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The Efficacy and Tolerability of Clobetasol Propionate Foam 0.05% in the Treatment of Mild to Moderate Plaque-type Psoriasis of Nonscalp Regions

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Abstract

Background: Clobetasol propionate foam 0.05% (Connetics Corporation, Palo Alto, CA) is approved by the United States Food and Drug Administration for the treatment of corticosteroid-responsive scalp dermatoses, but there is only limited data available for its efficacy and tolerability in treating dermatoses which affect nonscalp sites.

Objective: The efficacy and tolerability of clobetasol propionate foam (clobetasol foam) in treating psoriatic lesions at nonscalp sites was evaluated in a multicenter, randomized, double-blinded, placebo-controlled study of 279 patients with mild to moderate plaque-type psoriasis.

Methods: The patients applied clobetasol foam or placebo to the psoriatic lesions twice daily for two weeks. In addition to receiving clinical evaluations, the study patients completed a questionnaire evaluating various characteristics of the foam formulation, including their preference for its use and their projected likelihood to comply with similar therapy in a nonstudy environment.

Results: At Week 2 (or end of treatment), 68% (94/139) of patients who received clobetasol foam had a Physician's Static Global Assessment score of 0 (clear, except for minor residual discoloration) or 1 (majority of lesions have individual scores for plaque thickness, erythema, and scaling that averages 1). This was significantly more than the 21% (30/140) observed in the placebo group ($P < 0.0001$). Similar results were obtained for the Patient's Global Assessment score at Week 2 and in changes (from Baseline to Week 2) in the scores for the signs of psoriasis at a target lesion and for pruritus. Adverse effects were generally limited to mild and transient burning or other application site reactions in only a few patients in each treatment group. In the patient's poststudy questionnaire (completed at Week 2, or end of treatment) a majority of patients rated the characteristics of the foam formulation very highly. The patients ranked the foam formulation as superior to other topical formulations based on factors impacting their quality of life and indicated they would be more likely to comply with a recommended course of therapy with the foam formulation than with other topical formulations.

Conclusion: Clobetasol propionate foam 0.05% is safe and effective for the treatment of plaque-type psoriasis on scalp and nonscalp areas, when applied twice daily for two weeks. As it is understood that patient dissatisfaction with select topical formulations affects their compliance with therapy, which necessarily affects the effectiveness of the

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therapy, the results of the patient's poststudy questionnaire suggest that there are multiple and integrated benefits for the use of clobetasol foam in the treatment of psoriasis of nonscalp sites.

Sommaire

Antecédents: La Food and Drug Administration, aux États-Unis, a approuvé l'usage de la mousse de propionate de clobétasol à 0,05% (Connetics Corporation, Palo Alto, California) dans le traitement des dermatoses du cuir chevelu qui sont sensibles aux corticostéroïdes. Cependant, les données sur son efficacité et le degré de tolérabilité dans le traitement d'autres dermatoses sont limitées.

Objectifs: L'efficacité et la tolérabilité de la mousse de propionate de clobétasol (mosse clobétasol) dans le traitement des lésions de psoriasis qui ne sont pas localisées dans le cuir chevelu ont été évaluées dans une étude multicentrique, randomisée à double insu, contrôlée contre placebo, sur 279 patients souffrant de psoriasis doux à modéré.

Méthodes: Pendant deux semaines, les patients appliquaient soit la mousse de clobétasol, soit le placebo, deux fois par jour sur les lésions de psoriasis. En plus de l'évaluation clinique, les patients ont rempli un questionnaire d'évaluation des différentes caractéristiques de la mousse, y compris leur préférence d'utilisation et jusqu'à quel point ils pensent pouvoir observer le traitement en-dehors de l'étude.

Résultats: À la fin de la deuxiéme semaine (fin du traitement), 68% des patients (soit 94/139) qui ont reçu la mousse de clobétasol ont eu un score de 0 (guéri, sauf pour une décoloration résiduelle mineure) ou de 1 (la plupart des lésions présentent un score individuel moyen de 1 pour l'épaisseur, l'érythème et la desquamation). Ce pourcentage est bien supérieur aux 21% (30/140) du groupe placebo ($P < 0,0001$). Des résultats similaires ont été obtenus dans l'évaluation générale du patient à la deuxiéme semaine, ainsi que dans le changement du score (état de base/2 semaines) des signes du psoriasis et du prurit. Les effets indésirables se limitaient généralement à des brûlures faibles et passagères, ou à d'autres réactions sur le site de l'application chez seulement quelques patients dans chaque groupe. Dans le questionnaire que les patients ont rempli à la fin de l'etude, une majorité a donné une note élevée aux caractéristiques de la préparation en mousse. Les patients ont mieux classé cette préparation que les autres préparations topiques en ce qui concerne l'effet sur la qualité de vie et ont indiqué qu'ils seraient plus enclins à observer un traitement à la mousse qu'un traitement avec d'autres préparations topiques.

