Treatment of Oral Erosive Lichen Planus With 1% Pimecrolimus Cream

A Double-blind, Randomized, Prospective Trial With Measurement of Pimecrolimus Levels in the Blood

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Objectives: To evaluate the efficacy of 1% pimecrolimus cream in treating oral erosive lichen planus and to assess its tolerance.

Design: Double-blind randomized trial with placebo control.

Setting: Outpatients of the Department of Dermatology, University Hospital of Nice, from December 21, 2004, to April 19, 2005.

Patients: Fourteen consecutive patients with oral erosive lichen planus confirmed by histological examination and with a clinical score superior to 3. Of the 14 patients, 2 did not meet the inclusion criteria and 12 were enrolled in the trial.

Intervention: The intervention was 1% pimecrolimus cream or its vehicle, which was applied on ulcerated lesions twice a day for 4 weeks.

Main Outcome Measures: The efficacy of the treatment was quantified using a 12-point clinical score. The blood level of pimecrolimus was analyzed on days 0 (baseline), 14, and 28.

Results: In the placebo group, the mean score was 4.67 on day 0 vs 3.33 on day 28 (P = .22). In the pimecrolimus group, the mean score was 6.83 on day 0 vs 3.33 on day 28 (P = .04). In the pimecrolimus group, blood concentrations of pimecrolimus were always above the threshold (mean value, 2.84 ng/mL; extreme values, 0.6-6.19 ng/mL). Pimecrolimus cream was well tolerated, and only transient burning sensations were reported by some subjects. Each of the patients in the pimecrolimus group whose condition improved subsequently relapsed when assessed 1 month after treatment.

Conclusions: The 1% pimecrolimus cream seems to be an effective and well-tolerated treatment for oral erosive lichen planus. The finding of systemic levels of pimecrolimus after mucosal applications necessitates long-term study because it seems that long-term application is required to maintain clinical improvement.

Trial Registration: clinicaltrials.gov Identifier: NCT00321750

Arch Dermatol. 2007;143:472-476

ORAL EROSI VE LICHEN PLANUS (OELP) is a severe form of mucosal lichen planus. Lesions are often intensely painful, and pain when eating can lead to weight loss. A long-term course is punctuated by intermittent flares. Spontaneous remissions are rare. Treatment is difficult: topical corticosteroids are usually prescribed first, but antimalarial agents, oral retinoids, systemic corticosteroids, immunosuppressive drugs, and even extracorporeal photochemotherapy can be necessary in severe cases. There is a need for novel therapies that are effective and produce less morbidity. The anti-inflammatory action of calcineurin inhibitors provides a rational basis for using these topical agents in patients with OELP, and several open-label studies\textsuperscript{1-7} using topical tacrolimus demonstrated effectiveness. The effectiveness of 1% pimecrolimus cream in OELP has also been suggested in a few case reports\textsuperscript{8,9} and in a recent comparative study.\textsuperscript{10} The absorption of pimecrolimus through human mucosa has not been adequately studied. Its application on the ulcerative lesions of OELP could produce significant systemic levels of the drug.

See also pages 463, 511, and 519

CME course available at www.archdermatol.com

The objectives of this study were to evaluate the efficacy of 1% pimecrolimus cream in treating OELP, to assess its tolerability, and to evaluate the potential for systemic adverse
effects by monitoring the blood levels of this drug during the treatment period.

METHODS

STUDY DESIGN

Fourteen consecutive outpatients seeking treatment for OELP in the Department of Dermatology, University Hospital of Nice, were assessed for eligibility for this study from December 21, 2004, to April 19, 2005. Of the 14 patients, 2 did not meet the inclusion criteria and 12 were enrolled in a randomized, double-blind, controlled trial. Randomization into 2 groups was done by draw lots, with equilibration every 4 subjects. The study was approved by the ethics committee of Nice.

