# A Double-Blind Comparative Study of Sodium Sulfacetamide Lotion 10% Versus Selenium Sulfide Lotion 2.5% in the Treatment of Pityriasis (Tinea) Versicolor

Cheryl A. Hull, MD; Sandra Marchese Johnson, MD

*Pityriasis (tinea) versicolor, which consists of hyperpigmented and hypopigmented scaly patches, is often difficult to treat. A double-blind comparative study between once-a-day sodium sulfacetamide lotion and selenium sulfide lotion was undertaken. Both treatments were safe and efficacious. Selenium sulfide was statistically more efficacious (76.2% vs 47.8%, P=.013).*

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Pityriasis (tinea) versicolor is a superficial infection of the stratum corneum by the yeast *Malassezia furfur* (also called *Pityrosporum orbiculare*),[1] which is part of the normal cutaneous flora. Pityriasis versicolor is characterized by hyperpigmented and hypopigmented scaly patches, primarily on the trunk and proximal extremities. Involvement of the cutaneous surface occasionally can be extensive, leading to emotional distress because of appearance. Symptoms vary from none to severe pruritus. Most people first present during adolescence. There is seasonal variation, with most people seeking treatment in the spring. In children, the face and neck are commonly involved.[1-3]

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From the Department of Dermatology, University of Arkansas for Medical Sciences, Little Rock.
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Reprints: Sandra Marchese Johnson, MD, Department of Dermatology, University of Arkansas for Medical Sciences, 4301 W Markham, CSC 124A, Slot 576, Little Rock, AR 72205 (e-mail: johnsonsandram@uams.edu).

To confirm clinical suspicion of pityriasis versicolor, a potassium hydroxide (KOH) preparation is performed. Scale from the affected area is placed on a glass slide, and 10% to 15% KOH is added with or without dimethyl sulfoxide. A fungal stain, such as chlorazol black E or Parker blue-black ink, may be added to highlight hyphae and yeast cells. A confirmatory KOH preparation reveals short stubby hyphae and yeast forms, either of which may predominate.[1-3]

Many treatment options for pityriasis versicolor exist. Selenium sulfide shampoo is considered to be the conventional first-line therapy at this time.[4] Most clinical trials in the treatment of pityriasis versicolor compare various experimental agents with selenium sulfide lotion 2.5%. However, selenium sulfide can be irritating to the skin, often resulting in local discomfort and pruritus.

Other topical therapies include propylene glycol, ketoconazole shampoo, zinc pyrithione shampoo, ciclopirox olamine, bifonazole, terbinafine solution, salicylic acid and sulfur soap baths, tioconazole, clotrimazole, griseofulvin, and benzoyl peroxide.[5-12] Topical-precipitated sulfur has been used in the past but has fallen out of favor because of the noxious odor.[3]

Oral therapies include itraconazole as a single dose or a daily dose for 7 days, ketoconazole in various treatment regimens, and fluconazole as a single dose or a weekly dose.[13-15] Oral terbinafine is not considered effective for pityriasis versicolor.[6] Oral ketoconazole and itraconazole interact with other systemic treatments and may lead to irreversible hepatotoxicity. Many subjects cannot be

treated with systemic antifungals because of concomitant hepatic disease, renal disease, endocrine disease, or the use of systemic medications.[1]

Pityriasis versicolor tends to be a recurring malady in young adults. Exogenous factors that promote recurrence include high temperatures and high levels of humidity. Endogenous factors include well-moisturized skin, hyperhidrosis, local or systemic immunodeficiency, as well as genetic predisposition.[2] Topical prophylaxis is considered important to prevent relapse.[2,3]

Sodium sulfacetamide is known to be beneficial in the treatment of acne vulgaris, perioral dermatitis, and seborrheic dermatitis.[16] Because both seborrheic dermatitis and pityriasis versicolor are related to *Malassezia*, it is intuitive that sodium sulfacetamide also would be efficacious in the treatment of pityriasis versicolor. This potential use was highlighted by the clinical observation of a subject being treated with topical sodium sulfacetamide for acne. When the product was used incidentally on the chest and back of this subject, rapid improvement of his pityriasis versicolor was noted after one week. For these reasons, it was decided to investigate the efficacy of sodium sulfacetamide in the treatment of pityriasis versicolor.

