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The Effectiveness of 4% Niacinamide in A Case of Cutaneous Lupus

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Abstract

Background: Niacinamide, also called nicotinamide, is the active form of niacin (nicotinic acid, vitamin B3). Niacinamide's role in medicine continues to be studied due to its extensive effects and low toxicity. Various studies also suggest that niacinamide offers anti-inflammatory effects, improves the skin barrier, and acts as an anti-aging, brightening, and anticancer agent. Cutaneous lupus (CL) is a general term for a group of autoimmune connective tissue disorders affecting the skin that may be associated with systemic lupus erythematosus (SLE). There are plenty of treatment modalities for patients with CL, each with varying efficacy. Therapeutic options for CL can range from topical agents, including corticosteroids and calcineurin inhibitors, to systemic therapy, such as antimalarials, immunosuppressants, retinoids, thalidomide, and biological agents. Niacinamide is a topical agent widely used in various cases, one of which is CL. **Objective:** This case report aims to discuss the effectiveness of niacinamide as an adjuvant therapy in CL. **Case Presentation:** A 48-year-old woman with SLE and CL received systemic therapy consisting of methylprednisolone, hydroxychloroquine, and 4% niacinamide gel for 8 weeks. **Results:** Observations showed clinical improvement in CL lesions without any significant side effects. **Conclusion:** Therefore, 4% niacinamide gel therapy can be used as an adjuvant therapy.

Keywords: Cutaneous Lupus Erythematosus, Niacinamide

Case Report

INTRODUCTION

Systemic lupus erythematosus (SLE) is a general term for a group of autoimmune connective tissue disorders that affect the skin and other organs (Bitar et al., 2022). Cutaneous lupus (CL), one of the most common manifestations of SLE, has a refractory disease course and requires long-term therapy (Grönhagen & Nyberg, 2014). CL appears as a single skin disease or consists of one of several manifestations of SLE. Skin lesions appear in 70–80% of cases of SLE at some point during their course and maybe the initial disease manifestation in 25% of patients (Vale & Garcia, 2023). Until now, there is no specific and licensed therapy for CL; most therapeutic agents are off-label and often not supported by randomized controlled trials (RCT) (Kuhn et al., 2017).

First-line therapy of topical corticosteroids is usually associated with side effects such as skin atrophy, telangiectasis, and tachyphylaxis effects, which are characterized by decreasing efficacy over time (Mehta et al., 2016). The manifestations of CL vary highly. Therefore, therapy needs to be

adjusted to the patient's condition. Several topical agents have shown effectiveness as adjuvants for the treatment of CL, one of which is niacinamide (Nouh et al., 2023).

The role of niacinamide in the field of medicine continues to be studied due to its extensive effects and low toxicity (El Ters et al., 2020). Topical niacinamide preparations can be used for the treatment of discoid cutaneous lupus as an adjuvant with good cosmetic results and minimal side effects. This case report will discuss the selection of 4% niacinamide gel and its effectiveness as an adjuvant therapy in patients with CL.

CASE PRESENTATION

A 45-year-old woman complained of reddish spots on her face that spread to her hands and back. The spots felt a little itchy and grew redder, especially when exposed to sunlight. Complaints have gotten worse for the past 3 months and were accompanied by hair loss. The patient also felt joint pain in the fingers and toes. The patient was previously diagnosed with systemic lupus erythematosus (SLE) 11 years ago but did not undergo regular treatment.

Dermatological status in the facial and superior extremities regions showed erythematous patches and plaques and some hyperpigmentation accompanied by fine scales (Figure 1). Meanwhile, in some areas of the hair, there was non-cicatricial alopecia. A dermoscopic examination of the erythematous plaque area supported descriptions of CL (Figure 2).