Conclusion: L'efficacité et l'innocuité de la mousse de propionate de clobétasol à 0,05% sont prouvées dans le traitement du psoriasis en plaques, touchant ou non le cuir chevelu, lorsque la préparation est appliquée deux fois par jour pendant deux semaines. Sachant que le mécontentement des patients envers une préparation topique donnée affecte l'observation du traitement, qui nuit par le fait même à l'efficacité du médicament, les résultats du questionnaire suggèrent que les avantages de l'utilisation de la mousse de clobétasol dans le traitement du psoriasis qui n'affecte pas le cuir chevelu sont multiples.

Because of their antiinflammatory, immunosuppressive, antimitotic, and antipruritic actions, topical corticosteroids, including clobetasol propionate, have been used effectively in various formulations for the treatment of psoriasis and other corticosteroid-responsive dermatoses of the skin and scalp. In a National Psoriasis Foundation (NPF) Patient Membership Survey,[1] 87% of telephone-survey respondents reported that they received topical therapy for psoriasis; however, 49% of respondents indicated that they were only somewhat or not at all satisfied with their therapies. The patients noted that topical therapies were time-consuming to apply and remove and affirmed the general dissatisfaction that psoriatic patients have with the management of their disease. Poor compliance with topical therapy may be an important factor affecting clinical efficacy.[2]

Clobetasol propionate was first approved for marketing in the United States for the treatment of corticosteroid-responsive dermatoses in 1985. It is currently approved in the U.S. in six different dosage forms for topical use: cream, ointment, gel, emollient cream, scalp application (solution), and foam, all at a strength of 0.05%. In a multicenter, randomized, double-blinded, active and placebo-controlled study, the foam dosage form of clobetasol propionate 0.05% was as effective as clobetasol propionate solution in the treatment of moderate to severe scalp psoriasis.[3] The safety profile of clobetasol foam is comparable to that of other clobetasol

formulations. Systemic absorption of topical corticosteroids may suppress the hypothalamic–pituitary–adrenal (HPA) axis.[4] In an unpublished study, 3 of 13 patients treated with clobetasol foam (7 g/day for 14 days) showed reversible HPA axis suppression.[5] However, the actual number of reports of adverse events related to HPA axis suppression is small and generally involves misuse. In one such report, Cushing's syndrome was reported in a Hispanic woman after she used up to 100 g/week of clobetasol propionate 0.05% ointment over many months.[6] Various local adverse events have also been reported with the use of clobetasol 0.05% in different formulations. These include burning, stinging, irritation, pruritus, erythema, folliculitis, cracking and fissuring of the skin at the application site, scalp/ear papules and/or pustules, numbness of the fingers, skin atrophy, tingling or tightening of the scalp, acne, headache, and telangiectasia.[5,7–11] As with use of other topical corticosteroids, the use of clobetasol to treat psoriasis may be associated with tachyphylaxis, rebound, or pustular flares of psoriasis.[4,12] Clobetasol has not been recommended for use beyond a two-week duration, as systemic and topical adverse events may be more frequent and/or severe.

The foam delivery system has advantages over older dosage forms (such as creams and ointments) that may assuage the complaints voiced by patients in the National Psoriasis Foundation survey. The thermolabile foam formulation is a nongreasy, low-residue vehicle that is easily applied. When applied to the skin, body heat causes the foam structure to collapse and deposit the active ingredient directly on the lesion. Better patient compliance is to be expected with the foam formulation because of localized application, ease of use, lack of greasiness or residue, or related vehicle preference.

The purpose of the current study was to evaluate the efficacy and tolerability of clobetasol foam in the treatment of mild to moderate plaque-type psoriasis of nonscalp regions. Patient satisfaction and intended compliance with therapy were also assessed.

Methods

This was an IRB-approved, multicenter (17-center), randomized, double-blinded, placebo-controlled study of patients with mild to moderate plaque-type psoriasis. Two hundred seventy nine (279) patients were enrolled, randomly assigned to one of two parallel treatment groups in a 1:1 ratio of clobetasol foam:placebo foam.

Selection of Study Population

Men or women, 18 years of age or older and in good general health with mild to moderate plaque-type psoriasis of nonscalp regions [defined by a Physician's Static Global Assessment (PSGA) score of 2–3, Table 1], were included in this study. The psoriasis could not involve more than 20% of body surface area (BSA) (could have additional lesions of the scalp), and the patient had to have a target lesion (greater than 2 cm^2) on the trunk or extremities (not palms/soles) with a score of 2–3 for each of erythema, scaling, and plaque thickness (Table I).

