

Calcitriol 3 [micro]g/g ointment: an effective and safe addition to the armamentarium in topical psoriasis therapy

ABSTRACT High-potency topical corticosteroids are very effective for the treatment of psoriasis, but are associated with a number of cutaneous adverse effects. Vitamin D modulators have emerged as an important alternative to corticosteroids for the long-term topical treatment of psoriasis. Calcitriol 3 [micro]g/g ointment has long been used to treat psoriasis in Europe and is now the only vitamin [D.sub.3] ointment available for use in the United States (U.S.). Several randomized clinical trials have compared the safety, efficacy, and cosmetic acceptability of calcitriol ointment with other topical psoriasis therapies. In a three-week investigator-blinded study of 25 healthy subjects, calcitriol 3 [micro]g/g ointment was associated with markedly less cumulative skin irritation than was calcipotriene ointment.

A multicenter, investigator-blinded study of patients with psoriasis found that investigator-rated global improvement of psoriasis symptoms with calcitriol ointment was statistically noninferior to calcipotriene ointment and that calcitriol use produced significantly fewer patients with cutaneous reactions or discomfort. A multicenter clinical trial of patients with psoriasis who had lesions affecting sensitive skin areas found that calcitriol use produced less skin irritation than did calcipotriene and was generally preferred to calcipotriene ointment by patients. Calcitriol was also significantly more effective for the treatment of psoriasis lesions affecting flexural areas. In another study, patients who received calcitriol ointment exhibited improvement in psoriasis symptoms that was similar to the corticosteroid betamethasonepropionate, but were much less likely to have relapsed eight weeks after treatment discontinuation. Two clinical studies also suggested that calcitriol is similar in efficacy to short-contact dithranol, but with a lower incidence of skin irritation and staining. Together, the results of these studies demonstrate that calcitriol 3 [micro]g/g ointment is a significant new option for topical therapy of psoriasis. Calcitriol ointment produces improvement in psoriasis symptoms that is generally similar to the improvement attained with other (except for high potency steroid) topical psoriasis therapies, with a low incidence of adverse events.

INTRODUCTION Approximately 75% of patients with psoriasis have a mild-to-moderate form of the disease that can be effectively managed using topical therapies. (1), (2) As a class, topical corticosteroids are the most widely used medications for psoriasis. (3) Topical corticosteroids are available in a large number of strengths and formulations, and controlled clinical trials have reported that approximately 70% of patients who use topical high-potency corticosteroids exhibit clearing or near-clearing of disease within four-to-six weeks. (4), (5) However, the long-term use of topical corticosteroids is associated with a number of adverse events, including skin atrophy, telangiectases, and striae, as well as less common events, such as adrenal suppression and, arguably the gradual loss of efficacy (tachyphylaxis). (6) The risk of cutaneous adverse events is especially high when corticosteroids are applied to sensitive skin areas such as the face or intertriginous regions. (6) Noncorticosteroid topical therapies are therefore important in the long-term management of psoriasis. Topical vitamin D modulators have emerged as an important alternative to corticosteroids for the long-term treatment of psoriasis. The synthetic vitamin [D.sub.3] analog calcipotriene has been available in the U.S. since 1994, but as a non-combination agent it was recently removed from the U.S. market, and a second synthetic agent, tacalcitol, is available in some countries outside the U.S. Topical calcitriol, a naturally occurring active form of vitamin [D.sub.3], is now the only vitamin [D.sub.3] ointment available for use in the U.S. A systematic review by Bruner et al. examined the rates of adverse events reported for various topical therapies for psoriasis in randomized, controlled clinical trials. (1) Examination of data for the vitamin D agents revealed that adverse event rates tended to be lowest with tacalcitol (4.8% of subjects) and calcitriol (5.0%) and generally consisted of skin irritation and erythema. (1) Clinical trials of calcipotriene 50 [micro]g/g ointment demonstrated treatment-related adverse event rates of 9.5 to 23% and were more likely to include adverse effects such as rash, pruritus and burning, while adverse event rates of 5% were demonstrated in clinical trials of calcitriol 3 [micro]g/g ointment (skin irritation). (1) Although these findings suggest that calcitriol and tacalcitol maybe less likely than is calcipotriene to cause adverse cutaneous reactions, none of the studies reviewed in this analysis directly compared calcitriol and calcipotriene treatment groups. As described in more detail below, a number