## Methods

*Study Design*—A prospective, open-label, double-blind, comparative, randomized, clinical trial was conducted at the University of Arkansas for Medical Sciences.

*Human Subject Use*—This study complied with the Declaration of Helsinki recommendations.[17] Approval was obtained by the Human Research Advisory Committee of the University of Arkansas for Medical Sciences before study initiation. Verbal and written informed consents were obtained from all subjects.

*Subject Population*—Forty-four subjects with pityriasis versicolor were included in the study. Subjects at least 12 years of age who might benefit from an alternative therapy (in the investigator's opinion) were included in the study. Twenty-three subjects were treated with sodium sulfacetamide lotion 10%, and 21 subjects were treated with selenium sulfide lotion 2.5%. Subjects were randomized by use of a series of sealed envelopes prepared by the Division of Biostatistics at the University of Arkansas for Medical Sciences. Subjects and the investigators who evaluated the outcomes were blinded to the group assignment during the course of treatment. Subjects were enrolled between June 2000 and August 2002.

Inclusion criteria included male or female subjects between the ages of 12 and 85 years, with clinical evidence of pityriasis versicolor primarily on the trunk and proximal extremities and a positive KOH preparation. Female subjects were included if they agreed to use an acceptable form of contraceptive (oral or double barrier) or to abstain.

Subjects were excluded if they had any known allergy to sulfa-containing medication, sodium sulfacetamide, or metabisulfite; were pregnant or breast-feeding; or had received any treatment, systemic or topical, for pityriasis versicolor within 14 days of enrollment.

*Treatment*—Klaron® lotion 10% was chosen as the study formulation of sodium sulfacetamide, which contains 100 mg of sodium sulfacetamide in a vehicle consisting of purified water; propylene glycol; lauramide diethanolamine (DEA)(and) DEA; polyethylene glycol 400, monolaurate; hydroxyethyl cellulose; sodium chloride; sodium metabisulfite; methylparaben; xanthan gum; ethylene diamine tetra acetic acid; and simethicone.[18]

Sodium sulfacetamide lotion 10% or selenium sulfide lotion 2.5% was applied once daily as a thin coating to the entire neck, torso, and upper extremities. The treatment also included all other areas affected with pityriasis versicolor. Study drug was applied for a maximum of 28 days or until a negative KOH preparation had been confirmed.

Evaluations were conducted at days 1, 14, 28, and at 4-week follow-up. Additional unscheduled visits were permitted if deemed necessary. Subjects were provided a diary at enrollment to record study-related information. Compliance was assessed based on the subject's diary and interview with the investigator.

## Results

The 2 treatment groups were comparable for all baseline characteristics, including age, gender, distribution of pityriasis versicolor, and percentage body surface area affected with pityriasis versicolor (Table 1).

Adverse events associated with treatment were minimal. One subject in the selenium sulfide group complained of a foul odor. No subjects treated with sodium sulfacetamide reported adverse events, and no subjects in either group discontinued treatment because of side effects.

Response to treatment (clearance) was defined as a lack of significant scaling and a negative KOH preparation. Clinically, hyperpigmented and/or hypopigmented patches were necessary for initial diagnosis of pityriasis versicolor, but resolution of pigmentary change was not a criterion for response to treatment. This is because return of normal pigmentation may lag several weeks behind the clearance of *M furfur*.

Table 1.