Figure 1. Skin lesion of the face and superior extremities (□)

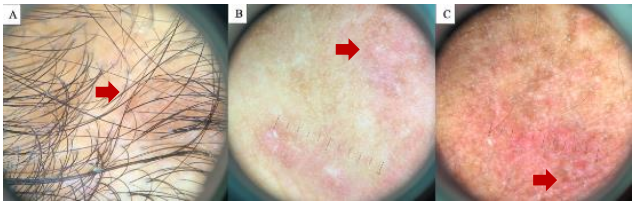

Figure 2. Dermoscopic findings: a) patchy white scales, b) scattered grey-brown peppering and c) dotted vessels

Laboratory examination showed a positive ANA test, an increase in ESR of 32 mm/hour, positive anti-dsDNA IgM with a value of 23.8 IU/mL, and positive anti-dsDNA IgG with a value of >200 IU/mL.

The patient was diagnosed with SLE (MEX-SLEDAI 11, lupus nephritis IIIA) and CL, and she received therapy in the form of hydroxychloroquine, methylprednisolone, calcium carbonate, and vitamin D3. As an adjuvant, 4% niacinamide gel was given. The patient was also advised to avoid sun exposure.

Observations in the fourth and eighth weeks showed clinical and dermoscopic improvements, especially in lesions in the facial area (Figure 3 and 4). The patient also did not complain of side effects such as heat or burning.

Figure 3. Follow up after 8 weeks, multiple hyperpigmented patch on *sun exposed area.*

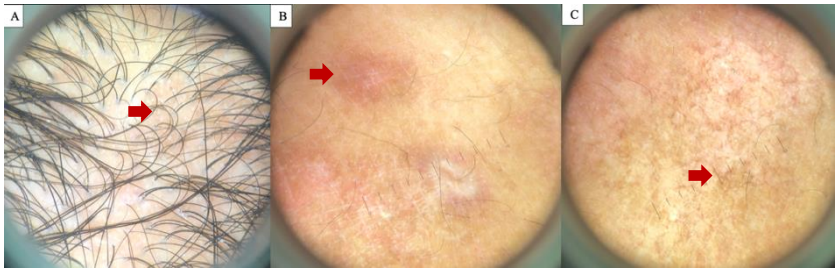

Figure 4. Dermoscopic findings: A) less erythematous, B) hyperpigmentation, C) scattered grey-brown peppering

DISCUSSION

The classification of Cutaneous Lupus (CL) is grouped according to the clinical characteristics of the lesion, namely acute cutaneous lupus erythematosus (ACLE), subacute cutaneous lupus erythematosus (SCLE), and chronic cutaneous lupus erythematosus (CCLE). This classification relates to the activity pattern and severity of systemic lupus erythematosus (SLE) (Curtiss et al., 2022).

SCLE is one form that is associated with mild or no SLE. Subacute CL lesions are photosensitive and occur primarily in sun-exposed areas, for instance, the upper back, shoulders, arm extensors, the V area of the neck, and, less commonly, the face, with variable clinical features (Jatwani S & Hearth Holmes MP, 2023). The annular form is marked by the presence of erythematous plaques accompanied by scales, which tend to merge and produce a polycyclic arrangement. In the patient, erythematous patch lesions and plaques were found on the face and forearms, which grew redder when exposed to sunlight (photosensitive) (Okon & Werth, 2013).

Approximately 50% of patients with SCLE meet the criteria for mild SLE (Fijałkowska et al., 2024). The most frequent symptoms are arthritis and myalgia, while severe systemic involvements such as vasculitis and nephritis occur in 10% of cases. Immunologically, 70% of cases have anti-Ro (SS-A) and ANA, and only 5% have anti-dsDNA (Gunawan & Soeroso, 2018). The patient experienced mild systemic symptoms such as fever and myalgia. Laboratory results showed positive ANA and dsDNA tests.