of recent clinical trials have compared the safety, tolerability and efficacy of topical calcitriol ointment with calcipotriene and other topical psoriasis therapies. These studies have found that calcitriol ointment is generally similar in efficacy to other topical therapies but is associated with a lower risk of cutaneous adverse events. Calcitriol Ointment: Cosmetic Acceptability, Cutaneous Irritation Potential Compared With Synthetic Vitamin [D.sub.3] Products The cutaneous irritation potential of calcitriol 3 [micro]g/g ointment was compared with calcipotriene, tacalcitol and white petrolatum in an investigator-blinded, intraindividual study of 25 healthy volunteer subjects. (7) Each subject received applications of all four test substances under occlusive patches, which were intended to maximize the cutaneous exposure to potentially irritating substances. Each of the test substances was applied five days per week for three weeks. Irritation was assessed 24 hours after each application of test substance (72 hours if the test substance was applied on a Friday), and erythema was rated on a scale from 0 (no reaction) to 3 (severe erythema). The investigators calculated a cumulative irritancy index for each patient and each test substance across the three-week study period. (7) As shown in Figure 1, the mean cumulative irritancy index score was markedly higher with calcipotriene than with the other test substances. (7) At the end of the three-week study, none of the subjects exhibited moderate-to-severe erythema at sites of calcitriol application. Moderate-to-severe erythema was noted for 29% of subjects at sites of calcipotriene application, 8% of tacalcitol sites and 4% of white petrolatum sites. The investigators concluded that calcitriol 3 [micro]g/g ointment was nonirritating, tacalcitol and white petrolatum were slightly irritating, and calcipotriene was moderately irritating. (7) [FIGURE 1 OMITTED] Psoriasis is a chronic condition that often requires continuous long-term topical therapy to attain optimal treatment benefit. Adherence to treatment is therefore essential to long-term success of psoriasis therapy. Spreadability, stickiness or other cosmetic factors associated with topical medications may limit cosmetic acceptability and contribute to poor treatment adherence. (8) A second study therefore compared the rheologic properties and cosmetic acceptability of calcitriol 3 [micro]g/g ointment, tacalcitol 4 [micro]g/g ointment, and calcipotriene 50 [micro]g/g ointment. (8) In vitro analysis indicated that calcitriol was associated with a lower viscosity and greater ease of spreadability than was tacalcitol or calcipotriene ointment. (8) Subjective cosmetic acceptance of calcitriol, calcipotriene and tacalcitol ointments was compared among patients with mild-to-moderate plaque psoriasis affecting [less than or equal to] 35% of the body surface area (BSA). (8) The patients applied each of the topical ointments to selected psoriasis lesions and were asked to rate the fluidity, ease of application, and stickiness of the three products. (8) As shown in Figure 2, nearly all of the patients rated the fluidity of calcitriol ointment as superior to calcipotriene ($P=0.0001$), and most patients also preferred the spreadability of calcitriol ointment ($P=0.0127$). (8) Ratings of the stickiness of the two medications were similar and did not differ from one another statistically. (8) [FIGURE 2 OMITTED] Calcitriol and Calcipotriene: Efficacy and Tolerability The efficacy and safety of calcitriol 3 [micro]g/g ointment and calcipotriene 50 [micro]g/g ointment were compared in a multicenter, randomized, investigator-blinded clinical trial of 250 patients with mild-to-moderate chronic plaque psoriasis. (9) The groups were well matched at baseline: the mean age of the patients was 41.7 years, and 66% were male. (9) The mean BSA affected at baseline was approximately 18%, and baseline rating of plaque thickness and erythema were similar for the two groups. (9) The primary efficacy end point was the global improvement in psoriasis, which was rated using a scale from 0 (no change) to 3 (clear or almost clear of psoriasis). The mean global improvement after 12 weeks was 2.22 for the calcipotriene group and 2.27 for the calcitriol group. The calcitriol outcome was considered therapeutically similar to the calcipotriene outcome for this measure. Improvement was rated as marked or better for 95.7% of patients in the calcitriol group and 85% of the calcipotriene group (not statistically