Key exclusionary criteria included known allergy to clobetasol propionate or other topical corticosteroids or to any component of the investigational formulations; use of systemic antipsoriatic therapy (e.g., corticosteroids, retinoids, methotrexate, psoralen and ultraviolet light, cyclosporine) within the preceding eight weeks; use of topical corticosteroid or retinoid therapy for psoriasis within the preceding four weeks; use of topical preparations containing tar, anthralin, or antihistamines within the preceding two weeks; the expectation of exposure to strong sunlight or UV therapy during the course of the study; or any condition that, in the judgment of the investigator, would put the patient at unacceptable risk for participation in the study. Enrolled men and women had to be practicing adequate contraception, and pregnant or lactating women were excluded from participation in the study.

Treatment Administration

Clobetasol foam (OLUX® Foam, Connetics Corporation, Palo Alto, CA) contains 0.05% clobetasol propionate in cetyl alcohol, stearyl alcohol, polysorbate 60, ethanol, purified water, propylene glycol, citric acid anhydrous, potassium citrate, and a butane/propane propellant in an aluminum epoxy phenolic-lined Cebal can. Placebo foam was dispensed in a configuration identical to that given above for clobetasol foam, but without the active ingredient clobetasol propionate.

Clobetasol foam or placebo was self-administered by patients twice daily (morning and evening) for two weeks. Patients were instructed to apply a maximum of 3.5 g of foam at each application (not to exceed 50 g of study medication per week). All psoriatic lesions were treated except those located on the face and intertriginous sites. Patients were instructed to treat the identified target lesion before other psoriatic lesions and the treatment of scalp lesions was permitted only if sufficient quantities of foam remained after other sites were treated.

Efficacy Assessments

Efficacy analyses were based on measurement of signs and symptoms of psoriasis assessed by the investigator and the patient at the four study visits (Baseline and Weeks 1, 2, and 4). The 6-point (0–5) efficacy assessments used by the investigators were adapted from an instrument developed by the National Psoriasis Foundation (NPF) Medical Advisory Board. They were intended to be used to assess clinical severity of psoriasis as a function of treatment and should be sensitive enough to allow for greater discrimination of changes within and between patients. The assessments are clinically significant and relevant. The final assessments (at Week 4) were included to evaluate durability of clinical response to therapy after a two-week interval without any psoriasis

TABLE I

Physician's Static Global Assessment (PSGA) and Psoriasis Grading Scale[a]

Score	*Scaling*	*Erythema*	*Plaque thickness (induration)*	*Pruritus*
0	No evidence of scaling	No evidence of erythema, hyperpigmentation may be present	No evidence of plaque elevation	No itching
1	Minimal; occasional fine scale over less than 5% of the lesion	Faint erythema	Minimal plaque elevation, ≃ 0.5 mm	Mild: only aware of itching at times; only present when relaxing; not present when focused on other activities
2	Mild; fine scales predominate	Light red coloration	Mild plaque elevation, ≃ 1 mm	Intermediate between 1 and 3
3	Moderate; coarse scales predominate	Moderate red coloration	Moderate plaque elevation, ≃ 1.5 mm	Moderate: often aware of itching; annoying; sometimes disturbs sleep and daytime activities
4	Marked; thick, nontenacious scale predominates	Bright red coloration	Marked plaque elevation, ≃ 2 mm	Intermediate between 3 and 5
5	Severe; very thick tenacious scale predominates	Dusky to deep red coloration	Severe plaque elevation, ≃ 2.5 mm or more	Severe: constant itching; distressing; frequent sleep disturbance; interferes with activities

[a] 0 = clear, except for minor residual discoloration.
1 = majority of lesions have individual scores for plaque thickness (induration), erythema, and scaling that averages 1.
2 = majority of lesions have individual scores for plaque thickness (induration), erythema, and scaling that averages 2.
3 = majority of lesions have individual scores for plaque thickness (induration), erythema, and scaling that averages 3.
4 = majority of lesions have individual scores for plaque thickness (induration), erythema, and scaling that averages 4.
5 = majority of lesions have individual scores for plaque thickness (induration), erythema, and scaling that averages 5.

treatment and to determine if there was any rebound flare, as well as to provide additional data related to safety.

The primary efficacy endpoint was the proportion of patients with a PSGA score (visually integrating or averaging lesional scores across all nonscalp plaques) of 0 or 1 after two weeks of treatment. Secondary efficacy endpoints included mean change from Baseline to Week 2 (or end of treatment) and to Week 4 within each treatment group for target lesion signs of psoriasis (erythema, scaling, plaque thickness) and for pruritus. A Patient's Global Assessment (PGA) was to be completed by each participant at each study visit and graded on a 0–5 scale: 0 (no psoriasis); 1 (20%), 2 (40%), 3 (60%), 4 (80% as bad as this current attack of psoriasis has been); or 5 (the worst this current attack of psoriasis has been).

