stacles to patient-centered dermatologic care—timely access. We can expect to be reimbursed for this service. Medicare pays for S&F teledermatology in Alaska and Hawaii, and Medicaid provides some type of reimbursement for telehealth services in 39 states,[1] including the state of California, where this study was conducted. Private payers across the country are increasingly willing to do so. Payment is generally the same as in-person care regardless of payer source; however, a half day spent doing S&F teledermatology with today's payment schema is less profitable than a half day spent in clinic doing procedures. Provider payment reforms may alter this differential in the future. Teledermatology has been transitioning from research to implementation for some time now, and as that conversion matures, payers are increasingly willing to reimburse for S&F teledermatology.

Teledermatology training and mentoring should be incorporated into our residency and continuing education programs. Primary care providers also need to be educated about how teledermatology can improve access to timely dermatologic expertise. Staff members and/or patients, depending on the structure of the service, need to be trained to take high-quality digital photographs and to send them securely.

Changes in health care overall may facilitate the adoption of S&F teledermatology. Programs resulting from the federal stimulus of 2009 are working to encourage the meaningful use of electronic health records and to accomplish secure, interoperable health information exchange in all states. A mature electronic environment in health care may facilitate the broader use of S&F teledermatology.

This study shows that concerns about liability are a perceived barrier to using S&F teledermatology. Improvements in the medical liability landscape in general could help and may encourage dermatologists to contribute expertise through S&F teledermatology, which can be done from anywhere that a reliable and secure computer connection exists.

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RESEARCH LETTERS

Autoantibody and Clinical Profiles in Patients With Discoid Lupus and Borderline Systemic Lupus

Discoid lupus erythematosus (DLE) is 1 of 11 American College of Rheumatology (ACR) systemic lupus erythematosus (SLE) diagnostic criteria,[1] of which 4 are required to fulfill the diagnosis of SLE. By meeting mainly skin-related ACR criteria, patients with DLE can be easily diagnosed as having SLE without having other organ involvement. These patients are defined as having borderline DLE/SLE. To determine whether SLE diagnosis is appropriate in these patients, we compared their autoantibody and clinical profiles with those of DLE patients who do not have SLE (DLE only) and those who do have SLE (DLE/SLE).

Methods. A pilot cross-sectional study was conducted comparing age- and sex-matched borderline DLE/SLE, DLE-only, and DLE/SLE patients selected from the Cutaneous Lupus Erythematosus Registry at The University of Texas Southwestern (UTSW) Medical Center in Dallas. For all patients, the diagnosis of DLE, which represented the discoid subtype of chronic cutaneous lupus, was confirmed by clinicopathologic correlation. Borderline DLE/SLE patients had either 3 or 4 skin-related ACR SLE diagnostic criteria (including DLE, self-reported malar eruption, oral ulcers, and photosensitivity) and positive findings of antinuclear antibody (ANA) to fulfill the SLE diagnosis. The DLE-only patients had fewer than 4 ACR SLE diagnostic criteria. The DLE/SLE patients met at least 4 ACR SLE diagnostic criteria with at least 1 non–skin-related, non–ANA-related criterion. Patients with absence of DLE, history of drug-related DLE, or DLE diagnosis before age 18 years were excluded. The study was approved by the UTSW institutional review board.

Autoantibodies were quantified using (1) an enzyme-linked immunosorbent assay (ELISA) kit manufactured by INOVA Diagnostics for ANA; (2) an ELISA kit manufactured by ORENTEC Diagnostika for double-stranded DNA (dsDNA) and single-stranded DNA (ssDNA) antibodies; and (3) a QUANTA Plex fluorescent immunoassay system manufactured by INOVA Diagnostics for ribonucleoprotein (RNP), Smith (Sm), Scl-70, 60-kDa SS-A, 52-kDa SS-A, and SS-B antibodies. Treat-

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Table 1. Study Patient Characteristics[a]