PATIENTS

The inclusion criteria included confirmation of the diagnosis of OELP by histological examination of an oral biopsy specimen and a clinical score higher than 3. Clinical history and careful histological examination, including the type and the localization of the inflammatory infiltrate and the presence of cytoid bodies, were done to differentiate OELP from lichenoid reactions. Exclusion criteria were patients younger than 18 years, pregnancy or breastfeeding, malignancy, severe or recurrent infections, uncontrolled chronic disorders, congenital or acquired immunosuppression, and concomitant treatments potentially effective on OELP, such as antimalarial agents, oral retinoids, corticosteroids, or immunosuppressive drugs.

INTERVENTION

The intervention was 1% pimecrolimus cream or its vehicle, which was applied on ulcerated lesions twice a day for 4 weeks. Pimecrolimus cream and placebo cream were provided by Novartis Pharma AG, Basel, Switzerland. The placebo cream was the excipient of pimecrolimus. Pharmacological studies have already been performed by Novartis Pharma AG (unpublished data, 2004), and have shown no toxicity when this cream is applied on mucosa. No eating, drinking, or gum chewing was permitted for 30 minutes after the ointment was applied.

EVALUATION

Clinical evaluation was performed by a single physician (T.P.). The efficacy of the treatment was quantified using a calculated score. The scoring system was described in a previous study. Briefly, spontaneous and meal-triggered pain were scored from 0 to 4 using a visual analog scale. The surface area of the erosions was evaluated using a drawing in which the areas of various zones of the mouth were indicated as a percentage of the whole surface area of the oral mucosa. Involvement of less than 5% was scored as 1; 5% to 15%, 2; 16% to 25%, 3; and more than 25%, 4. The sum of the 3 items gave a maximal possible score of 12. Clinical evaluation (including blood pressure) was performed by a single physician (T.P.).

RESULTS

Six patients received the pimecrolimus cream, and 6 others received placebo (Table). All the patients had already received at least 1 other treatment. The mean duration of OELP was 12 years (range, 2-58 years) (placebo group, 7 years; and pimecrolimus group, 16 years). One patient (patient 9 in the placebo group) discontinued the study on D14 because his condition failed to improve. Results were analyzed in the intent-to-treat population. There was no statistically significant difference in score between the 2 groups at the onset of the study (4.67 for the placebo group vs 6.83 for the pimecrolimus group; \( P = .39 \)). In the placebo group, the total score improved in 3 patients (only 1 had a decrease in score of >3 points). The mean score was 4.67 on D0 vs 3.33 on D28 (\( P = .22 \)). In the pimecrolimus group, the total score improved in 5 patients (all had a decrease in score of >3 points). The mean score was 6.83 on D0 vs 3.33 on D28 (\( P = .04 \)) (Figure 1). The mean score of erosions was 1.67 on D0 vs 1.33 on D28 in the placebo group and 2.17 on D0 vs 0.83 on D28 in the pimecrolimus group (Figure 2).

In the pimecrolimus group, all the patients but 1 reported a moderate to important improvement of their symptoms and were satisfied by the treatment. This improvement was observed from the first week of treatment, usually within the first 2 days, and most notably patients reported less pain when eating. The clinical improvement of 1 patient is demonstrated in Figure 3. In the placebo group, only 1 patient reported moderate improvement and a modest decrease in pain when eating.

The treatment was well tolerated in both groups, but burning sensations in the first days of treatment were reported by 2 patients in the pimecrolimus group. The blood pressure remained stable in all the patients. Laboratory analyses demonstrated no abnormalities. Pimecrolimus was never detected in the blood of the control group. In the pimecrolimus group, most of the blood concentrations of pimecrolimus were higher than the threshold. The mean value was 2.32 ng/mL (extremes, 0.6-10 ng/mL) at D14 and 2.84 ng/mL (extremes, 0.6-19 ng/mL) at D28.