At the Week 2 (or end of treatment) visit, patients were asked to self-administer a poststudy questionnaire about their prior use of topical therapies for the treatment of psoriasis, their assessment of specific characteristics of the foam formulation, and their preference for the foam formulation compared with other vehicles. Patients were asked to rank the foam relative to other formulations based on the impact on certain aspects of their quality of life. Finally, they were asked to estimate their likely rate of compliance with twice daily application of various topical formulations, including foam.

Safety was assessed by vital signs and by patient-reported and investigator-observed adverse experiences at each study visit following the Baseline visit.

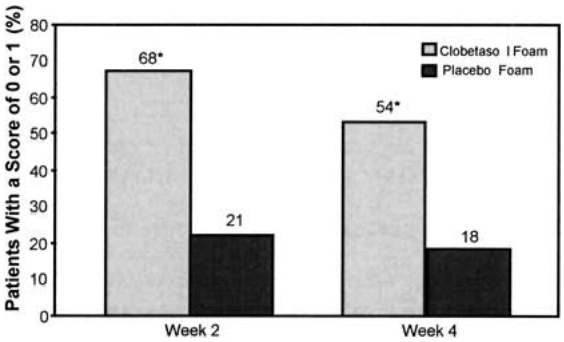
Results

Patient Disposition

At 17 U.S. sites, 279 patients were randomly assigned to treatment: 139 with clobetasol foam and 140 with placebo foam. In each group, 97% of the enrolled patients completed the study; 8 patients discontinued the study prematurely, 4 in each study group. In the clobetasol foam group, 1 patient requested discontinuation, 2 patients discontinued because of noncompliance, and 1 patient discontinued for another reason (use of methylprednisolone, a medication proscribed by the protocol). In the placebo group, 1 patient requested discontinuation, 1 patient discontinued because of an adverse event, and 2 patients discontinued for other reasons (one was lost to followup; the other was determined to be ineligible for enrollment because the patient did not meet inclusion criteria).

Ages ranged from 19 to 82 years in the entire sample (mean age 47 years), of which the majority were male (57%) and most were Caucasian (90%). The extent of psoriatic involvement was nearly identical between the groups, at a median score of 5% of BSA (mean 6.7). The scalp was involved in 60% (84/139) of patients allocated to clobetasol foam and in 59% (82/140) of those assigned to placebo. Pruritus severity was a mean 2.1 in each treatment group; 14% (20/139) in the active group and 14% (20/140) in the placebo group had a high pruritus severity of 4 or 5. The majority had mild to moderate pruritus (1–3): 72% (100/139) in the active treatment group and 76% (106/140) in the placebo group. There

FIGURE 1 Clobetasol foam clinical results: Physicians Static Global Assessment; *$P < 0.0001$.



were no significant differences between the treatment groups at baseline for any scored clinical characteristic (all $P \geq 0.1743$), including PSGA, signs and symptoms of psoriasis, and PGA.