significant). A Dermatologic Sum Score (DSS) was computed using ratings of plaque elevation, erythema and scaling for a single target psoriasis lesion. Each symptom was rated on a scale of 0 to 4, with lower values indicating less severe disease, and baseline values varied between 3 and 12 points. (9) The mean DSS values at baseline were approximately 8.1 in both groups. After treatment, there was a small but statistically significant difference between the two groups in final DSS scores in favor of calcipotriene (1.87 versus 2.54 with calcipotriene and calcitriol, respectively; $P < 0.01$). Both treatments were well tolerated by the patients. Two of 125 patients in the calcitriol group discontinued the study because of adverse events (one case of skin irritation considered related to study medication and one case of urethral calculus considered unrelated to treatment) and six of 125 patients in the calcipotriene group (all cases of skin irritation considered related to study medication). Moderate to severe cutaneous reactions were noted for 11 patients (8.9%) in the calcipotriene group but only one patient (0.8%) in the calcitriol group ($P = 0.0035$). (9) Cutaneous discomfort was rated as moderate to very severe by nine patients (7.3%) in the calcipotriene group and as moderate by four patients in the calcitriol group (3.2%; $P = 0.0246$). The results of this study suggest that calcitriol and calcipotriene produce similar improvement in psoriasis, but that calcitriol is less likely to cause cutaneous adverse events. A multicenter clinical trial conducted by Ortonne and colleagues compared the cutaneous safety and efficacy of calcitriol 3 [micro]g/g ointment and calcipotriene 50 [micro]g/g ointment in patients with mild-to-moderate plaque psoriasis affecting sensitive skin areas, such as the face, hairline, retroauricular folds and flexural areas. (10) This study used a double-blind, intraindividual design in which patients with bilateral and symmetrical psoriasis lesions that were similar in severity on both sides of the body applied calcitriol 3 [micro]g/g ointment to lesions affecting one side and calcipotriene 50 [micro]g/g ointment to lesions on the opposite side. Treatment was applied to up to four bilateral pairs of lesions, and evaluations of safety and efficacy were performed at weeks 1, 2, 3, 4 and 6. Seventy-five patients were enrolled. Ten patients discontinued their participation in the study before the end of six weeks: two because of

adverse events, six because of clearance of psoriasis lesions, one because of study protocol violation, and one at the patient's request. (10) The mean age of the patients was 44.5 years; 100% were Caucasian and 47% were female. (10) The safety of the two treatments was assessed by examining each medication application site for erythema and edema, which were rated by the investigators on a 4-point scale from 0 (none) to 3 (severe). The patients used the same 4-point scale to rate application-site stinging and burning. (10) Safety outcomes were quantified by assessing a "mean worst score" for lesions treated with each of the two study medications. The mean worst score observed with each of the two study medications was calculated for each patient by summing the worst score observed for each treated lesion at any evaluation during the 6-week study and dividing by the total number of lesions on that side. As shown in Figure 3, the mean worst score for ratings of perilesional erythema, edema, and stinging/burning were all significantly lower (i.e., better) with calcitriol ointment than with calcipotriene ointment. (10) FIGURE 3. Tolerability of calcipotriene ointment as shown by mean worst scores. The superior tolerability of calcitriol ointment is demonstrated by lower ratings of erythema, edema, and stinging/burning. (10) Calcitriol ointment Calcipotriene ointment Erythema $p < 0.001$ $p < 0.001$ Edema $p < 0.02$ $p < 0.02$ Stinging/burning $p < 0.001$ $p < 0.001$ Note: Table made from bar graph. The investigators also performed a global assessment of cutaneous safety for each treatment, which was rated as 0 (poor), 1 (good), or 2 (excellent). In flexural areas, tolerability was rated as excellent for 24 of 30 patients with flexural psoriasis lesions (80%) treated with calcitriol versus 17 of 30 patients (57%) treated with calcipotriene. Of the 56 patients who had retroauricular lesions, tolerability at these lesion sites was rated as excellent for 35 patients treated with calcitriol (62%) and for 21 patients treated with calcipotriene (38%). (10) Treatment efficacy was examined using investigator ratings of the global improvement from baseline for each target lesion, which was assessed on a 7-point scale from -1 (worse) to 5 (clear). (10) Global assessment of improvement was