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The Cutaneous Lupus Erythematosus Disease Area and Severity Index:

A Responsive Instrument to Measure Activity and Damage in Patients With Cutaneous Lupus Erythematosus

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Abstract

Objective—To assess the clinical responsiveness of the CLASI (Cutaneous Lupus Erythematosus [CLE] Disease Area and Severity Index).

Design—Validation cohort.

Setting—Tertiary referral center.

Patients—Eight patients with CLE.

Intervention—Assessment of patients with CLE from baseline until day 56 after starting a new standard of care therapy.

Main Outcome Measures—Correlation of the baseline to day-56 change in 2 CLASI scales (disease activity and damage), with baseline to day-56 change in the physicians' and patients' assessments of patient's global skin health scores, and the patients' assessments of pain and itch.

Results—The change in CLASI activity score highly correlated with the changes in 3 clinical validation measures: physicians' assessment of skin health (r=0.97; P=.003; n=7), patients' global skin health score (r=0.85; P=.007; n=8), and pain (r=0.98; P=.004; n=5). Using the Wilcoxon signed-rank test, paired baseline to day-56 changes in CLASI activity and damage scores were analyzed for the 2 subgroups (meaningful change vs nonmeaningful change) composing each validation variable. Change in CLASI activity was significantly different for patients who had a meaningful change in their global skin self-ratings (Z=1.07; P=.03) and approached statistical significance for patients who had a meaningful change in their level of itching (Z=1.83; P=.06) and their physicians' global skin

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rating (Z=1.84; P=.06). The CLASI activity score decreases after successful therapeutic intervention, whereas the damage score may increase in scarring forms of CLE.

Conclusion—The activity score of the CLASI correlates with the improvement of global skin health, pain, and itch and is thus a useful tool to measure clinical response.

The Cutaneous Lupus Erythematosus (CLE) Disease Area and Severity Index (CLASI) was developed because of the need for skin-based outcome measures for clinical trials in CLE. Parodi et al[1] found 60 outcome measures available for systemic lupus erythematosus (SLE), none of which is sensitive enough for measuring the activity of CLE. In addition, little is known about the course of CLE, the severity of the symptoms, and the time it takes for patients to respond to any treatment, which is a prerequisite for the evaluation of therapy.

We developed an outcome instrument for CLE to facilitate future clinical trials.[2] The CLASI differentiates between disease activity (hereinafter, activity) and damage in 2 separate scores. The activity scale includes measurements of erythema, scale and hypertrophy, and mucous membrane disease, whereas the damage scale measures hyperpigmentation, atrophy, and scarring alopecia. This separation is unusual for dermatological scores. However, this distinction between activity and damage is established for the scoring of SLE. This assures that the CLASI is more reactive to therapy-induced changes of activity rather than remaining stable as the activity wanes and the chronic damage develops.

The goal of this prospective trial is to assess the clinical responsiveness of the CLASI in the setting of patients starting any new therapy for CLE; this setting is similar to its proposed use in a therapeutic clinical trial, except that we did not follow any specific codified treatment protocol.

METHODS

PATIENT SELECTION

The inclusion and exclusion criteria were selected to assure that the patients included in the study reflected a broad group of patients with CLE in terms of disease type, skin type, and therapy. To reflect different skin types, we decided to have at least 3 patients, but not more than 7 patients, with Fitzpatrick skin type V or VI, and at least 3 patients with Fitzpatrick skin type I, II, or III. A major inclusion criterion was a biopsy-proven CLE, with or without systemic involvement. To measure activity, the patients had to have grade 2 erythema[3] in at least 3 locations, as defined by the CLASI activity score. Change of treatment or initiation of treatment had to reflect standard medical care. Patients should not have begun the treatment prior to inclusion in the study. The only exception was treatment with antimalarial drugs, which are known to take about 6 weeks to work. We decided to include at least 2 patients who had failed or were clinically ineligible for first-line treatment and who had to be treated with thalidomide. Registration and monitoring procedures outlined in the System for Thalidomide Education and Prescribing Safety protocol applied for patients on thalidomide. There were no restrictions on either sex or age.

STUDY PROCEDURES

All patients were treated at the Hospital of the University of Pennsylvania, Philadelphia, according to established medical standard care. The first visit included a verification of diagnosis and medical history, the confirmation of inclusion and exclusion criteria, and provision of informed consent. Procedures and documentation on the first day and at follow-up visits included evaluation of therapy and adverse events, the CLASI score (activity and damage) (Figure 1), assessment of global skin health by the physicians and the patients on a 0 to 10 analog scale, and patients' assessment of their pain and itch on a 0 to 10 analog scale.

Patients also filled in a modified quality of life questionnaire (modified Skindex 29-item questionnaire) at each visit, the results of which will be published in a future issue of the *Archives*.[4]

The therapy of CLE began with first-line medical therapy, such as antimalarial drugs or a combination of antimalarial drugs, or second-line treatment, such as thalidomide or immunosuppressants. Patients whose disease proved to be resistant to this therapy were treated with third-line therapy, which was chosen based on the clinical course and contraindications. Skin disease was scored for a minimum of 2 months, which was thought to be a realistic period for therapeutic trials. It was expected that there would be 5 clinical observations over a 2-month period, including a baseline (day 0) visit followed by visits on days 14, 28, 42, and 56. One patient who was receiving thalidomide had a screening visit 1 month prior to baseline, and an additional 2-week follow-up visit after initiation of treatment, to get a more detailed look at the crucial early response to treatment. The trial ended when the last recruited patient had been followed up for 2 months. Clinical responsiveness was defined as the change in the CLASI score (activity and damage) relative to a clinically meaningful change in the global skin health scores and itch and pain scores from baseline to day 56.