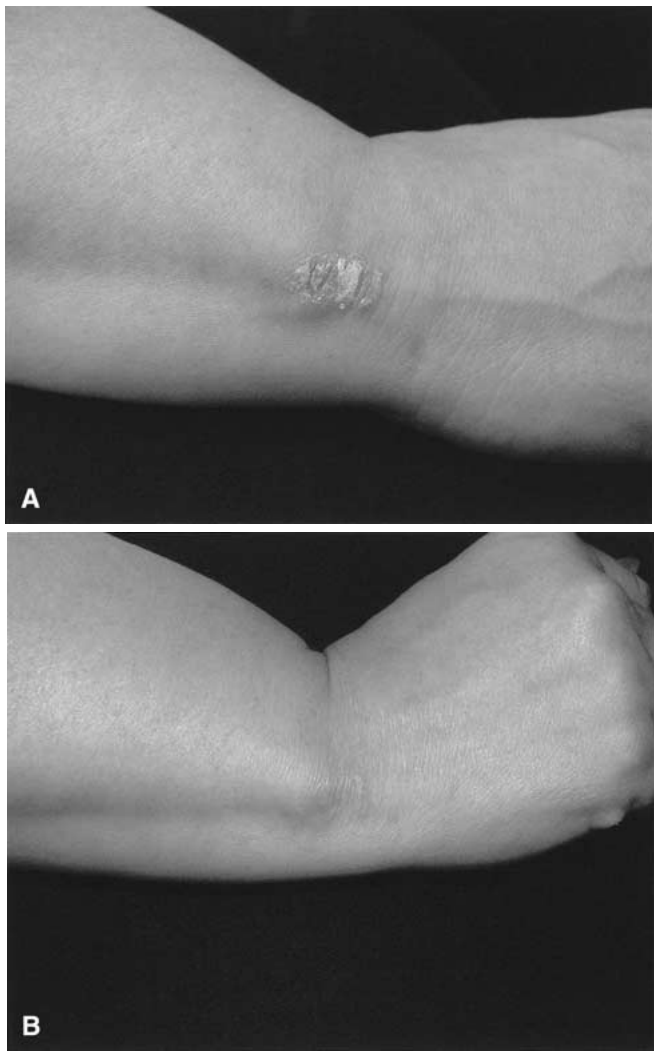
Efficacy Analyses

The primary efficacy endpoint was the proportion of patients with a PSGA score of 0 or 1 after two weeks of treatment (or at the end of treatment), compared between treatment groups. At Week 2 (or end of treatment), 68% (94/139) of patients who received clobetasol foam had a PSGA score of 0 or 1, significantly more than the 21% (30/140) in the placebo group ($P < 0.0001$). At the Week 4 visit, 54% (75/139) in the clobetasol foam group versus 18% (25/140) in the placebo group had a score of 0 or 1, also a significant difference ($P < 0.0001$). Thus, the therapeutic effects of two weeks of treatment were largely maintained in the two-week followup period without any instances of relapse to baseline severity or worse (rebound flare) (Fig. 1). In the per-protocol analyses, at Week 2, 71% (85/120) of clobetasol foam recipients and 22% (27/1225) in the placebo group had a PSGA score of 0 or 1, a significant difference ($P < 0.0001$). At Week 4, 57% (68/120) versus 17% (21/125), respectively, had a score of 0 or 1, also a significant difference ($P < 0.0001$).

At the target lesion (Fig. 2), the individual signs of psoriasis demonstrated improvement consistent with the global scores (Fig. 3). Mean changes in *scaling* scores from Baseline to Week 2 (or end of treatment) were −1.45 in the clobetasol foam group and −0.56 in the placebo group, a significant difference ($P < 0.0001$; median changes were −2 and 0, respectively). Mean changes in *plaque thickness* scores from Baseline to the Week 2 timepoint were −1.38 in the clobetasol foam group and −0.61 in the placebo group, a significant difference ($P < 0.0001$; median changes were −2 and −1, respectively). Mean changes in *erythema* scores from Baseline to Week 2 (or end of treatment) were −1.18 in the clobetasol foam group and −0.34 in the placebo group, a significant difference ($P < 0.0001$; medians were −1 and 0, respectively).

The proportions of patients with a PGA score of 0 (no psoriasis) or 1 (20% as bad as this current attack of psoriasis has been) were compared at Weeks 2 and 4. At Week 2 (or end of treatment), a PGA score of 0 or 1 was attained by significantly ($P < 0.0001$) more patients who received clobetasol foam than placebo: 57% (79/139) vs. 26% (36/140). At Week 4, the difference remained significant ($P < 0.0001$), with 49% (68/139) in the clobetasol foam group vs. 17% (24/140) in the placebo group attaining a score of 0 or 1.

FIGURE 2 Representative target lesion at Baseline (A) and Week 2 (B) treated with clobestasol foam twice daily.



Mean changes in pruritus scores from Baseline to Week 2 (or end of treatment) were −1.51 in the clobetasol foam group and −0.75 in the placebo group, a significant difference ($P < 0.0001$; median changes were −1 for each group; Fig. 4). The differences in mean changes from Baseline to Week 1 (−1.00 in the clobetasol foam group and −0.61 in the placebo group) and Week 4 (−1.29 and −0.59, respectively) were also significant ($P = 0.0004$ and $P < 0.0001$, respectively). The median changes from Baseline to Weeks 1 and 4 were −1 in the clobetasol foam group and 0 in the placebo group.

FIGURE 3 Clobetasol foam clinical results: signs of psoriasis; *$P <$ 0.0001.

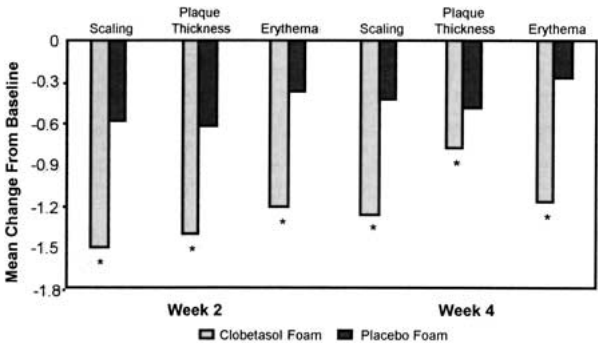
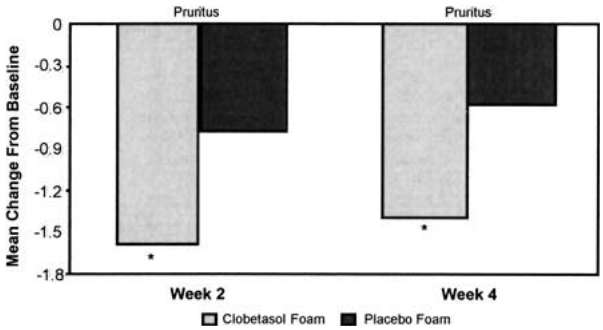


FIGURE 4 Clobetasol foam clinical results: signs of pruritus; *$P <$ 0.0001.