significantly greater with calcitriol than with calcipotriene ($P < 0.02$), which was primarily attributable to greater improvement of flexural areas with calcitriol. The tolerability and efficacy of calcitriol and calcipotriene ointments applied to bilateral lesions of the axillae are illustrated in Figure 4. (10) [FIGURE 4 OMITTED] The investigators also asked the patients to rate their preferences for the two treatments on the basis of treatment tolerability, efficacy and overall desirability using a 5-point rating scale: -2 (right side much better), -1 (right side better), 0 (2 sides equal), 1 (left side better) and 2 (left side much better). For treatment tolerability, the calcitriol side was rated as better or much better by 37 of 75 patients (49.3%), the calcipotriene side was preferred by 8 patients (10.7%), and the two sides were considered identical by 30 patients (40%), a statistically significant difference favoring calcitriol ($P < 0.0001$). For patient preference regarding efficacy, the calcitriol side was preferred by 33 of 75 patients (44%), the calcipotriene side was preferred by 22 patients (29.3%), and 20 patients (26.7%) rated the two sides as identical (not statistically significant). Finally, for the patients' global preference, 43 patients (57.3%) preferred the calcitriol side, 23 patients (30.7%) preferred the calcipotriene side, and nine patients (12%) rated the two sides as identical ($P < 0.02$ for the difference between calcitriol and calcipotriene ointments). (10) Together, the results of this study confirm that calcitriol is at least as effective as is calcipotriene and may be more effective when applied to sensitive flexural areas. This study also confirms reports that calcitriol appears to be associated with a better cutaneous tolerability profile than that of calcipotriene as measured by both clinician-rated and patient-rated cutaneous adverse effects. Calcitriol Versus Other Topical Psoriasis Therapies Calcitriol ointment has also been compared with topical betamethasone dipropionate in patients with psoriasis. (11) Betamethasone dipropionate is a mid- to high-potency topical corticosteroid that is widely used for the treatment of psoriasis. (12) In this study, the investigators evaluated both the immediate response to therapy and the duration of continued remission after treatment was discontinued. (11) Patients with at least moderately severe plaque psoriasis were randomized to double-blind treatment with calcitriol 3 [micro]g/g ointment or betamethasone dipropionate 0.05% ointment for six weeks. (11) Patients who responded to therapy were then followed for an additional eight weeks after treatment was discontinued to assess relapse. (11) Two hundred and fifty-eight patients were enrolled in the study. The mean age of the patients at baseline was 43.5 years, 64% were male, the mean BSA involved at baseline was 25.5%, and the mean baseline Psoriasis Area and Severity Index (PASI) score was 15.36. (11) Improvement during the active treatment phase of the study was similar for the two treatments. Improvement of psoriasis from baseline was rated by investigators as definite, considerable, or complete for 79% of patients in the calcitriol group and 82% of patients in the betamethasone dipropionate group after six weeks. (11) Global severity of psoriasis after treatment was rated by clinicians on a scale from 0 (none) to 4 (very severe). The mean severity score after treatment was 1.58 for the calcitriol group and 1.36 for the betamethasone group, a small but statistically significant difference in favor of betamethasone dipropionate ($P < 0.05$). However, both treatments produced marked and similar reductions in PASI scores, and the difference in the reduction of PASI score from baseline between the two treatments was not statistically significant. The mean PASI score decreased from 15.7 at baseline to 5.4 after six weeks in the calcitriol group and from 15.02 to 3.67 in the betamethasone dipropionate group. Remission at the end of the six-week active treatment phase was defined as clearance or considerable improvement of psoriasis not warranting further therapy. Remission was attained by 67 patients in the calcitriol group and 81 patients in the betamethasone dipropionate group. Patients in the calcitriol group were significantly more likely than were those in the betamethasone dipropionate group to remain free of psoriasis relapses during eight weeks of follow-up (48% versus 25% of patients in the calcitriol versus betamethasone dipropionate groups, respectively; $P < 0.01$). Both treatments were well tolerated. A total of seven patients in each group (5%) reported local skin