Dermoscopy images of CLE revealed a diverse blood vessel pattern with a pink-red background common to all CLE types (Behera et al., 2021). Notably, SCLE displayed more frequent occurrences of dotted vessels compared to other CLE subtypes. The examination also revealed clusters of brown to grey-blue dots known as "grey-brown peppering," scales, and mixed vascular patterns that could appear linear, wavy, or dotted in shape (Ürün et al., 2024).

Therapy for subacute CL comprises a combination of systemic and topical therapy (Verdelli et al., 2022). This patient was given 200 mg/day of oral hydrochloroquine and 8 mg/day of methylprednisolone. Meanwhile, for topical therapy, 2% niacinamide gel was given.

Failure of adequate treatment for CL results in morbidity, such as scarring, hair loss, and pigment changes, especially in dark-skinned individuals. This morbidity is permanent, which is why this condition heavily affects the patient's quality of life (McDaniel B et al., 2023). The main topical therapy, namely corticosteroids, shows side effects associated with long-term use, such as skin atrophy and telangiectasis. Therefore, alternative therapies with equivalent effectiveness are necessary (Kang & Kang, 2019).

Niacinamide is the active form of niacin (nicotinic acid, vitamin B3) soluble in water (Boo, 2021). Several reported benefits of niacinamide include reducing inflammation and oxidative stress, inhibiting mast cell degranulation and phosphodiesterase, and providing immunomodulatory effects. In the field of dermatology, niacinamide has been used widely for various diseases. In treating CL, niacinamide offers anti-inflammatory effects by controlling the transcription of signaling molecules mediated by NFκB. Niacinamide is also reported to provide a photoimmunoprotective effect because it is a precursor of nicotinamide adenine dinucleotide (NAD), which can give energy to irradiated cells. This effect can help repair photosensitive CL lesions. Another effect of niacinamide is that it improves hyperpigmentation by reducing the transfer of melanosomes in melanocytes and keratinocytes. There

have been a study conducted by Ahmed, et al. with the topical administration of 4% niacinamide on a patient with discoid CL reported effectiveness with no side effects. Topical administration of 4% niacinamide is reported to provide a superior response than a preparation with a 2% concentration, having more severe erythematous side effects. There was an improvement in the therapeutic response within 12 weeks of administering niacinamide gel (Damian, 2010; Nouh et al., 2023;). (Marques et al., 2024)

In this case report, providing 4% niacinamide gel to this patient as a 2-month therapy resulted in improvement in the lesions, which was reduced erythema and thinning of scales in several areas, both clinically and dermoscopically. In other words, it is considered relatively good in treating active lesions in other type of CL which is SCLE.

Therapy response can be assessed using measurable parameters, one of which is CLASI (Cutaneous Lupus Erythematosus Disease Area and Severity Index) (Lu et al., 2021). CLASI consists of two components: the activity of the disease and the degree of damage caused by the disease (Abbas et al., 2023). The activity score is calculated by evaluating the severity of skin symptoms, including erythema, scaling, mucous membrane, and non-scarring hair loss. The degree of damage is assessed based on dyspigmentation and scar tissue, including alopecia scar tissue (Chakka et al., 2021)

The Dermatology Life Quality Index (DLQI) is a self-reported questionnaire that measures the impact of skin conditions on patients' daily lives. The higher the score, the more severe the impact on quality of life (Hinduja et al., 2023) (Szabó et al., 2022). In this case, the activity score for the lesion showed significant improvements, while the damage score tended to remain unchanged. In this case, there were no significant side effects. DLQI score also indicating a significant improvement in quality of life due to their skin condition.

CONCLUSION

In this case report, a topical therapy using 4% niacinamide gel for 8 weeks provided significant clinical improvements, including reduced erythema and thinning of scales in the case of subacute cutaneous lupus erythematosus (SCLE). These findings suggest that niacinamide, which reduces inflammatory reactions on the skin and acts as a brightening agent and photoprotector, is an effective adjuvant therapy in the treatment of SCLE. Its effectiveness is also supported by minimal side effects observed with long-term use. As an adjuvant, it is considered relatively effective in the treatment of SCLE. As a replacement therapy, further studies with a larger sample size and longer follow-up are essential. This necessity arises because, in this case report, the patient continued to receive primary therapies.