Safety and Tolerability Analyses

Clobetasol propionate foam, 0.05%, was safe and well tolerated in this population of patients with mild to moderate plaque-type psoriasis of nonscalp regions. In this large study sample of 279 patients, the most common adverse experience (AE) was application site burning, which was considered at least possibly related to study treatment in each case. This event was reported in relatively few patients: 5% (7/139) of clobetasol foam users and 7% (10/140) of placebo recipients. Other application site reactions occurred in 3 patients (2%) in each group and were also considered at least possibly treatment related. The only patient who reported dryness at the application site was in the placebo-treated group. Only one patient (in the placebo group) withdrew from the study because of AEs: severe application site erythema and moderate application site burning. These data are similar to those observed in similar studies with another foam-based corticosteroid, betamethasone valerate foam, for the treatment of nonscalp psoriasis.[13]

The patient's poststudy questionnaire was completed by 137 patients in the clobetasol foam group and by 138 patients in the placebo group. There was no significant difference between the treatment groups in the response to each of the questions. Therefore, it appeared that patients were able to rate the foam product strictly on its merits without bias in response to efficacy or lack of efficacy. The foam characteristics of no residue, stain-free, quick-drying, and fragrance-free were rated as excellent or good by at least 95% of subjects in either treatment group (Table II). Patients in both treatment groups ranked the foam as superior to other formulations based on the impact of quality of life, including ease of use (73% for clobetasol foam group; 64% for placebo group), ability to continue daily tasks directly following application (79% for clobetasol foam group; 77% for placebo group), ability to feel free of medication after application (86% for clobetasol foam group; 85% for placebo group), and the ability to apply to any body area (66% for clobetasol foam group; 59% for placebo group), (Table III). The majority of subjects in the clobetasol foam treatment group rated the foam characteristics as superior to gel (70%), ointment (61%) or cream (66%). (Table IV). Ninety-eight percent of subjects in the clobetasol foam group and 96% of subjects in the placebo group indicated that they would be likely to comply with twice daily dosing for 28 days with the foam compared to ointments (56% and 67%, respectively), creams (72% and 76%, respectively), or gel (75% and 80%, respectively) (Table V).

Discussion and Conclusions

Clobetasol propionate foam 0.05% is effective, safe, and well tolerated for the treatment of plaque-type psoriasis on scalp and nonscalp areas. Following two weeks of treatment with clobetasol foam, 71% of per-protocol patients were rated as having the equivalent of 90%–100% improvement vs. only 22% of placebo-treated patients. This level of global improvement was maintained for at least two weeks off therapy in 57% of the clobetasol foam-treated patients. At the target lesion, scaling improved most dramatically, a finding consistent with that demonstrated in the study of clobetasol foam for the treatment of moderate to severe scalp psoriasis. Though plaque-type psoriasis has other clinically defining features, scaling is commonly a cause of patient concern and distress, and the improvement in scaling might be a critical component of successful therapy in a patient's judgment. While the foam vehicle is not drying, it is also not an emollient, thus a factor other than moisture appears to contribute to improvement in scaling in psoriasis. It is likely that the antiinflammatory effects of corticosteroids account for normalization of keratinocyte differentiation and improve the clinical sign of scaling,[14] and it is also possible that the foam vehicle optimizes delivery of cortisosteroid to the skin. The thickness of the target lesion plaque and erythema also demonstrated significant improvement. Clinical improvement in psoriasis was also durable after two weeks of therapy with clobetasol foam.

In responsive patients, psoriasis did not relapse to baseline severity or worse (rebound flare). Application site burning was the most common adverse experience related to the foam, though it was reported in only 5% of those treated with clobetasol foam. Many of the known local adverse events associated with the use of other

TABLE II

Patients' preferences, foam versus other formulations: foam characteristics

		Clobetasol foam 0.05% (n = 137)			*Placebo foam 0.05% (n = 138)*		
		Foam score			*Foam score*		
Questionnaire response[a]	*Statistic*[b]	*"Exc/Good"*	*"< Good"*	*P value*[c]	*"Exc/Good"*	*"< Good"*	*P value*[c]
No residue	n (%)	134 (98)	3 (2)	<0.0001	132 (6)	5 (4)	<0.0001
Stain-free	n (%)	136 (99)	1 (1)	<0.0001	134 (99)	1 (1)	<0.0001
Dries quickly	n (%)	133 (97)	4 (3)	<0.0001	131 (96)	6 (4)	<0.0001
Non dripping	n (%)	108 (79)	29 (21)	<0.0001	104 (76)	33 (24)	<0.0001
Easy to apply	n (%)	122 (89)	15 (1)	<0.0001	120 (88)	17 (l2)	<0.0001
Fragrance-free	n (%)	131 (96)	6 (4)	<0.0001	130 (95)	7 (5)	<0.0001

[a] Question: Please rate the foam on each of the following characteristics.
[b] Numbers and proportions of subjects who assessed foam as being "excellent or good."
[c] *P* values are from chi-square test.
Note: There were no statistically significant differences in patient preferences clobetasol foam vs. placebo foam using CMH test of association.