Characteristic	Borderline DLE/SLE	DLE	DLE/SLE	*P* Value
Total, No.	8[b]	12	12	NA
Age at visit, mean (SD), y	47 (15)	45 (13)	46 (10)	.89
Sex, (M/F), No.	1/7	1/11	1/11	>.99
Ethnicity				
White	5 (62)	5 (42)	6 (50)	.75
African American	3 (38)	7 (58)	5 (42)	.73
Hispanic	0	0	1 (8)	>.99
Age at diagnosis, mean (SD), y	37 (12)	38 (17)	43 (12)	.43
Duration of disease, mean (SD), y	11 (8)	6 (11)	5 (3)	.25
Treatment at time of visit				
Topical and/or intralesional corticosteroids	3 (38)	5 (42)	6 (50)	.91
Hydroxychloroquine	4 (50)	6 (50)	10 (83)	.13
Chloroquine	1 (13)	2 (17)	2 (17)	>.99
Quinacrine	1 (13)	3 (25)	3 (25)	.76
Azathioprine	1 (13)	0	0	.25
Rituximab	1 (13)	0	0	.25
Methotrexate	0	1 (8)	0	.38
Prednisone	0	0	4 (33)	<.05
Mycophenolate mofetil	0	1 (8)	3 (25)	.41
Leflunomide	0	0	1 (13)	>.99
Efalizumab	0	0	1 (13)	>.99
None	1 (13)	2 (17)	0	.45
SLE criteria				
Malar	3 (38)	1 (8)	4 (33)	.30
Discoid	8 (100)	12 (100)	12 (100)	NA
Photosensitivity	7 (88)	8 (67)	11 (92)	.29
Oral	6 (75)	2 (17)	5 (42)	.03
ANA	8 (100)	2 (17)	11 (92)	<.001
Arthritis	0	1 (8)	8 (67)	<.001
Serositis	0	0	3 (25)	>.99
Renal disorder	0	0	4 (33)	.03
Neurologic disorder	0	0	0	NA
Hematologic disorder	0	1 (8)	9 (75)	<.001
Immunologic disorder	0	0	8 (67)	<.001

Abbreviations: ANA indicates antinuclear antibodies; DLE, discoid lupus erythematosus; NA, not applicable; RNP, ribonucleoprotein; SLE, systemic lupus erythematosus.

[a] Unless otherwise indicated, data are reported as number (percentage) of patients.

[b] One borderline DLE/SLE patient had concomitant DLE and subacute cutaneous lupus erythematosus.

ments, disease activity,[2,3] lesion distribution, medical and family histories, and laboratory values were also collected. Unsupervised cluster analyses were performed using Cluster software, version 2.1, and Treeview software, version 1.6 (http://rana.lbl.gov/EisenSoftware.htm). Continuous and categorical predictive variables among groups were compared using Kruskal-Wallis and Fisher exact tests, respectively.

Results. **Table 1** summarizes the patient characteristics. All borderline DLE/SLE patients had 3 skin-related ACR SLE diagnostic criteria with positive ANA findings except 1 patient, who had 4 skin-related ACR SLE diagnostic criteria with positive ANA findings.

Unsupervised clustering analysis of 9 autoantibody levels revealed 2 distinct clusters of patients (**Figure 1**). One cluster was composed mostly of borderline DLE/SLE patients (6 of 8) and DLE-only patients (11 of 12). Another cluster was dominated by DLE/SLE patients (8 of 12). Borderline DLE/SLE and DLE-only patients had similarly low levels of Sm ($P<.001$), RNP ($P=.01$), and ssDNA autoantibodies (not shown) ($P=.08$) compared with DLE/SLE patients (**Figure 2**A and B). Compared with the other 2 groups, borderline DLE/SLE patients had moderate dsDNA autoantibody ($P=.04$) and ANA levels ($P=.01$) (Figure 2C and D). No significant differences in 60-kDa SS-A, SS-B, Scl-70, and 52-kDa SS-A autoantibodies were seen (data not shown).

Localized disease (or lesions above the neck) was more common in borderline DLE/SLE and DLE-only patients than in DLE/SLE patients ($P=.03$) (**Figure 3**A). Compared with DLE/SLE patients, borderline DLE/SLE and DLE-only patients had lower numbers of treatment types ($P=.05$) (Figure 3B). The DLE/SLE patients were most likely to be undergoing oral immunosuppressive therapy ($P=.01$) (Figure 3C). Disease activity, personal and family history of autoimmunity, and serum urea nitrogen and creatinine levels were not significantly different among the groups (data not shown).