REFERENCES

Abbas, L. F., Nandy, K., & Chong, B. F. (2023). Classification of disease damage and activity in cutaneous lupus erythematosus: A cross-sectional analysis. *Journal of the American Academy of Dermatology*, *88*(1). https://doi.org/10.1016/j.jaad.2022.04.045

Behera, B., Kumari, R., Gochhait, D., & Ayyanar, P. (2021). Dermoscopic appearance of an annular subacute cutaneous lupus erythematosus. In *Dermatology Practical and Conceptual* (Vol. 11, Issue 2). https://doi.org/10.5826/dpc.1102a13

Bitar, C., Menge, T. D., & Chan, M. P. (2022). Cutaneous manifestations of lupus erythematosus: a practical clinicopathological review for pathologists. In *Histopathology* (Vol. 80, Issue 1). https://doi.org/10.1111/his.14440

Boo, Y. C. (2021). Mechanistic basis and clinical evidence for the applications of nicotinamide (Niacinamide) to control skin aging and pigmentation. In *Antioxidants* (Vol. 10, Issue 8). https://doi.org/10.3390/antiox10081315

Chakka, S., Krain, R. L., Concha, J. S. S., Chong, B. F., Merola, J. F., & Werth, V. P. (2021). The CLASI, a validated tool for the evaluation of skin disease in lupus erythematosus: a narrative review. *Annals of Translational Medicine*, *9*(5). https://doi.org/10.21037/atm-20-5048

Curtiss, P., Walker, A. M., & Chong, B. F. (2022). A Systematic Review of the Progression of Cutaneous Lupus to Systemic Lupus Erythematosus. In *Frontiers in Immunology* (Vol. 13). https://doi.org/10.3389/fimmu.2022.866319

Damian, D. L. (2010). Photoprotective effects of nicotinamide. In *Photochemical and Photobiological Sciences* (Vol. 9, Issue 4). https://doi.org/10.1039/b9pp00146h

El Ters, M., Zhou, X., Lepping, R. J., Lu, P., Karcher, R. T., Mahnken, J. D., Brooks, W. M., Winklhofer, F. T., Li, X., & Yu, A. S. L. (2020). Biological Efficacy and Safety of Niacinamide in Patients With ADPKD. *Kidney International Reports*, *5*(8). https://doi.org/10.1016/j.ekir.2020.06.002

Fijałkowska, A., Kądziela, M., & Żebrowska, A. (2024). The Spectrum of Cutaneous Manifestations in Lupus Erythematosus: A Comprehensive Review. In *Journal of Clinical Medicine* (Vol. 13, Issue 8). Multidisciplinary Digital Publishing Institute (MDPI). https://doi.org/10.3390/jcm13082419

Grönhagen, C., & Nyberg, F. (2014). Cutaneous lupus erythematosus: An update. *Indian Dermatology Online Journal*, *5*(1), 7. https://doi.org/10.4103/2229-5178.126020

Gunawan, H., & Soeroso, J. (2018). The Coexistence of Systemic Lupus Erythematosus and Psoriasis: Is It Possible? The coexistence of SLE and psoriasis: Is it possible? In *Acta Med Indones-Indones J Intern Med* • (Vol. 50, Issue 2).

Hinduja, N., Mv, P., Padhee, S., Maikap, D., Padhan, P., Kar, H. K., Misra, R., Srinivas, C. R., & Ahmed, S. (2023). Assessment of cutaneous disease activity in early lupus and its correlation with quality of life: a cross-sectional study. *Rheumatology International*, *43*(10). https://doi.org/10.1007/s00296-023-05353-y

Jatwani S, & Hearth Holmes MP. (2023, July 31). *Subacute Cutaneous Lupus Erythematosus*. StatPearls.