## Demographics and Baseline Characteristics for All Treated Subjects*

| Parameter | Sodium Sulfacetamide Lotion 10% (n=23) | Selenium Sulfide Lotion 2.5% (n=21) | Total (N=44) | *P* Value† |
|---|---|---|---|---|
| Age, y | | | | .783 |
| Mean (SD) | 33.87 (14) | 35.05 (14.17) | 34.43 (13.93) | |
| Median | 30 | 34 | 34 | |
| Range | 12–57 | 14–61 | 12–61 | |
| Gender, n (%) | | | | .765 |
| Female | 11 (47.8) | 11 (52.4) | 22 (50) | |
| Male | 12 (52.2) | 10 (47.6) | 22 (50) | |
| Location of PV, n (%) | | | | |
| Arm | 0 | 1 (4.8) | 1 (2.3) | |
| Arm, chest | 0 | 1 (4.8) | 1 (2.3) | |
| Arms, chest, back | 6 (26.1) | 5 (23.8) | 11 (25) | |
| Arms, chest, back, hands, abdomen | 0 | 1 (4.8) | 1 (2.3) | |
| Arms, chest, back, neck | 1 (4.3) | 2 (9.5) | 3 (6.8) | |
| Arms, chest, back, abdomen | 1 (4.3) | 0 | 1 (2.3) | |
| Arms, chest, back, scalp | 1 (4.3) | 0 | 1 (2.3) | |
| Back | 3 (13.0) | 2 (9.5) | 5 (11.4) | |
| Back, neck | 1 (4.3) | 1 (4.8) | 2 (4.5) | |
| Chest | 2 (8.7) | 3 (14.3) | 5 (11.4) | |
| Chest, back | 4 (17.4) | 2 (9.5) | 6 (13.6) | |
| Chest, back, abdomen | 1 (4.3) | 0 | 1 (2.3) | |
| Chest, back, face | 1 (4.3) | 0 | 1 (2.3) | |
| Chest, back, neck | 2 (8.7) | 1 (4.8) | 3 (6.8) | |
| Face | 0 | 1 (4.8) | 1 (2.3) | |
| Neck | 0 | 1 (4.8) | 1 (2.3) | |
| Total BSA affected, % | | | | .788 |
| Mean (SD) | 13.86 (12.42) | 12.85 (12.18) | 13.38 (12.17) | |
| Median | 13.5 | 11.7 | 11.75 | |
| Range | 0.4–50.4 | 0.2–45.4 | 0.2–50.4 | |

*PV indicates pityriasis versicolor; and BSA, body surface area.
†For continuous variables, obtained from analysis of variance with the factor being "treatment." For categorical variables, obtained from the log-rank test.

Table 2.

**Time to Clearance for All Treated Subjects**

| Parameter | Sodium Sulfacetamide Lotion 10% (n=23) | Selenium Sulfide Lotion 2.5% (n=21) | Total (N=44) | *P* Value* |
|---|---|---|---|---|
| Clearance Time, n (%) | | | | |
| Day 14 | 5 (21.7) | 13 (61.9) | 18 (40.9) | .013 |
| Day 28 | 5 (21.7) | 3 (14.3) | 8 (18.2) | |
| Day 42 | 1 (4.3) | 0 | 1 (2.3) | |
| Failed to return | 11 (47.8) | 5 (23.8) | 16 (36.4) | |
| Did not clear at day 28 | 1 (4.3) | 0 | 1 (2.3) | |

*Obtained from Wilcoxon test from Proc Lifetest, with "failed to return" treated as censored at 4-week follow-up (day 56) and with "did not clear" treated as censored at day 28.

Clearance rates were significantly different between the 2 groups: 47.8% (11/23) in the sodium sulfacetamide group versus 76.2% (16/21) in the selenium sulfide group (*P*=.013)(Table 2). This was largely due to the greater number of subjects who failed to return for clinical assessment in the sodium sulfacetamide group (47.8%, 11/23) compared with the selenium sulfide group (23.8%, 5/21). For analysis, all subjects who failed to return for clinical appointments were considered nonresponsive to treatment. Of the subjects who kept the follow-up appointments, 91.7% (11/12) in the sodium sulfacetamide group and 100% (16/16) in the selenium sulfide group responded to treatment.

## Conclusion

Topical selenium sulfide is an effective therapy for pityriasis versicolor. However, it is not accepted readily by all subjects because it can be messy, time-consuming, and malodorous. One subject in this study treated with selenium sulfide complained of the noxious odor. Several effective oral treatments exist, but these carry the risk of significant side effects. For these reasons, alternative topical therapies are needed, and many have already been described.[5-12]

In this study, sodium sulfacetamide in a vehicle containing propylene glycol appeared efficacious in the treatment of pityriasis versicolor. The contribution of the vehicle to the response was not evaluated separately, and the study results may have been affected significantly by the large number of subjects who did not return for follow-up. Treatment response rate was not as high as for selenium sulfide in subjects who returned for evaluation. There was a higher failure to return rate among the sodium sulfacetamide–treated subjects. This difference between the 2 groups makes it difficult to draw firm conclusions about relative efficacy. Sodium sulfacetamide was well tolerated by all subjects. This study provides some evidence to suggest that sodium sulfacetamide deserves further study as an agent to add to the treatment armamentarium against pityriasis versicolor.

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