STATISTICAL ANALYSIS AND HYPOTHESIS

It was determined that 10 patients should provide adequate power (80%) to demonstrate a correlation of r=0.70 vs r=0.0 between the change in CLASI and the change in each validation measure, at a significance level of P=.05.

DATA ANALYSIS

To validate and assess the responsiveness of the CLASI scales, correlations, linear regressions, and Wilcoxon rank sum and signed rank exact tests (1-sided) were conducted. The differences between the baseline and day 56 (“change scores”) were obtained for the 2 CLASI scales (activity and damage), and 4 validation measures (physician’s assessment of the patient’s global skin health and the patients’ self-assessment of their global skin health, pain, and itch).[5] The CLASI activity and damage change scores were each correlated with the change score of each validation measure using Pearson correlation coefficients. Next, clinical cut points representing a minimal clinically meaningful change were determined for each validation measure, using changes of the 0 to 10 visual analog scale of global skin health, pain, and itch intensity; these were set at 2 points for each rating scale.6 For the patient’s global skin health ratings, a change of 3 or more was considered clinically meaningful. For each clinical validation measure, Wilcoxon rank sum tests were employed to compare the CLASI change scores of persons in the clinically changed group vs persons who did not change.

Wilcoxon signed rank tests were used to assess the patients’ paired CLASI changes within each subgroup. Simple linear regression (β coefficients) was used to estimate the amount of change in CLASI that is associated with a clinically meaningful change in each validation measure. Using this estimated change in CLASI that is associated with a meaningful change in the validation measure, and assuming an unknown standard deviation, power analysis (using PASS statistical software [Number Cruncher Statistical Systems, Kaysville, Utah] and the method used by Guyatt et al7) was conducted to estimate the responsiveness of the CLASI, and the number of patients needed to assess that level of responsiveness with a 1-tailed α of . 05, and power of at least 80%. This latter calculation should assist in planning future therapeutic studies.

ETHICS

The protocol for the study was approved by the institutional review board of the University of Pennsylvania Medical School and is in accordance with the Declaration of Helsinki in its current form. All patients gave written consent before inclusion in the study.

RESULTS

We recruited 11 patients for the study; 8 were evaluated, and 3 dropped out because findings from repeated biopsies demonstrated other confounding skin conditions that made analysis of the CLE lesions impossible. The confounding diagnoses of these 3 patients were (1) discoid lupus erythematosus (DLE) with a large squamous carcinoma on the arm initially biopsied and thought to be hypertrophic lupus erythematosus; (2) cutaneous T-cell lymphoma, with an initial biopsy interpreted as CLE; and (3) DLE in a patient who subsequently developed erythema multiforme due to a drug. Of the patients analyzed, 4 were African American; 3, white; and 1, Asian. Patient 8 began methotrexate therapy at day 0 and had her dosage gradually increased. She dramatically improved at day 42, after reaching therapeutic dosages of the drug. One patient missed her 14-day visit.

Four of the patients had generalized DLE, 2 had localized DLE, and 2 had subacute CLE (SCLE). One of the patients with generalized DLE and 1 with localized DLE met criteria for SLE (Table 1). None of the patients had tumid lupus or lupus panniculitis.

ACTIVITY

The correlation between the change in physician's assessment of patients' global skin health with the change in CLASI skin activity was high (r=0.97; P<.001; n=7) (Figure 2A) and was similar to the patients' self-assessment of their skin (r=0.85; P=.007; n=8) (Figure 2B). We assessed only patients who had baseline pain or itch and correlated the change in the patients' assessment of their pain and itch with the change in skin activity as assessed by the CLASI. The correlation between the change in the CLASI activity score with the change in the pain score (r=0.98; P=.004; n=5) (Figure 3A) was higher than that for the change in itch score (r=0.67; P=.10; n=7) (Figure 3B).

CONTRASTED GROUP VALIDITY

There was a statistically significant difference between the CLASI activity change scores of the group of patients who did have a meaningful change in the physician's assessment of patients' global skin health vs those who did not (Wilcoxon signed rank test, 0.00; P=.008), and in the patients' self-assessment of global skin health (Wilcoxon signed rank test, 0.00; P=.008). Furthermore, there was a statistically significant change in CLASI for the subgroup of patients who had a minimal, clinically meaningful change in the patients' skin ratings (Z=2.04, P=.03). The change in CLASI for the subgroup of patients who had a minimal, clinically meaningful change in the physician's global skin rating (Z=1.84; P=.06; n=4), and itch rating (Z=1.83; P=.06; n=4) was not statistically significant. Although the CLASI activity change was not statistically significant for persons who had a meaningful change in pain (n=3), their CLASI change scores were large (29, 16, and 5) (Table 2). There were no statistically significant changes in CLASI activity for the subgroup of patients who did not have a "meaningful change" in the physician's skin rating and the patient's skin, itch, and pain ratings (P=.25, P=.25, and P=.50, respectively).