Comment. Our pilot study demonstrated that borderline DLE/SLE and DLE-only patients have similar autoantibody, treatment, and lesion distribution profiles, calling into question their SLE diagnosis. Requiring a noncutaneous, non-ANA diagnostic criterion would reduce overdiagnosis of SLE.

Levels of Sm and RNP autoantibodies, which were low in borderline DLE/SLE and DLE-only patients compared with DLE/SLE patients, may be important in distinguishing these groups in future studies. Moderate ANA and dsDNA values in borderline DLE/SLE patients imply that they are somewhat distinct from

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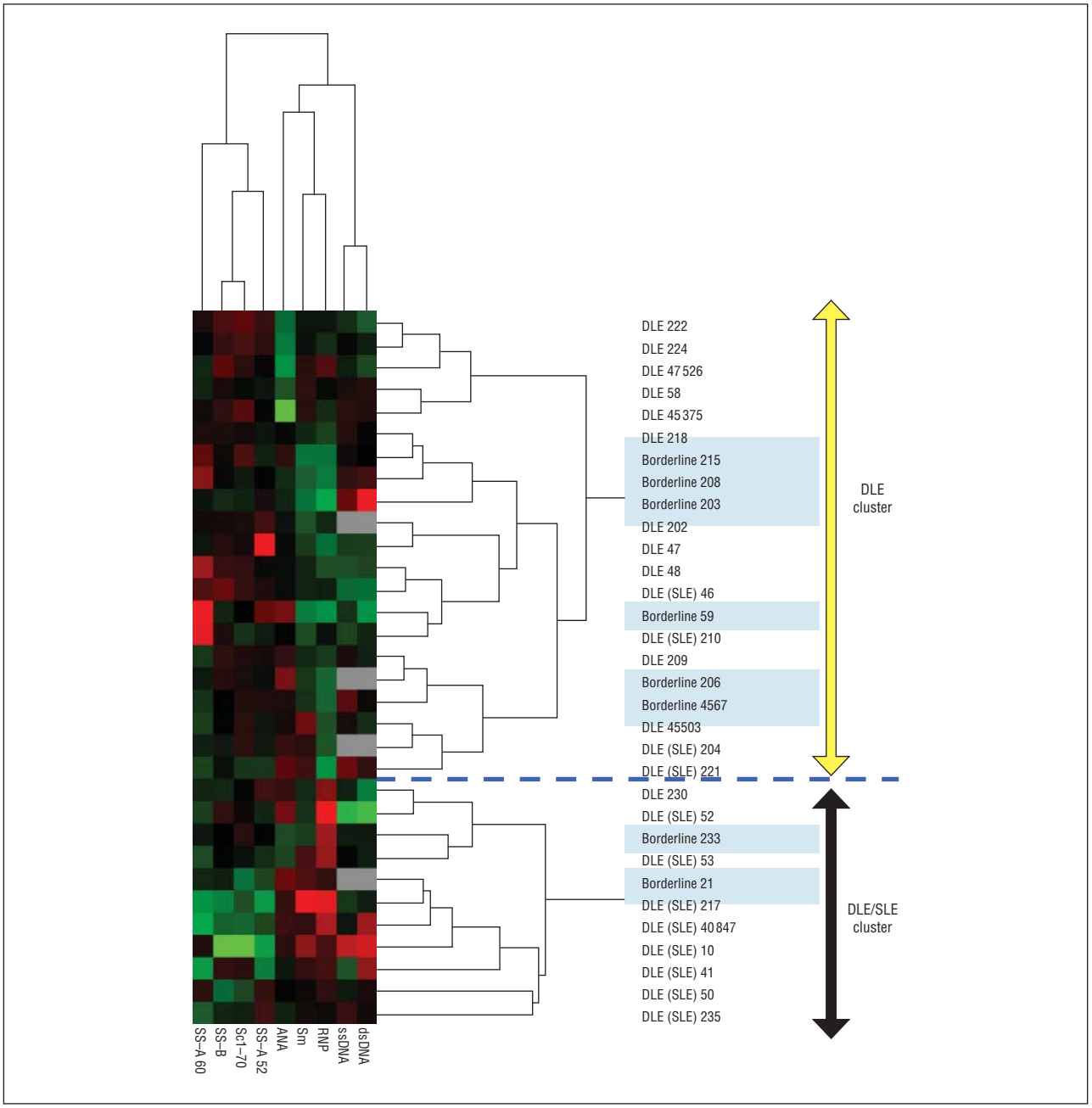