TABLE III

Patients' preferences, foam versus other formulations: foam characteristics

		Clobetasol foam 0.05% (n = 137)			*Placebo foam 0.05% (n = 138)*		
Questionnaire response[a]	*Statistic*[b]	*Foam is superior*	*Foam is not superior*	*P value*[c]	*Foam is superior*	*Foam is not superior*	*P value*[c]
Ease of use of foam	n (%)	97 (73)	35 (27)	< 0.0001	84 (64)	48 (36)	0.0017
Ability to continue daily tasks	n (%)	104 (79)	27 (21)	< 0.0001	101 (77)	31 (23)	< 0.0001
Feel free of medication	n (%)	114 (86)	18 (14)	< 0.0001	112 (85)	20 (15)	< 0.0001
Ability to apply to any body area	n (%)	86 (66)	44 (34)	0.0002	78 (59)	54 (41)	0.0367

[a] Question: In terms of its impact on your quality of life, please rank the following characteristics of the foam relative to other formulations you have previously used in the treatment of your psoriasis.
[b] Numbers and proportions of subjects who assessed foam as being "significantly superior or superior" compared with other formulations.
[c] *P* values are from chi-square test.
Note: There were no statistically significant differences in patient preferences of clobetasol foam vs. placebo foam using CMH test of association.

TABLE IV

Patients' preferences, foam versus other formulations: rank of foam

		Clobetasol foam 0.05% (n = 137)			*Placebo foam (n = 138)*		
Questionnaire response[a]	*Statistic*[b]	*Foam is superior*	*Foam is not superior*	*P value*[c]	*Foam is superior*	*Foam is not superior*	*P value*[c]
Foam vs. gel to treat psoriasis	n (%)	45 (70)	19 (30)	0.0012	35 (60)	23 (40)	0.1151
Foam vs. cream to treat psoriasis	n (%)	73 (61)	47 (39)	0.0176	71 (59)	50 (41)	0.0563
Foam vs. ointment to treat psoriasis	n (%)	81 (66)	41 (34)	0.0003	79 (67)	39 (33)	0.0002

[a]Question: Given the characteristics of the foam listed in previous two questions, please rate the foam formulation relative to other formulations used for treatment of psoriasis.
[b]Numbers and proportions of subjects who assessed foam as being "significantly superior or superior" compared with other formulations.
[c]*P* values are from chi-square test.
Note: There were no statistically significant differences in patient preferences of clobetasol foam vs. placebo foam using CMH test of association.

formulations of clobetasol were not reported in this particular patient population, exposed to clobetasol foam for a single two-week dosing duration. Studies of clobetasol foam applied for longer than two weeks, or in a chronic intermittent fashion, or in combination or rotation with alternative therapies could provide additional insights into relevant long-term safety concerns, as well as further data on efficacy.

As it has been noted that patients with psoriasis often comply poorly with prescribed topical therapy, ostensibly due to their dissatisfaction with inconvenient, time-consuming, messy, and possibly staining formulations, the foam formulation of clobetasol versus older formulations may offer real clinical benefit. Patient compliance is an important aspect of response to therapy.[15] In this study, the patient-administered questionnaire provided insight into the potential for clobetasol foam to improve the quality of life for psoriasis patients. The vast majority of patients in the study rated the physical characteristics of the foam as excellent or good. The ability to "feel free of

TABLE V

Patients' preferences, foam versus other formulations: compliance

		Clobetasol foam 0.05% (n = 137)			*Placebo foam (n = 138)*		
Questionnaire response[a]	*Statistic*[b]	*Likely to comply*	*Not likely to comply*	*P value*[c]	*Likely to comply*	*Not likely to comply*	*P value*[c]
B.I.D. compliance with ointments	n (%)	64 (56)	50 (44)	0.1898	79 (67)	39 (33)	0.0002
B.I.D. compliance with creams	n (%)	83 (72)	32 (28)	< 0.0001	88 (76)	28 (24)	< 0.0001
B.I.D. compliance with foam	n (%)	130 (98)	3 (2)	< 0.0001	124 (96)	5 (4)	< 0.0001
B.I.D. compliance with gel	n (%)	48 (75)	16 (25)	< 0.0001	49 (80)	12 (20)	< 0.0001