CHANGE IN CLASI

The β coefficients (5.66, 2.03, and 4.62) from the regression analysis suggest that more than a 2-point change in the physician's rating, the patients' itch, and the patients' pain predicts a

CLASI activity change of approximately 11.3, 4.1, and 9.2 points, respectively. The β coefficient (2.82) from the patients' skin ratings suggests that more than a 3-point change in patients' skin self-rating is associated with a change in CLASI activity of about 8.7.

RESPONSIVENESS

Given an 11-point change in CLASI activity and a standard deviation of 18 points (Table 3), the CLASI activity scale would have a responsiveness index of 0.61. To detect a change in CLASI of 11.0 vs 0, with reasonable power (0.80), 20 subjects would be needed (Table 3). This projection may be used to plan future studies that use the CLASI as an outcome variable.

Improvement was defined as at least a 2-point change in physician's and at least a 3-point change in patient's global skin health score.[5] Six patients showed clinical improvement (3 with DLE, 1 with DLE and SLE, and 2 with SCLE), with a mean improvement in the patient global assessment of 4.17 points, correlating with a CLASI activity score decrease of 60%.

DAMAGE

The correlation between the change in CLASI skin damage with the change in physician's global assessment of patients' global skin health was moderate (r=0.52; P=.23; n=7). There was a moderate to poor correlation between the change in CLASI damage score with the change in itch score (r=0.45; P=.32; n=7), pain score (r=0.64; P=.24; n=5), and patients' self-assessment of their global skin health (r=0.32; P=.45; n=8).

ACTIVITY AND DAMAGE

The CLASI activity score may decrease while the damage score increases or remains unchanged (Figure 4 and Figure 5). This underscores the importance of separating activity and damage to avoid stability or increase of the score while the active disease is improving. All 3 patients with scarring forms of CLE and with notable improvement in activity had a decrease in their activity score with an increase in their damage score compared with 3 patients who had no change in their damage score.

COMMENT

The CLASI was designed as an instrument to be used in therapeutic trials in patients with CLE. The primary objective of most therapy is to suppress disease activity. Therefore, the focus of our evaluation of the clinical responsiveness was disease activity. This focus assures that the CLASI is useful in clinical therapeutic research. However, the design of our evaluation went further than this pure assessment of activity because we collected data about the clinical course of clinical symptoms such as pain and itch, about which little is known in CLE. This additional information can be helpful for the design of clinical trials.

The CLASI's activity score had excellent correlation with the general assessment of the global skin health by the physicians and by the patients. This correlation is essential for therapeutic trials because it assures that improvement, as demonstrated by a reduced CLASI score, correlates with clinically meaningful changes. However, unlike the general assessment, the CLASI can document the distribution and severity of cutaneous symptoms in a way that allows comparison among groups of patients.

The CLASI was designed as 2 different scores for activity and damage. This study confirms the necessity of separating these 2 measures. Although therapy reduced the activity of the disease, we observed either no improvement or worsening of damage in many of our patients. Thus, a separation of activity and damage scores avoided stability or even paradoxical increase of the score as the disease resolved in these patients. As a result, the correlation between the

assessment of global skin health, which largely reflects activity, and damage as measured by the CLASI was only moderate. The observation that physicians' and patients' assessment of global skin health was not perfectly correlated can probably be attributed to the relatively higher relevance that the remaining and often quite considerable damage had on the patients' perception of improvement. The problem of the effect of damage on quality of life will be discussed in detail in a report[4] that investigates the quality of life assessments that were part of this study.

Not much systematic research about the frequency and the course of pain and itch in CLE had been performed prior to this study. We found that there was an excellent correlation of the improvement in the CLASI skin activity with the improvement in skin pain. This improvement is likely to correlate well with the increased ability of the patients to use their hands (eg, to write or to ambulate if the CLE involved the hands or feet). However, the correlation of the CLASI with the patient's assessment of itch level was only moderate. Not every patient complained of itch, and some patients actually developed this symptom even though the skin condition remained stable and in spite of treatment. Therefore, it seems unlikely from our perspective that itch is a reliable measure of disease activity in CLE because it does not seem to reflect disease activity, progression, or severity.

This small observational study is meant to facilitate the design of larger prospective therapeutic clinical trials for which this instrument was developed. The design of the CLASI was geared toward trials that we found likely to be realistic, that is, trials of the larger subgroups of CLE, including acute lupus erythematosus, DLE, or SCLE. It is not meant to document the whole clinical variety of CLE. Future trials in lupus profundus, tumid lupus erythematosus, or bullous lupus erythematosus may find it necessary to add and evaluate additional subscales to measure the subgroup's particular characteristics, such as bullae or induration. Although the final number of eligible patients fell slightly short of the initial proposed sample size, the data gathered provide important information about the usefulness of CLASI in a clinical trial setting. Future studies will certainly involve larger sample sizes to validate our current findings.

