.7	2 weeks	Improved
Abe et al.[4] (2 cases)	0.1%	63	2 weeks	Improved
Evans et al.[5] (1 case)	0.1%	55	Few weeks	Improved
Ogawa et al.[6] (1 case)	0.1%	66	Four days	Improved
Suga et al.[7] (1 case)	0.1%	35	2 weeks	Improved
Our case (1 case)	0.03%	55	4 weeks	Improved

DISCUSSION

CAD is persistent, ultraviolet radiation-induced eczema of exposed or sometimes covered sites[2]. The exact cause and pathogenesis of CAD is not clear and it is classified as an idiopathic photodermatoses, but the clinical and histologic features suggest that CAD is a T-cell mediated allergic condition[2,3]. The diagnosis of CAD is made on the basis of clinical features of eczematous skin lesions, especially on sun-exposed areas, histologic findings implicating chronic dermatitis and an abnormal phototesting result to UVB, with or without abnormal response to UVA or visible light[2]. Treatment of CAD is usually difficult and often only partially effective, even with systemic and topical corticosteroids. It has been reported that in several cases, topical tacrolimus ointment was applied to CAD patients successfully without adverse effects (Table 1)[3-7]. Tacrolimus is an immunosuppressive macrolide antibiotics, acting as a calcineurin inhibitor that suppresses T-cell activation[8]. In contrast to corticosteroids, topical tacrolimus does not cause atrophic changes on the human skin[9]. As the first topical immunosuppressant since hydrocortisone, topical tacrolimus was applied to atopic dermatitis at first, but it is being widely investigated in other inflammatory skin diseases including psoriasis, pyoderma gangrenosum, lichen planus, graft-versus-host disease, alopecia areata, allergic contact dermatitis and rosacea[9]. In previous reports[3-7], 0.1% topical tacrolimus was applied to CAD with successful clinical results. In this case, we applied 0.03% topical tacrolimus to a CAD patient, refractory to other treatments including systemic and topical corticosteroids. Within 4 weeks of the treatment, the patient had relief from itching and an improvement of eczematous skin lesions on the face. We recommended to maintain application of topical tacrolimus twice daily, in addition to other sun protective methods, and the patient has had no recurrence for 8 months. The exact pathogenesis of CAD is unclear, but the dermal lymphocytic infiltrations of the affected skin suggest that CAD is a T-cell mediated allergic reaction. Tacrolimus inhibits T lymphocyte activation by binding to an intracellular protein, FKNP-12. A complex of tacrolimus, calcium, calmodulin and calcineurin is then formed, and inhibits phosphatase activity of the calcineurin. This effect eventually prevents gene transcription for the formation of lymphokines such as interleukin (IL)-2, γ-interferon, IL-3, IL-4, IL-5, granulocyte- macrophage-colony stimulating factor and tumor necrosis factor-α. Tacrolimus also inhibits the release of mediators from cutaneous mast cells and basophils and downregulates the expression of of FcεRI on Langerhans cells[5]. Topical tacrolimus ointment seems to be another choice for the treatment of CAD, refractory to other immunosuppressive drugs such as corticosteroids and azathioprin which can cause significant adverse effects. However, more case studies and information about the pathogenesis of CAD are needed to evaluate the benefits of topical tacrolimus in CAD patients.

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