[a] Question: Given the direction to use your psoriasis therapy 2 times per day for 2 weeks (28 applications), with each of the following formulations, please indicate how likely you are to comply with this treatment regimen.
[b] Numbers and proportions of subjects who are likely to be at least 75% compliant with a given formulation.
[c] *P* values are from chi-square test.
Note: There were no statistically significant differences in patient compliance of clobetasol foam vs. placebo foam using CMH test of association.

medication" following application was rated by 86% of patients (combined groups) as superior for foam versus existing formulations; this reflects the lack of greasiness or other residue or fragrance and the rapid drying without dripping. Additionally, the "ability to continue daily tasks" directly following application of the foam was rated as superior to existing formulations by 78% of patients (combined groups). Presumably as a result of the improved convenience and physical characteristics of the foam, patients projected their intended compliance with the foam as much higher than that with other vehicles. A confirmatory clinical study could be performed to compare topical corticosteroids in different formulations to assess patients' opinions without relying on their recollection of products used previously. However, the argument might be made that, in true clinical practice, patients' personal recollections strongly influence their preference for medications and formulations.

Clobetasol foam potentially satisfies both patients' and physicians' needs: patients request convenient, well-formulated topical preparations and physicians entreat patients to comply with their prescribed therapy.[16] The convenience of having one topical corticosteroid formulation to treat both scalp and nonscalp dermatoses may be quite appealing to patients and may represent a significant financial advantage as well.

The value and usefulness of the foam vehicle is applicable to a wide range of other topical therapeutics. There is great potential for formulating diverse drugs, such as topical antibiotics, antifungals, immunomodulators, vitamin D analogs, retinoids, anesthetics, antipruritics, in foam vehicles. Multiple additional patient populations could benefit from topical therapy delivered in an optimal formulation to satisfy their functional and cosmetic needs and hopefully improve therapeutic outcomes.

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References

1. Krueger G, Koo J, Lebwohl M, et al. The impact of psoriasis on quality of life. Arch Dermatol 2001; 137:280–284.
2. Miller JJ, Roling D, Margolis D, et al. Failure to demonstrate therapeutic tachyphylaxis to topically applied steroids in patients with psoriasis. J Am Acad Dermatol 1999; 41:546–549.
3. Franz TJ, Parsell DA, Myers JA, et al. Clobetasol propionate foam 0.05%: a novel vehicle with enhanced delivery. Int J Dermatol 2000; 39:535–539.
4. Gottlieb AB. Psoriasis. Dis Manag Clin Outcomes 1998; 1:195–202.
5. Connectics Crop.. Clobetasol propionate (foam) prescribing information. Palo Alto, CA: Connetics Corporation, 2000, September.
6. Gilbertson EO, Spellman MC, Piacquadio DJ, et al. Super potent topical corticosteroid use associated with adrenal suppression: clinical considerations. J Am Acad Dermatol 1998; 38:318–321.
7. Katz HI, Lindholm JS, Weiss JS, et al. Efficacy and safety of twice-daily augmented betamethasone dipropionate lotion versus clobetasol propionate solution in patients with moderate to severe scalp psoriasis. Clin Ther 1995; 17:390–401.
8. Olsen EA, Cram DL, Ellis CN, et al. A double-blind, vehicle-controlled study of clobetasol propionate, 0.05% (Temovate) scalp application in the treatment of moderate to severe scalp psoriasis. J Am Acad Dermatol 1991; 24:443–447.
9. Lubach D, Rath J, Kietzmann M. Skin atrophy induced by initial continuous topical application of clobetasol followed by intermittent application. Dermatology 1995; 190:51–55.
10. Galxo Welcome. Clobetasol propionate (ointment) prescribing information. Middlesex: Glaxo Wellcome, 2000, .
11. Galxo Welcome. Clobetasol propionate (scalp application) prescribing information. Middlesex: Glaxo Wellcome, 2000, .
12. Koo J, Lebwohl M. Duration of remission of psoriasis therapies. J Am Acad Dermatol 1999; 41:51–59.
13. Stein LF, Sherr A, Solodkina G, et al. Betamethasone valerate foam for the treatment of nonscalp psoriasis. J Cut Med Surg 2001; 4:303–307.
14. Gottlieb SL, Gilleaudeau P, Johnson R, et al. Response of psoriasis to lymphocyte-selective toxin (DAB_{389}IL-2) suggests a primary immune but not keratinocyte pathogenic basis. Nat Med 1995; 1:442–447.
15. Richards HL, Fortune DG, O'Sullivan TM, et al. Patients with psoriasis and their compliance with medication. J Am Acad Dermatol 1999; 41:581–583.
16. Endzweig CH, Lebwohl M. Olux foam as a cosmetically appearing delivery system for the treatment of psoriasis. Cosm Dermatol 2001; 14:13–15.