This study demonstrates that the activity portion of the CLASI is a responsive outcome instrument that correlates well with the physicians' and patients' global assessment of disease activity on a 0 to 10 visual analog scale. Only 2 patients failed to improve, and additional studies are needed to further validate the CLASI in this situation. Owing to the nature of the disease, the CLASI damage score does not correlate with global assessment as well. However, its clinical course is predictable and plausible. In conclusion, the CLASI allows a much more nuanced and detailed measurement of the extent and severity of skin involvement than a global scale does and thus allows assessment and comparison of patients in terms of extent and acuity of the disease as well as observation of their reaction to therapy.

Acknowledgments

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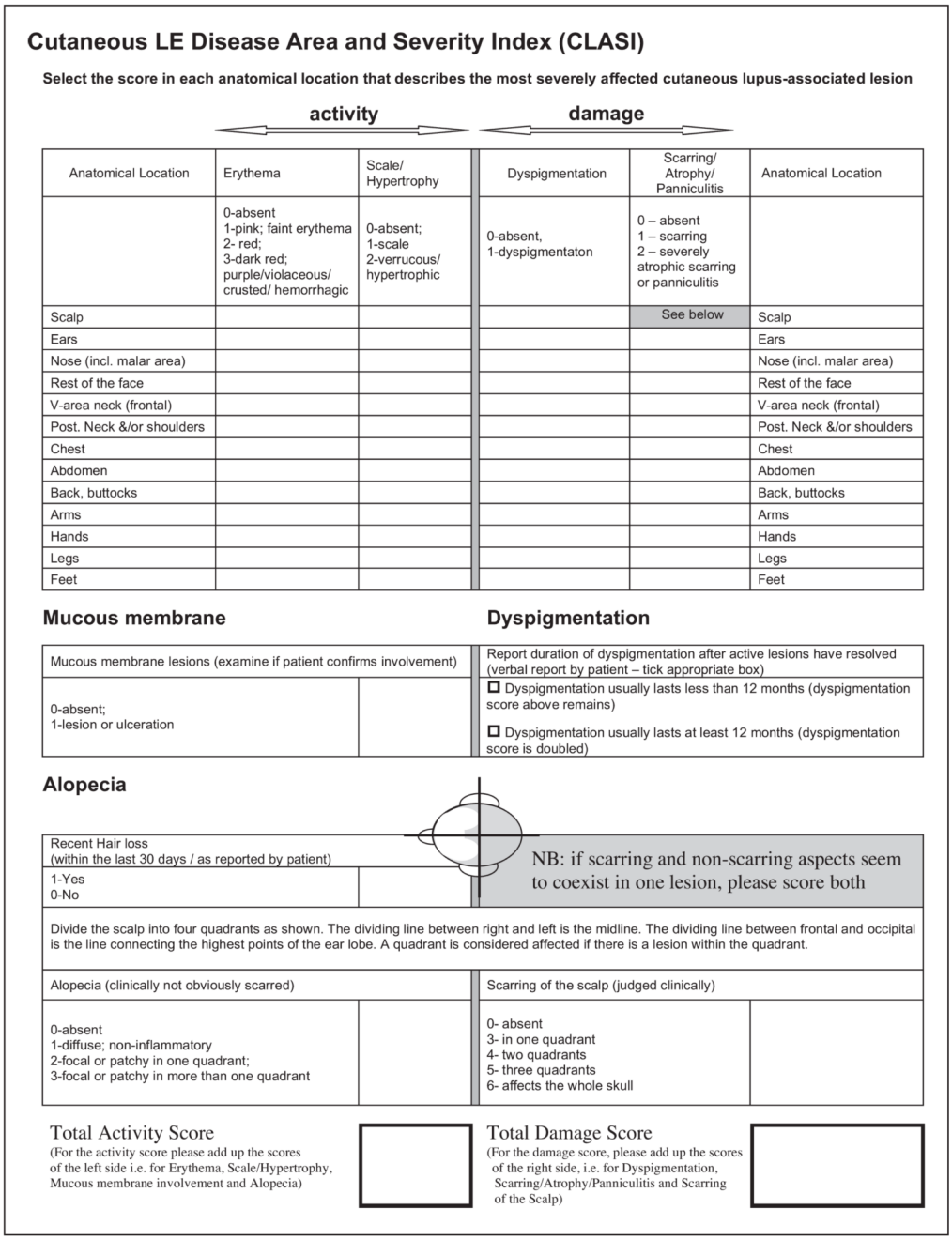

Cutaneous LE Disease Area and Severity Index (CLASI)

Select the score in each anatomical location that describes the most severely affected cutaneous lupus-associated lesion

activity **damage**

Anatomical Location	Erythema	Scale/ Hypertrophy	Dyspigmentation	Scarring/ Atrophy/ Panniculitis	Anatomical Location
	0-absent 1-pink; faint erythema 2- red; 3-dark red; purple/violaceous/ crusted/ hemorrhagic	0-absent; 1-scale 2-verrucous/ hypertrophic	0-absent, 1-dyspigmentaton	0 – absent 1 – scarring 2 – severely atrophic scarring or panniculitis	
Scalp				See below	Scalp
Ears					Ears
Nose (incl. malar area)					Nose (incl. malar area)
Rest of the face					Rest of the face
V-area neck (frontal)					V-area neck (frontal)
Post. Neck &/or shoulders					Post. Neck &/or shoulders
Chest					Chest
Abdomen					Abdomen
Back, buttocks					Back, buttocks
Arms					Arms
Hands					Hands
Legs					Legs
Feet					Feet