irritation, which was generally mild and transient. Three patients withdrew prematurely from the study because of cutaneous adverse events: two patients in the calcitriol group (mild/moderate pruritus) and one patient in the betamethasone dipropionate group (mild pustulation of psoriasis plaques). (11) No significant changes were noted for either group in laboratory measures of calcium homeostasis. (11) Two studies compared calcitriol ointment with short-contact anthralin (dithranol) for the treatment of psoriasis. Dithranol has long been used for the treatment of psoriasis, although its use is often limited by skin irritation and by staining of skin, clothing and furniture. (6) The first study was a randomized, open-label comparison of calcitriol ointment versus dithranol cream in 114 patients with at least moderate psoriasis. (13) Calcitriol 3 [micro]g/g ointment was applied twice daily; dithranol 2% cream was applied once daily and washed from the skin after 30 minutes. Treatment response after eight weeks was similar for the two medications. Improvement of psoriasis from baseline was rated as considerable, definite or total in 72% of patients in the calcitriol group and 70% in the dithranol group. The Psoriasis Disability Index (PDI) quality-of-life rating scale indicated that patients in the calcitriol group rated their quality of life as better than did patients in the dithranol group. The overall acceptability of treatment was rated as "good" by 47% of patients in the calcitriol group versus 20% of patients in the dithranol group. Patient ratings of skin staining and irritation with the two treatments are shown in Table 1 (13) TABLE 1. Patient Assessment of Medication Acceptability (13) Factor Rating Calcitriol Dithranol P ointment (n=54) Cream (1) (n=50) (1) Staining None 28 (47%) 0 (0%) <0.01 Acceptable 21 (35%) 33 (61%) Unacceptable 5 (8%) 17 (32%) Irritation None 51 (85%) 11 (20%) <0.01 Acceptable 3 (5%) 31 (57%) Unacceptable 0 (0%) 8 (15%) (1) Percentage calculated relative to number of patients who completed the study, ie 60 and 54 for the calcitriol and dithranol groups, respectively. Acceptability assessments of 6 and 4 patients, respectively, were missing. Reprinted with permission from Hutchinson PE et al. *Dermatology*. 2000;201:139-145. The second study compared the efficacy of calcitriol ointment and short-contact dithranol cream in 10 patients receiving narrowband ultraviolet B (UVB) therapy for plaque-type (n = 7) or guttate (n = 3) psoriasis. (14) The authors noted that although UVB phototherapy is often very effective for the treatment of psoriasis, it is also associated with an increased risk of carcinogenesis. There is therefore considerable interest in the use of adjunct therapies to improve the UVB response rate and reduce exposure to UV radiation. In this study, patients with psoriasis were hospitalized and treated with narrowband UVB once daily for five days of each week for a maximum of five weeks or until clearance of lesions. Each patient also applied twice-daily topical calcitriol ointment to psoriasis lesions of one arm, and once-daily dithranol cream to lesions of the other arm. The two treatments produced similar improvement in psoriasis lesions. PASI scores for the patients' arms decreased from median pretreatment values of 4.7 points in both treatment groups to values of 1.6 with dithranol and 2.3 with calcitriol after two weeks (not statistically significant). Dithranol produced skin irritation, staining of clothing, and both hyperpigmentation and hypopigmentation of psoriasis lesions and surrounding skin. Calcitriol was associated with hyperpigmentation that was confined entirely to psoriasis lesions. Although this study was relatively small, the findings suggest that calcitriol ointment is an effective and well-tolerated alternative to short-contact dithranol as adjunctive therapy with UVB.

CONCLUSION Topical medications are an important part of the standard of care for most patients with psoriasis. High-potency topical corticosteroids are very effective for psoriasis treatment and induce rapid improvement in the signs and symptoms of psoriasis for most patients. The long-term use of these agents is limited, however, because of increased risk of cutaneous adverse effects. Topical vitamin D derivatives have emerged as an important option for the corticosteroid-free long-term treatment of psoriasis. Calcitriol 3 [micro]g/g ointment is now the only vitamin [D.sub.3] ointment available for use in the U.S. and has long been used for psoriasis care in other countries. Considerable research suggests that calcitriol ointment produces improvement in psoriasis symptoms that is generally similar to that of calcipotriene ointment, but with a lower incidence of adverse events. In a randomized clinical trial that compared calcitriol and calcipotriene ointments, global improvement in psoriasis symptoms was equivalent, and