RESEARCH LETTERS

Treatment Nonadherence and Long-term Effects of Narrowband UV-B Therapy in Patients With Psoriasis

Nonadherence to a treatment regimen is a common problem in patients with dermatologic conditions, including psoriasis. From 30% to 80% of patients report being nonadherent at some stage of their dermatologic treatment, and particularly high nonadherence has been reported for topical treatments.[1,2] Patients' adherence to the instructions and advice given by dermatologists, including self-management of topical treatments and medication intake for systematic treatments, can influence the effectiveness of therapies such as UV-B treatment. Particularly during follow-up treatment, patients may fail to comply with instructions to regularly apply topical medications. Nonadherence to treatment regimens might be a predictor of the long-term effectiveness and maintenance of results after successful UV-B therapy.

In the present prospective study, we investigate the predictive value of nonadherence with dermatologic treatment on psoriasis outcome (Psoriasis and Area Severity Index [PASI]) at follow-up assessments 3 and 6 months after psoriasis clearance. In our analysis, we controlled for clinical and treatment variables (PASI at the start and end of treatment, skin type, irradiation regimen, minimal erythema dose [MED], cumulative dose, and protocol adjustments) and lifestyle variables (smoking habits and alcohol consumption).

Methods. The participants were patients with psoriasis referred for UV-B treatment as part of a randomized, con-

Table. Correlations and Regression Analyses for Predictors of the PASI at 3- and 6-Month Follow-up Assessments After Finishing UV-B Treatment in Patients With Psoriasis

Characteristic[a]	3 Months			6 Months		
	r[b]	R^2[c]	β[d]	r[b]	R^2[c]	β[d]
Sex	−.25	.03	.24	−.38[e]	.07	.10
Age	−.03	NA	NA	.02	NA	NA
Educational level	.05	NA	NA	.11	NA	NA
Clinical parameters						
PASI at start of UV-B treatment	.45[e]	.18[e]	.40[e]	.32[g]	.07	.21
PASI at end of UV-B treatment	.47[e]	.14[e]	.33[g]	.53[f]	.15[f]	.32[f]
Skin type	.17	NA	NA	.27	NA	NA
MED	.18	NA	NA	.08	NA	NA
Treatment parameters						
Erythema or suberythema dose	.23	NA	NA	.16	NA	NA
Cumulative dose	.13	NA	NA	.15	NA	NA
Protocol adjustments	.06	NA	NA	−.03	NA	NA
Lifestyle parameters						
Smoking habits	−.09	NA	NA	.04	NA	NA
Alcohol use	.02	NA	NA	.08	NA	NA
Adherence to dermatologic treatment regimen	−.50[e]	.10[f]	−.36[f]	−.59[g]	.17[e]	−.47[e]
Total R^2 variance	**NA**	**.45[f]**	**NA**	**NA**	**.46[f]**	**NA**

Abbreviations: MED, minimal erythema dose; NA, not applicable; PASI, Psoriasis Area and Severity Index.

[a] Scores and/or ranges of all characteristics: sex: male, 0; female, 1; age range, 18 to 75 years; educational level, 1 to 7; PASI, 0 to 38; skin type, I to V; MED, 0.00 to 1.50; irradiation doses: suberythema, 1; erythema, 2; cumulative dose, 5.64 to 407.20 J/cm²; protocol adjustments, 0 to 19; smoking habits, 1 to 7; alcohol use, 1 to 7; adherence, 1 to 4.

[b] Pearson correlation coefficients: the significant correlation (r) indicates that male sex, a higher PASI score at the start and end of treatment, and weaker adherence to dermatologic treatment are related to a higher PASI score at the follow-up assessments.

[c] Percentages of the explained variance in regression analyses for predictors that significantly correlated with the PASI at 3- and 6-month follow-up assessments.

[d] Standardized beta (and t tests) in regression analyses for predictors that significantly correlated with the PASI at 3- and 6-mo follow-up assessments.

[e] $P < .01$.

[f] $P < .05$.

[g] $P < .001$.

trolled trial of irradiation given in an erythematogenic or suberythematogenic regimen.[3] Of the 77 patients who achieved clearance, data of 69 (90%) and 47 (61%) patients were available for the 3- and 6-month follow-up assessments, respectively. Analyses on both follow-up data sets as well as analyses for the 47 completers revealed the same results overall, and so the analyses for the 47 completers are reported herein.

Clinical severity was assessed with the PASI score at baseline, every 4 weeks, at the time of clearance, and at both the 3- and 6-month follow-up assessments. Variables of UV-B treatment were assessed by a dermatologist and nursing personnel and included skin phototype (Fitzpatrick classification of 6 skin types), MED, registration of protocol adjustments, and cumulative dose.

Nonadherence was assessed at baseline via the nonadherence scale of the Impact of Skin Disease on Daily Life questionnaire.[4] Specifically, patients were asked "In general, do you attend to the treatment instructions and advice given by the dermatologist?" Answers were scored on a 4-point Likert scale (1, not at all; 2, a little bit; 3, to a relatively large extent; and 4, completely).

Lifestyle variables were assessed by self-administered questionnaires asking about the average alcohol consumption and smoking habits during the past 6 months.

Results. Eight percent of the study patients were largely nonadherent to recommended treatment instructions and advice; 63% were sometimes nonadherent; and 29% were largely adherent. A higher level of nonadherence was significantly related to a higher PASI score at the 3- and 6-month follow-up assessments ($r=-0.50$ [$P<.01$] and $r=-0.59$ [$P<.001$], respectively) (**Table**). In addition, a higher PASI score at both the start and end of treatment was related to PASI scores at 3 and 6 months. Finally, male sex was significantly associated with higher PASI at the 6-month, but not at the 3-month, follow-up assessment. When the predictors that significantly correlated with PASI scores at follow-up assessments were entered into a sequential regression analysis (PASI score at the start and end of treatment, male sex), higher levels of nonadherence still significantly predicted a higher PASI score at 3- and 6-month follow-up assessments, with significant standardized beta values for both assessment points ($t=-2.60$ [$P<.05$] and $t=-3.38$ [$P<.01$], respectively) (Table).

Comment. Our results indicate that nonadherence to dermatologic treatment instructions and advice is a predictor of longer-term outcomes after psoriasis clearance with UV-B therapy. A higher level of nonadherence at the start of the study significantly predicted a poorer PASI score at both follow-up assessments. These effects remained significant after we controlled for PASI scores at the start and end of treatment, irradiation schemes, MED, skin type, cumulative dose, protocol adjustments, and lifestyle factors (smoking habits and alcohol consumption). A cost-effective adjunct to UV-B therapy to improve adherence would include (1) short, systematic assessments of barriers to and facilitators of adherence;

(2) identification of subgroups of patients who are more likely to be nonadherent by means of questionnaire assessments before patient consultation with the dermatologist; and (3) administration of 1 or 2 short-term psychoeducational or self-management, cognitive-behavioral programs when the disease is in an early stage.[5]

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