Mucous membrane

Mucous membrane lesions (examine if patient confirms involvement)	
0-absent; 1-lesion or ulceration	

Dyspigmentation

Report duration of dyspigmentation after active lesions have resolved (verbal report by patient – tick appropriate box)

☐ Dyspigmentation usually lasts less than 12 months (dyspigmentation score above remains)

☐ Dyspigmentation usually lasts at least 12 months (dyspigmentation score is doubled)

Alopecia

Recent Hair loss (within the last 30 days / as reported by patient)	
1-Yes 0-No	

NB: if scarring and non-scarring aspects seem to coexist in one lesion, please score both

Divide the scalp into four quadrants as shown. The dividing line between right and left is the midline. The dividing line between frontal and occipital is the line connecting the highest points of the ear lobe. A quadrant is considered affected if there is a lesion within the quadrant.

Alopecia (clinically not obviously scarred)		Scarring of the scalp (judged clinically)	
0-absent 1-diffuse; non-inflammatory 2-focal or patchy in one quadrant; 3-focal or patchy in more than one quadrant		0- absent 3- in one quadrant 4- two quadrants 5- three quadrants 6- affects the whole skull	

Total Activity Score
(For the activity score please add up the scores of the left side i.e. for Erythema, Scale/Hypertrophy, Mucous membrane involvement and Alopecia)

Total Damage Score
(For the damage score, please add up the scores of the right side, i.e. for Dyspigmentation, Scarring/Atrophy/Panniculitis and Scarring of the Scalp)

Figure 1.

The Cutaneous Lupus Erythematosus (LE) Disease Area and Severity Index instrument. Post indicates posterior; incl, includes.

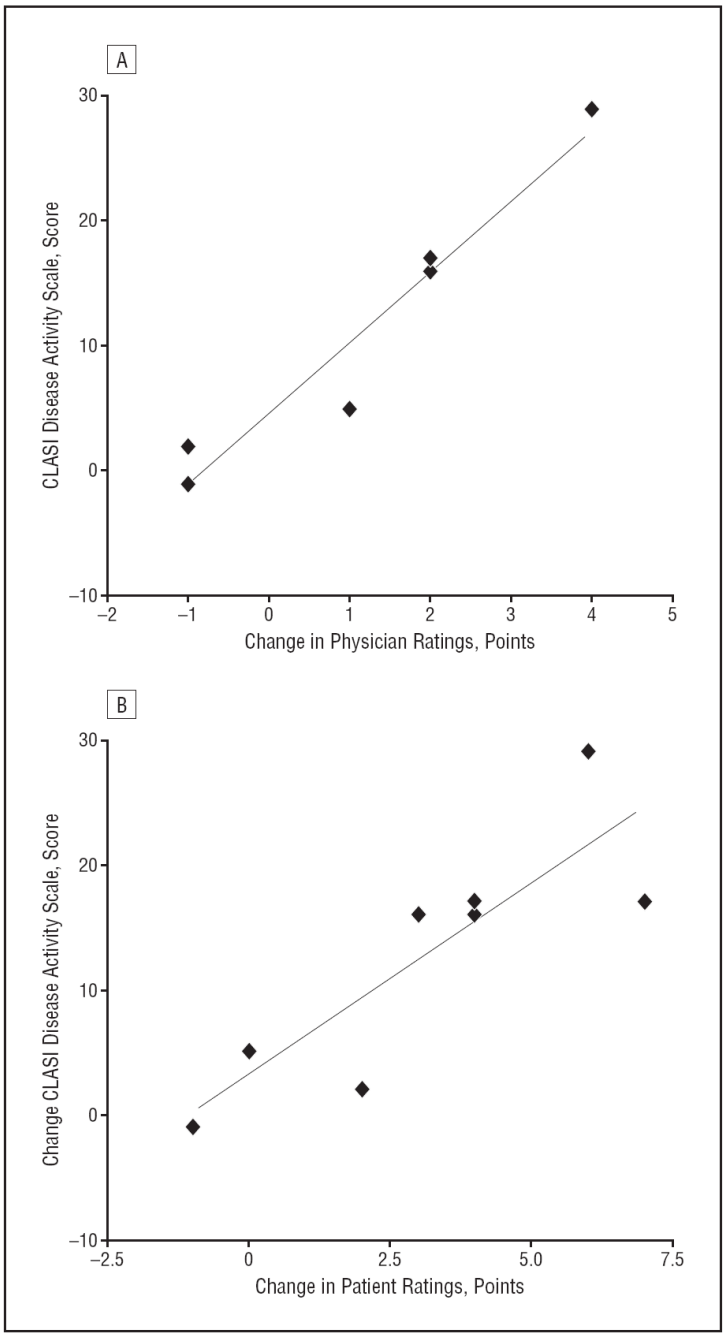

Figure 2.
Correlation of change in global health measures with Cutaneous Lupus Erythematosus Disease Area and Severity Index (CLASI) activity. A, Correlation of change in physician's global skin health score relative to the CLASI disease activity score from baseline to day 56. B, Correlation of change in patients' global skin health score relative to the CLASI disease activity score from baseline to day 56.