Figure 1. Autoantibody expression levels in borderline DLE/SLE, DLE-only, and DLE/SLE patients. An unsupervised cluster analysis based on the expression of 9 different autoantibodies in the 3 DLE patient groups was performed. Red and green boxes represent high and low autoantibody expression, respectively, relative to the mean. Data from borderline DLE/SLE patients are highlighted in blue. ANA indicates antinuclear antibodies; DLE, discoid lupus erythematosus; dsDNA, double-stranded DNA; RNP, ribonucleoprotein; SLE, systemic lupus erythematosus; Sm, Smith; ssDNA, single-stranded DNA; SS-A 52, 52-kDa SS-A autoantibody; and SS-A 60, 60-kDa SS-A autoantibody.

DLE-only patients and could be at higher risk for systemic spread of their disease. Comparable treatment history and lesion distribution in borderline DLE/SLE and DLE-only patients suggest similar disease courses. Since generalized DLE is associated with systemic disease,[4] the low incidence of this clinical finding in borderline DLE/SLE patients favors limited disease.

Limitations of this study include cross-sectional design and small sample size, which would be addressed with a larger prospective study. Self-reporting of malar eruption, oral ulcers, and photosensitivity affects patient classification.

Overall, borderline DLE/SLE patients express autoantibody and clinical features more comparable with DLE-only patients than with DLE/SLE patients, implying that SLE diagnosis may be misleading in borderline DLE/SLE patients. To improve diagnostic methods of SLE, additional studies are needed to define which cutaneous features are most related to SLE.

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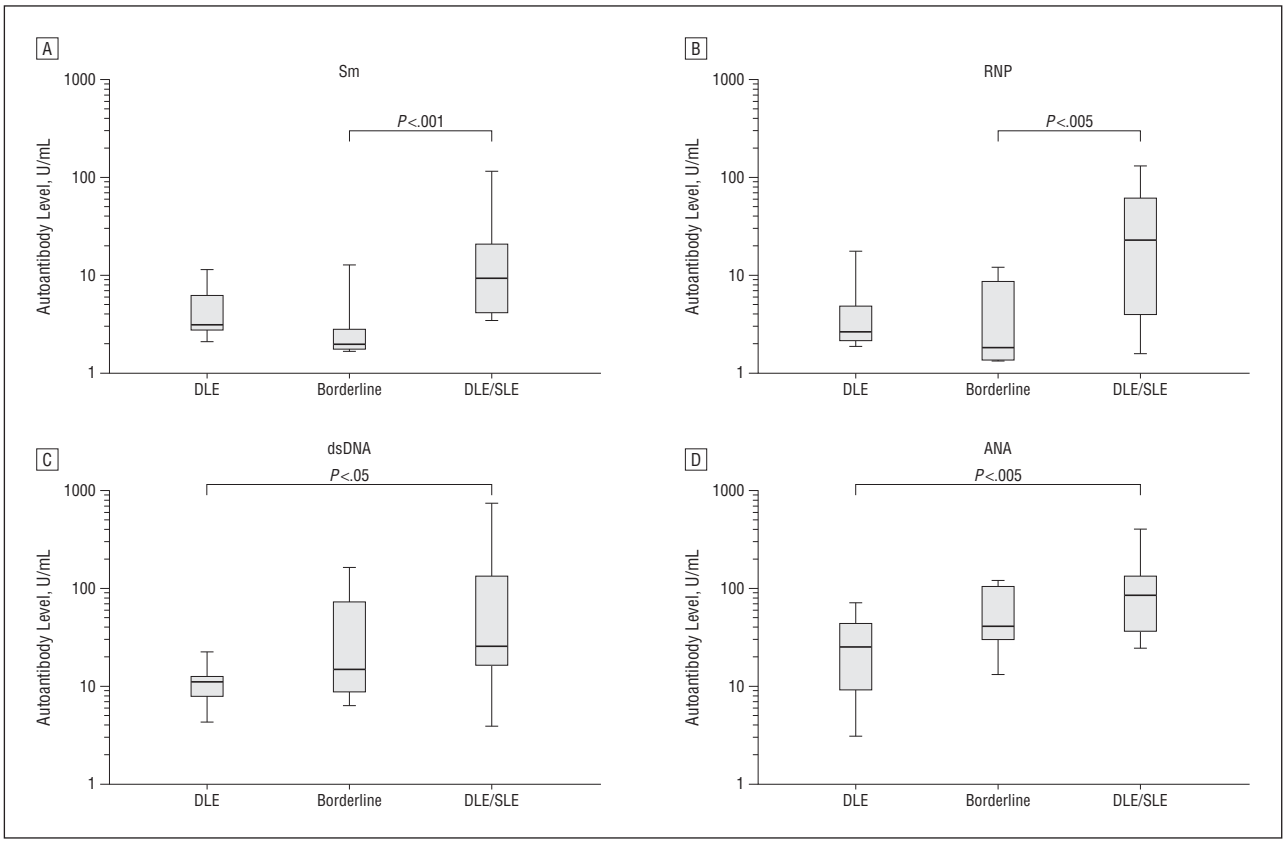