The mean quantity of cream used during the month of treatment was not statistically different between the pimecrolimus and placebo groups (34 vs 50 g; \( P = .42 \)). All the patients in the pimecrolimus group whose condition improved had a relapse within the month following the end of the treatment.
The significant decrease in severity score observed in the pimecrolimus group demonstrates the effectiveness of 1% pimecrolimus cream in treating OELP. Because of the few patients in this study, caution must be exercised when considering the clinical significance of this treatment. However, the objective measures are supported by the subjective reports of improvement in erosions and pain when eating, beginning early in the treatment course. More important, all the patients in the pimecrolimus group but 1 have reported a moderate to important improvement of their disease and were satisfied by the treatment. However, the treatment did not produce long-lasting benefits. All of the patients with OELP whose condition improved during the treatment period relapsed within 1 month after treatment was discontinued. These results corroborate previous observations and studies performed with topical pimecrolimus.

Pimecrolimus cream was well tolerated, with transient burning sensations noted during the first 2 weeks of therapy in 1 patient and during the first week in the other 1.

The score range possible was from 0 to 4.

*The score range possible was from 0 to 12.
†Each blood sample was analyzed twice.
‡Each blood sample was analyzed twice.

### Table. Population and Results

<table>
<thead>
<tr>
<th>Patient No./Sex/Age, y</th>
<th>Onset of Disease, y</th>
<th>Previous Treatment</th>
<th>Erosive Lesions†</th>
<th>Surface of Erosive Lesions‡</th>
<th>Pain During Drinking§</th>
<th>Pain During Eating¶</th>
<th>Basal Pain*</th>
<th>Evaluation by the Patient</th>
<th>Blood Level of Pimecrolimus, ng/mL‡</th>
<th>Tolerance</th>
<th>D14</th>
<th>D28</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/M/73 1% Pimecrolimus cream</td>
<td>25</td>
<td>Betamethasone valerate cream (−)</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>16.7</td>
<td>+</td>
<td>Good</td>
<td>0</td>
<td>0/0.31</td>
<td></td>
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<tr>
<td>2/M/79 1% Pimecrolimus cream</td>
<td>58</td>
<td>Betamethasone cream (−) and tacrolimus mouthwashes (+)</td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>21.0</td>
<td>+</td>
<td>Very good</td>
<td>1.33/1.61</td>
<td>1.54/1.51</td>
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</tr>
<tr>
<td>3/F/66 Placebo</td>
<td>3</td>
<td>Betamethasone cream (−) and antimalarial agent (+)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>33.5</td>
<td>Fair improvement</td>
<td>Very good</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
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<td>4/M/70 Placebo</td>
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<td>Betamethasone cream (−) and antimalarial agent (+)</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>52.6</td>
<td>Worse</td>
<td>Very good</td>
<td>0</td>
<td>0</td>
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<td>5/F/77 1% Pimecrolimus cream</td>
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<td>Betamethasone cream (−), tacrolimus mouthwashes (−), and antimalarial agent (−)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>35.9</td>
<td>++</td>
<td>Good</td>
<td>3.28/3.29</td>
<td>4.48/4.63</td>
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<td>6/M/75 Placebo</td>
<td>13</td>
<td>Betamethasone cream (−), acitretin (−), tacrolimus mouthwashes (−), and antimalarial agent (−)</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>34.1</td>
<td>+</td>
<td>Very good</td>
<td>0</td>
<td>0</td>
<td></td>
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<td>Betamethasone cream (−)</td>
<td>8</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>85.9</td>
<td>−</td>
<td>Good</td>
<td>5.35/6.10</td>
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<tr>
<td>8/F/78 Placebo</td>
<td>2</td>
<td>Cyclosporine mouthwashes (−)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>45.3</td>
<td>Fair improvement</td>
<td>Very good</td>
<td>0</td>
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<tr>
<td>9/M/49 Placebo</td>
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<td>Betamethasone cream (−)</td>
<td>NA (2 at D14)</td>
<td>NA (3 at D14)</td>
<td>NA (2 at D14)</td>
<td>NA (7 at D14)</td>
<td>13.9 at D14</td>
<td>NA</td>
<td>NA</td>
<td>0</td>
<td>NA</td>
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</tr>
<tr>
<td>10/M/73 1% Pimecrolimus cream</td>
<td>5</td>
<td>Cyclosporine mouthwashes (−), tacrolimus mouthwashes (−), and antimalarial agent (−)</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>94.0</td>
<td>+</td>
<td>Very good</td>
<td>1.20/1.18</td>
<td>2.00/1.90</td>
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</tr>
<tr>
<td>11/F/58 1% Pimecrolimus cream</td>
<td>3</td>
<td>Acitretin (−), tacrolimus mouthwashes (−), and antimalarial agent (−)</td>
<td>9</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>46.6</td>
<td>++</td>
<td>Very good</td>
<td>2.33/2.18</td>
<td>5.81/6.19</td>
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</tr>
<tr>
<td>12/F/78 Placebo</td>
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<td>Betamethasone cream (−)</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>26.4</td>
<td>−</td>
<td>Average</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: D0, day 0 (baseline); D14, day 14; D28, day 28; NA, data not available; +, moderate improvement; ++, important improvement; −, no improvement.