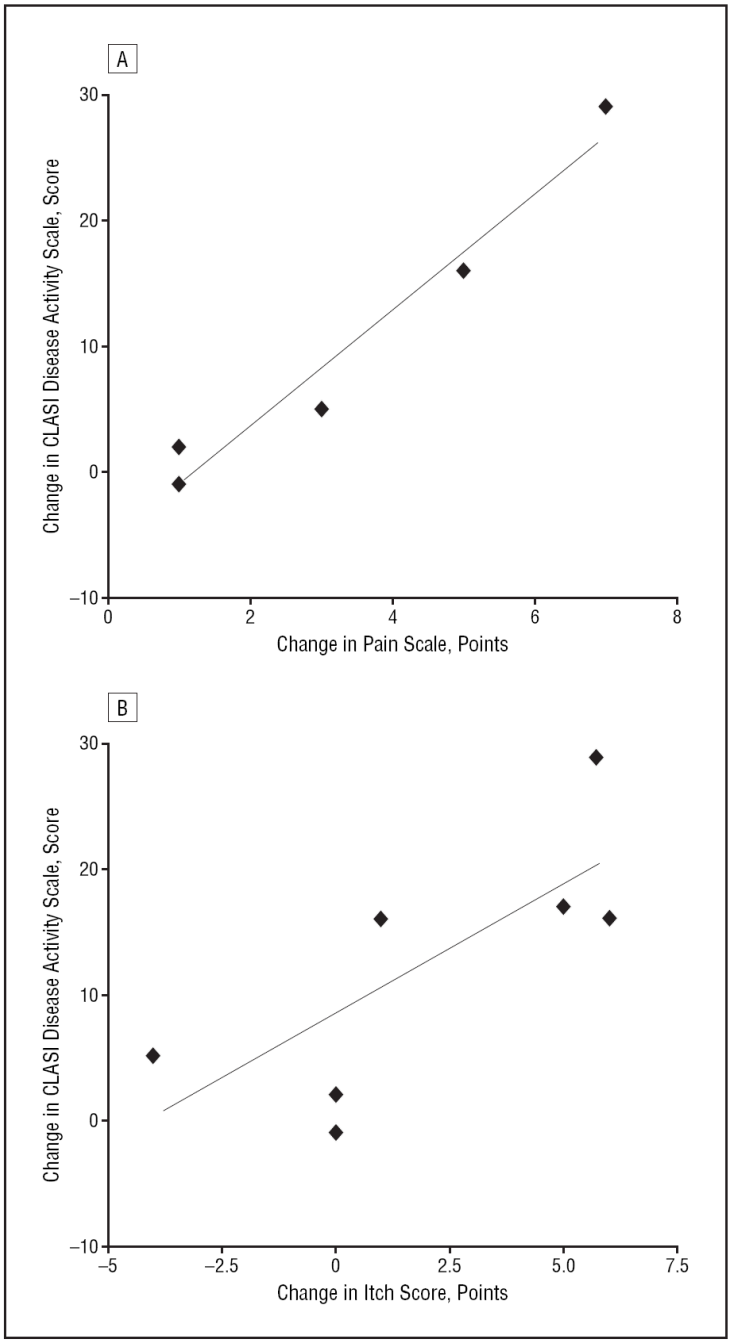

Figure 3.
Correlation of change in patient symptoms with Cutaneous Lupus Erythematosus Disease Area and Severity Index (CLASI) disease activity score. A, Correlation of change in pain score relative to the CLASI disease activity score from baseline to day 56. B, Correlation of change in itch score relative to the CLASI disease activity score from baseline to day 56.