Figure 2. Autoantibody expression levels in borderline DLE/SLE, DLE-only and DLE/SLE patients. Enzyme-linked immunosorbent assays and fluorescent assays measured autoantibodies against Sm (A), RNP (B), dsDNA (C), and ANA (D) in each of the 3 DLE patient groups (with the exception of 2 borderline DLE/SLE patients, 1 DLE-only patient, and 1 DLE/SLE patient who did not have dsDNA data available for measurement). The boxes contain results between the 25th and 75th percentiles, with the dark lines in the boxes representing the median. Whiskers of box-and-whisker plot indicate maximum and minimum values. ANA indicates antinuclear antibodies; DLE, discoid lupus erythematosus; dsDNA, double-stranded DNA; RNP, ribonucleoprotein; SLE, systemic lupus erythematosus; and Sm, Smith.

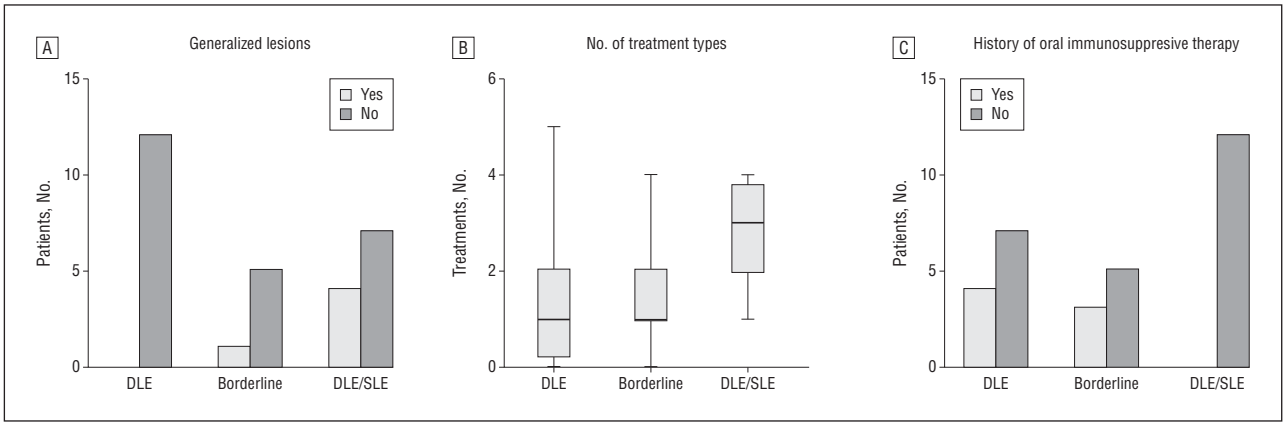

Figure 3. Distribution of lesions and treatment history in borderline DLE/SLE, DLE-only, and DLE/SLE patients. A, The presence of generalized active and chronic discoid lesions. B, The total number of treatment types (eg, topical and/or intralesional steroids, antimalarial agents, prednisone, other immunosuppressants) (the boxes contain results between the 25th and 75th percentiles; the dark lines in the boxes represent the median number of treatments; and the whiskers represent minimum and maximum number of treatments). C, History of oral immunosuppressive therapy was assessed in the 3 DLE patient groups at the study visit. DLE indicates discoid lupus erythematosus; SLE, systemic lupus erythematosus.

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Chong. *Analysis and interpretation of data:* Vasquez, Zhang, and Chong. *Drafting of the manuscript:* Vasquez and Chong. *Critical revision of the manuscript for important intellectual content:* Vasquez, Tseng, Victor, Zhang, and Chong. *Statistical analysis:* Vasquez and Zhang. *Obtained funding:* Chong. *Administrative, technical, and material support:* Vasquez, Tseng, and Victor. *Study supervision:* Chong.

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COMMENTS AND OPINIONS

Ustekinumab for Pyoderma Gangrenosum

I read with great interest the article by Guenova et al,[1] who showed a biological "proof of concept" with an increase expression of interleukin (IL)-23 in a pyoderma gangrenosum (PG) lesion before initiating ustekinumab therapy successfully. A wide number of local and systemic treatments have been tried for this difficult condition and, in the era of biological agents, new, targeted therapies are promising.[2]