calcitriol produced significantly fewer severe cutaneous reactions and reports of cutaneous discomfort. (9) In a study that compared calcitriol and calcipotriene in patients with psoriasis affecting sensitive skin areas such as flexural areas, calcitriol was significantly more effective than was calcipotriene for the treatment of flexural areas and was also associated with significantly less cutaneous irritation. (10) Patients in this study also preferred the tolerability and overall acceptability of calcitriol ointment significantly more often than those measures of calcipotriene. Clinician-rated global improvement in psoriasis was similar for calcitriol ointment and betamethasone dipropionate ointment, but the rate of remission following discontinuation of treatment was nearly twice as great with calcitriol as with betamethasone dipropionate (48% versus 25%, respectively). (11) In two studies, calcitriol was similar in efficacy to short-contact dithranol but was significantly less likely to cause skin staining or irritation. (13), (14) **These findings suggest that calcitriol 3 [micro]g/g ointment is a safe, well-tolerated, and effective option for the long-term treatment of psoriasis and is appropriate for the treatment of lesions affecting sensitive skin.**

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Aventis, Sinclair, Shionogi and Stiefel. He is on the speakers' bureau for Abbott, Allergan, Amgen, Galderma, Genetech, Medicus, Promus, Sanofi Aventis, Stiefel and UCB. REFERENCES (1.) Bruner CR, Feldman SR, Ventrapragada M, Fleischer AB Jr. A systematic review of adverse effects associated with topical treatments for psoriasis. *Dermatol Online J.* 2003;9(1):2. (2.) Griffiths CE, Clark CM, Chalmers RJ, et al. A systematic review of treatments for severe psoriasis. *Health Technol Assess.* 2000;4(40):1-125. (3.) Pearce DJ, Stealey KH, Balkrishnan R, et al. Psoriasis treatment in the United States at the end of the 20th century. *Int J Dermatol.* 2006;45(4):370-374 (4.) Jarratt MT, Clark SD, Savin RC, et al. Evaluation of the efficacy and safety of clobetasol propionate spray in the treatment of plaque-type psoriasis. *Cutis.* 2006;78(5):348-354. (5.) Gottlieb AB, Ford RO, Spellman MC. The efficacy and tolerability of clobetasol propionate foam 0.05% in the treatment of mild to moderate plaque-type psoriasis of nonscalp regions. *J Cutan Med Surg.* 2003;7(3): 185-192. (6.) Afifi T, de Gannes G, Huang C, Zhou Y. Topical therapies for psoriasis: Evidence-based review. *Can Fam Physician.* 2005;51:519-525. (7.) Queille-Roussel C, Duteil L, Parneix-Spake A, et al. The safety of calcitriol 3 microg/g ointment. Evaluation of cutaneous contact sensitization, cumulative irritancy, photoallergic contact sensitization and phototoxicity. *Eur J Dermatol.* 2001;11 (3):219-224. (8.) Marty JP, Lafforgue C, Grossiord JL, Soto P Rheological properties of three different vitamin D ointments and their clinical perception by patients with mild to moderate psoriasis. *J Eur Acad Dermatol Venereol.* 2005;19 Suppl 3:7-10. (9.) Zhu X, Wang B, Zhao G, et al. An investigator-masked comparison of the efficacy and safety of twice daily applications of calcitriol 3 microg/g ointment vs. calcipotriol 50 microg/g ointment in subjects with mild to moderate chronic plaque-type psoriasis. *J Eur Acad Dermatol Venereol.* 2007;21 (4):466-472. (10.) Ortonne JP, Humbert P, Nicolas JF, et al. Intra-individual comparison of the cutaneous safety and efficacy of calcitriol 3 microg g(-1) ointment and calcipotriol 50 microg g(-1) ointment on chronic plaque psoriasis localized in facial, hairline, retroauricular or flexural areas. *Br J Dermatol.* 2003;148(2):326-333. (11.) Camarasa JM, Ortonne JP, Dubertret L. Calcitriol shows greater persistence of treatment effect than betamethasone dipropionate in topical psoriasis therapy. *J Dermatolog Treat.* 2003;14(1):8-13. (12.) Del Rosso J, Friedlander SF. Corticosteroids: Options in the era of steroid-sparing therapy. *J Am Acad Dermatol.* 2005;53(1 Suppl 1):S50-S58. (13.) Hutchinson PE, Marks R, White J. The efficacy, safety and tolerance of calcitriol 3 microg/g ointment in the treatment of plaque psoriasis: A comparison with short-contact dithranol. *Dermatology.* 2000;201 (2):139-145. (14.) Hofmann UB, Eggert AA, Brocker EB, Goebeler M, Calcitriol vs. dithranol in combination with narrow-band ultraviolet B (311 nm) in psoriasis. *Br J Dermatol.* 2003; 148(4): 779-783. ADDRESS FOR CORRESPONDENCE William Abramovits, MD Dermatology Treatment and Research Center 5310 Harvet Hill Road, #160 Dallas, TX 75230-5808 E-mail: DrA@DermCenter.us William Abramovits, MD Baylor University Medical Center, Dallas, TX The University of Texas Southwestern Medical School, Dallas, TX

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