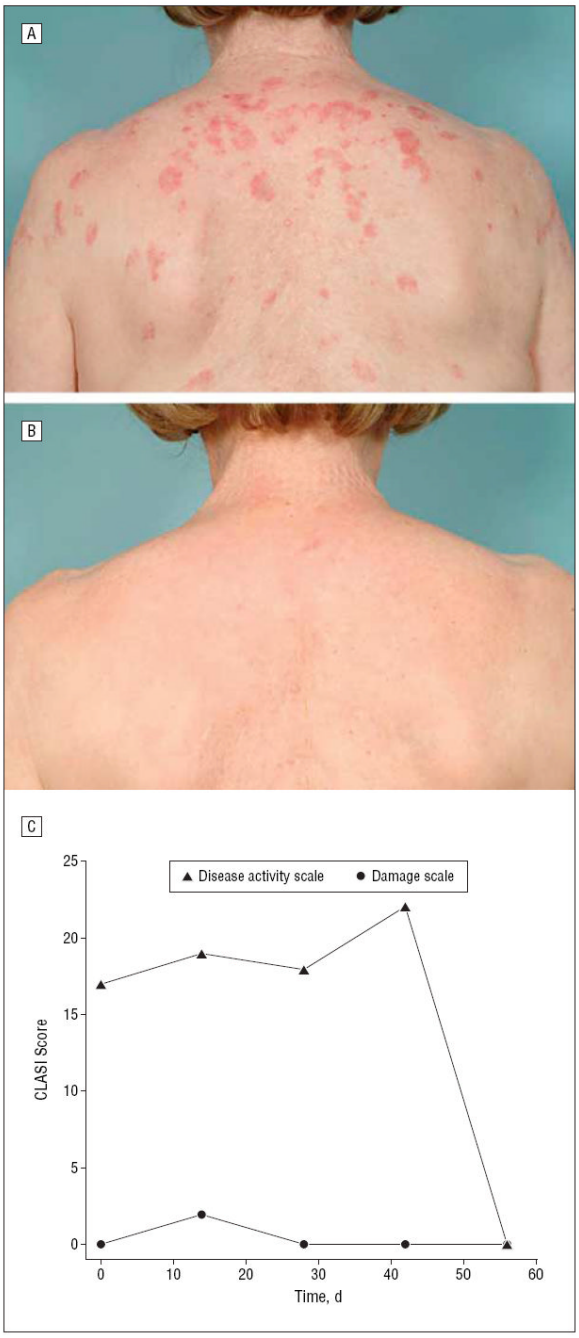

Figure 4.
Clinical response in activity and damage for patient 8 with subacute cutaneous lupus erythematosus. A, Day 0; B, day 56; and C, graph of the Cutaneous Lupus Erythematosus Disease Area and Severity Index (CLASI) score over time for patient 8.

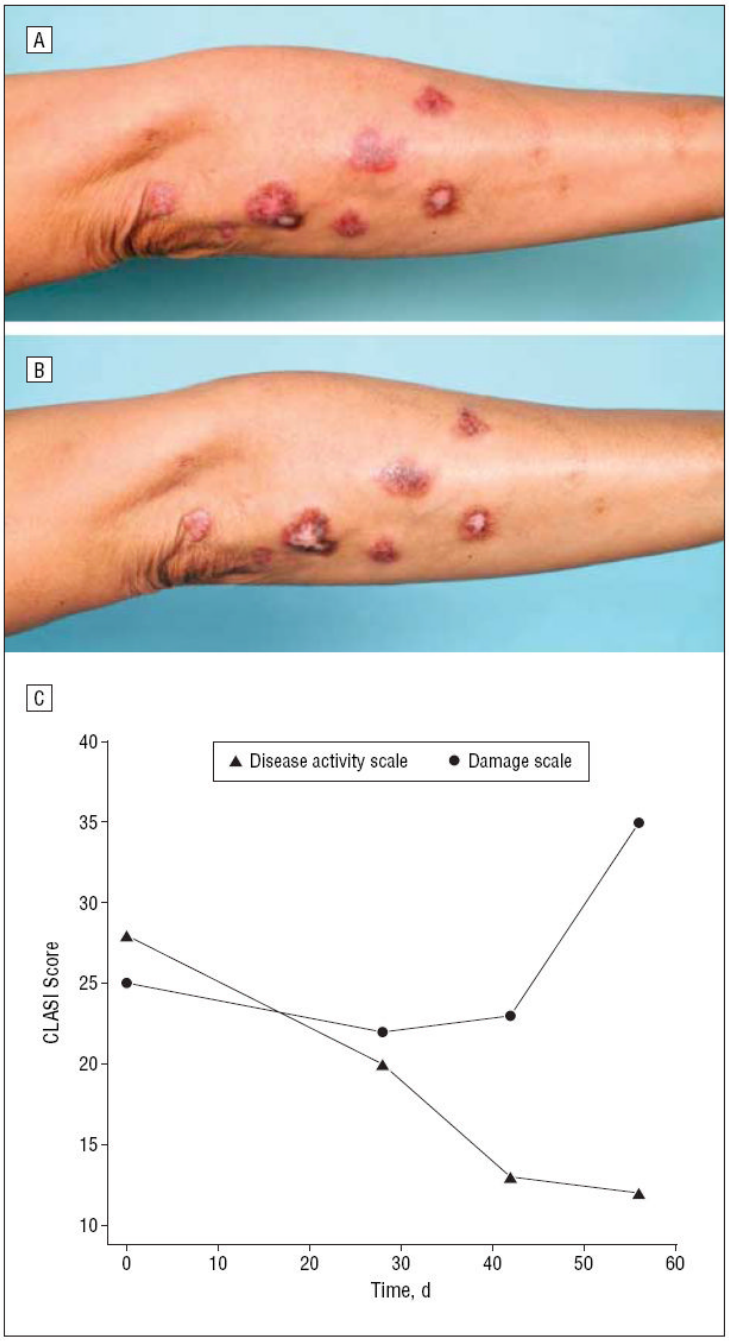

Figure 5.
Clinical response in disease activity and damage over time for patient 10 with discoid lupus erythematosus. A, Day 0; B, day 56; and C, graph of the Cutaneous Lupus Erythematosus Disease Area and Severity Index (CLASI) score over time for patient 10.