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of treatment. No patient discontinued treatment for this reason. Blood pressure remained stable, and laboratory analyses demonstrated no abnormalities. To our knowledge, no toxicity data were available in humans before this study. Only pharmacological studies were performed by Novartis Pharma AG on animals (unpublished data, 2004). No toxic effects were found when this cream was applied on the mucosa of rabbits. To our knowledge, our study was the first to evaluate systemic exposure after mucosal exposure of pimecrolimus cream in humans. Blood concentrations of pimecrolimus were always above the threshold of detection and were higher (about 3 times) than those detected after use on skin.12 These results were predictable because the skin barrier is more efficient than the mucous barrier and because the treated lesions were erosive. In our study, blood levels of pimecrolimus seem not to be linked with the surface area of erosive lesions or the quantity of cream used, and an interindividual susceptibility can be suspected. Moreover, blood levels of pimecrolimus have not decreased with the healing of lesions. On the contrary, they have increased by D28 compared with D14. This slight increase could be because of the repeated exposures and/or a cumulative effect. The blood levels of pimecrolimus remain significantly below (about 10-fold lower) levels observed when treating psoriasis with oral pimecrolimus (ie, 54.5 ng/mL).13 However, even with blood levels of pimecrolimus superior to 50 ng/mL, no clinical, labora-

![Figure 1. Evolution of the total score under treatment.](https://archderm.jamanetwork.com/article.aspx?articleid=475)

![Figure 2. Evolution of the erosion score under treatment.](https://archderm.jamanetwork.com/article.aspx?articleid=475)

![Figure 3. Clinical aspect before and after 14 and 28 days of treatment with 1% topical pimecrolimus cream: baseline, before treatment on inner cheek and lip lesions (A), on day 14 of treatment (B), and on day 28 of treatment (C).](https://archderm.jamanetwork.com/article.aspx?articleid=475)
Acquisition of data: Ortonne.

Study concept and design: the data in the study and takes responsibility for the interpretation of data: Passeron, Lacour, Fontas, and Ortonne.

Faculty of Medicine and Pharmacy of Nantes, which paid for the insurance for the patients and covered the expenses of the study.

Previous Presentation: This study was presented at the annual meeting of the French Society of Dermatology; September 12, 2005; Paris, France.

Acknowledgment: We thank Marie-France Verpilleux, MD, and Carle Paul, MD, Novartis Pharma AG, for their help and support.

Accepted for Publication: September 4, 2006.

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Author Contributions: Dr Lacour had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Passeron, Lacour, Fontas, and Ortonne. Acquisition of data: Passeron. Analysis and interpretation of data: Passeron, Lacour, and Fontas. Drafting of the manuscript: Passeron. Critical revision of the manuscript for important intellectual content: Lacour, Fontas, and Ortonne. Statistical analysis: Fontas. Obtained funding: Lacour. Administrative, technical, and material support: Lacour. Study supervision: Lacour and Ortonne.

Financial Disclosure: None reported.

Funding Support: This study was supported by grant Contrat d’Incitation à la Recherche 2003 from the Centre Hospitalier et Universitaire de Nice, which paid for

REFERENCES