However, in my view, the biological overexpression of IL-23 did not balance the benefit-risk ratio of initiating ustekinumab therapy in this peculiar case.[1] Most of the reported patients who have received treatment with anti–tumor necrosis factor (TNF) agents for PG had longstanding disease with multiple and sometimes disseminated lesions, and most importantly they experienced failure of several lines of systemic immunosuppressive therapies.[3,4] In contrast, Guenova et al[1] used ustekinumab straightaway, a biological agent that has never been used for this indication and for which long-term safety is not known. The patient had barely a 1-month history of isolated localized PG of the leg, which was neither life-threatening nor extending to muscle or tendon.[5]

Furthermore, tacrolimus ointment concentration (0.1% or 0.03%) and frequency of daily applications were not mentioned. The inefficiency of the tacrolimus treatment was evaluated after only 3 weeks, while longer duration of treatment should have been attempted. The authors state that there is no gold standard treatment or guidelines for PG, but common sense and published "recommendations" suggest systemic alternatives to corticosteroid therapy, such as cyclosporine, when these are not contraindicated.[5]

Pyoderma gangrenosum may be associated with hematologic malignancy and can sometimes precede the diagnosis of malignancy by several months. Initiating therapy with a biological agent in a young patient with a recent history of PG and short evolution is risky, and the authors did not have enough follow-up data to rule out such possibility when they initiated ustekinumab treatment.. The article does not mention any patient's written consent or authorization of the local ethical committee for such treatment.

Moreover, a 45-mg injection of ustekinumab costs more than €3000. It is debatable whether such expensive treatment is warranted when the patient might have benefited from a wide number of less expensive therapies that might have been as efficient as ustekinumab.[5] The authors did not compare their results with those of anti-TNF treatment. Even though a direct comparison is impossible, anti-TNF agents seem to provide complete healing faster than ustekinumab.[3,4]

In conclusion, the benefit-risk ratio was here not favorable for initiating ustekinumab treatment. The patient had no clinical indication for such new treatment: no disseminated lesions, no visceral involvement, no chronic evolution, no resistance to several lines of immunosuppressive therapies. Owing to the rarity of PG, it is unlikely that any large-scale trial will be conducted for ustekinumab treatment of PG. Such trials do not exist even for anti-TNF therapies. Ustekinumab will simply be added to the long list of isolated case report–based efficient therapies.

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