Table 1

Patient Characteristics

Patient No./Sex/Age, y/Race	CLE Type	Old Medications	New Medications
1/F/43/White	Generalized DLE	Hydroxychloroquine sulfate	Lenalidomide
2/F/48/Black	Generalized DLE	Prednisone, hydroxychloroquine, quinacrine hydrochloride, azathioprine	Azathioprine
4/F/42/White	Localized DLE	Hydroxychloroquine	Thalidomide, methotrexate
6/F/48/White	SCLE	Chloroquine phosphate, quinacrine, hydroxychloroquine, prednisone	Methotrexate
7/F/19/Asian	Generalized DLE/SLE	None	Prednisone, hydroxychloroquine, Quinacrine, cyclophosphamide
8/F/83/Hispanic	SCLE	Hydroxychloroquine, prednisone	Methotrexate
10/F/61/Black	Generalized DLE	Hydroxychloroquine, quinacrine,	Hydroxychloroquine
11/F/50/Black	Localized DLE/SLE	Chloroquine, quinacrine, methylprednisolone, dapsone, methotrexate, cyclosporine, azathioprine	Lenalidomide

Abbreviations: CLE, cutaneous lupus erythematosus; DLE, discoid lupus erythematosus; SCLE, subacute CLE; SLE, systemic lupus erythematosus.

Table 2

CLASI Disease Activity and Damage Group Means Stratified by Each Validation Measures' Subgroups (a Clinically Meaningful Change vs No Change)

Variable	Patients, No.	Patient-Specific Baseline Scores	Day 56 Scores	Baseline vs Day 56 Difference, Median (Range)[a]	Wilcoxon Signed Rank Test, *Z* score	*P* Value[b]
CLASI Activity Scale						
Physician's global skin rating (0-10), change[c]						
0-1	3	21, 19, 8	19, 14, 9	2.0 (−1 to 5)	1.07	.25
≥2	4	49, 28, 23, 17	20, 12, 7, 0	16.5 (16 to 29)	1.84	.06
Patient's skin rating, change[c]						
0-2	3	21, 19, 8	19, 14, 9	2.0 (−1 to 5)	1.07	.25
≥3	5	49, 28, 23, 17, 17	20, 12, 7, 0, 0	17.0 (16 to 29)	2.04	.03
Patient's itch rating, change[d]						
0-1	3	28, 21, 8	12, 19, 9	2.0 (−1 to 16)	1.07	.25
≥2	4	49, 23, 19, 17	20, 7, 14, 0	16.5 (5 to 29)	1.83	.06
Patient's pain rating, change[d]						
0-1	2	21, 8	19, 9	0.5 (−1 to 2)	0.45	.50
≥2	3	49, 23, 19	20, 7 ,14	16.0 (5 to 29)	1.60	.13
CLASI Damage Scale						
Physician's global skin rating, change[c]						
0-1	3	35, 17, 15	38, 33, 17	−3.0 (−16 to −2)	−1.60	.13
≥2	4	44, 25, 10, 0	44, 35, 9, 0	0.0 (−10 to 1)	−0.45	.50
Patient's skin rating, change[c]						
0-2	3	35, 17, 15	38, 33, 17	−3.0 (−16 to −2)	−1.60	.13
≥3	5	44, 25, 10, 2, 0	44, 35, 9, 4, 0	0.0 (−10 to 1)	−1.07	.25
Patient's itch rating, change[d]						
0-1	3	25, 17, 15	35, 33, 17	−10.0 (−16 to −2)	−1.60	.13
≥2	4	44, 35, 10, 0	44, 38, 9, 0	0.0 (−3 to 1)	−0.45	.50
Patient's pain rating, change[d]						

Variable	Patients, No.	Patient-Specific Baseline Scores	Day 56 Scores	Baseline vs Day 56 Difference, Median (Range)[a]	Wilcoxon Signed Rank Test, *Z* score	*P* Value[b]
0-1	2	17, 15	33, 17	−9.0 (−16 to −2)	−1.34	.25
≥2	3	44, 35, 10	44, 38, 9	0.0 (−3 to 1)	−0.45	.50

Abbreviation: CLASI, Cutaneous Lupus Erythematosus Disease Area and Severity Index.

[a] Differences are calculated so that a negative difference indicates worst and a positive difference indicates improvement.

[b] One-sided.

[c] Direction of scales: The scores are 0 to 10; the higher the score, the better the skin condition.

[d] The higher the score, the worse the skin condition.

Table 3

Responsiveness, Power, and Sample Size Requirements[a]

Responsiveness Index (or Effect Size)	SD	Sample Size, No.	Power
CLASI Activity Change of 11.0			
0.20	55.0	60	0.80
0.40	27.5	40	0.84
		50	0.87
		55	0.90
0.50	22.0	25	0.78
		30	0.85
		35	0.89
		40	0.93
0.61	18.0	15	0.73
		20	0.84
		25	0.91
0.80	13.8	10	0.75
		15	0.90
1.00	11.0	10	0.90
CLASI Activity Change of 9.0			
0.20	45.0	60	0.45
0.40	22.5	40	0.80
		45	0.84
		50	0.87
		55	0.90
0.50	18.0	25	0.78
		30	0.85
		35	0.89
		40	0.93
0.60	15.0	20	0.83
		25	0.90
		30	0.94
0.80	11.3	10	0.75
		15	0.90
1.00	9.0	10	0.90

Abbreviation: CLASI, Cutaneous Lupus Erythematosus Disease Area and Severity Index.

[a]One sample, paired *t* test; α=.05; 1-tailed; SD unknown. Power calculations were performed using PASS statistical software (Number Cruncher Statistical Systems, Kaysville, Utah).