Kang, Sewon., & Kang, S. (2019). *Fitzpatrick's dermatology*. McGraw-Hill Education.

Kuhn, A., Aberer, E., Bata-Csörgő, Z., Caproni, M., Dreher, A., Frances, C., Gläser, R., Klötgen, H. W., Landmann, A., Marinovic, B., Nyberg, F., Olteanu, R., Ranki, A., Szepietowski, J. C., & Volc-Platzer, B. (2017). S2k guideline for treatment of cutaneous lupus erythematosus – guided by the European Dermatology Forum (EDF) in cooperation with the European Academy of Dermatology and Venereology (EADV). In *Journal of the European Academy of Dermatology and Venereology* (Vol. 31, Issue 3). https://doi.org/10.1111/jdv.14053

Lu, Q., Long, H., Chow, S., Hidayat, S., Danarti, R., Listiawan, Y., Deng, D., Guo, Q., Fang, H., Tao, J., Zhao, M., Xiang, L., Che, N., Li, F., Zhao, H., Lau, C. S., Ip, F. C., Ho, K. M., Paliza, A. C., … Lin, C. S. (2021). Guideline for the diagnosis, treatment and long-term management of cutaneous lupus erythematosus. *Journal of Autoimmunity*, *123*. https://doi.org/10.1016/j.jaut.2021.102707

Marques, C., Hadjab, F., Porcello, A., Lourenço, K., Scaletta, C., Abdel-Sayed, P., Hirt-Burri, N., Applegate, L. A., & Laurent, A. (2024). Mechanistic Insights into the Multiple Functions of Niacinamide: Therapeutic Implications and Cosmeceutical Applications in Functional Skincare Products. *Antioxidants*, *13*(4), 425. https://doi.org/10.3390/antiox13040425

McDaniel B, Sukumaran S, Koritala T, & et al. (2023, August 28). *Discoid Lupus Erythematosus*. StatPearls.

Mehta, A. B., Nadkarni, N. J., Patil, S. P., Godse, K. V., Gautam, M., & Agarwal, S. (2016). Topical corticosteroids in dermatology. In *Indian Journal of Dermatology, Venereology and Leprology* (Vol. 82, Issue 4). https://doi.org/10.4103/0378-6323.178903

Nouh, A. H., Elshahid, A. R., Kadah, A. S., & Zeyada, Y. A. (2023). Topical niacinamide (Nicotinamide) treatment for discoid lupus erythematosus (DLE): A prospective pilot study. *Journal of Cosmetic Dermatology*, *22*(5). https://doi.org/10.1111/jocd.15628

Okon, L. G., & Werth, V. P. (2013). Cutaneous lupus erythematosus: Diagnosis and treatment. In *Best Practice and Research: Clinical Rheumatology* (Vol. 27, Issue 3). https://doi.org/10.1016/j.berh.2013.07.008

Szabó, Brodszky, V., & Rencz, F. (2022). A comparative study on the measurement properties of Dermatology Life Quality Index (DLQI), DLQI-Relevant and Skindex-16*. *British Journal of Dermatology*, *186*(3). https://doi.org/10.1111/bjd.20765

Ürün, Y. G., Ürün, M., & Danişman, M. Ş. (2024). Dermoscopic Characteristics of Cutaneous Lupus Erythematosus According to Subtype, Lesion Location, Lesion Duration, and CLASI Score. *Dermatology Practical and Conceptual*, *14*(1). https://doi.org/10.5826/dpc.1401a40

Vale, E. C. S. do, & Garcia, L. C. (2023). Cutaneous lupus erythematosus: a review of etiopathogenic, clinical, diagnostic and therapeutic aspects. In *Anais Brasileiros de Dermatologia* (Vol. 98, Issue 3). https://doi.org/10.1016/j.abd.2022.09.005

Verdelli, A., Corrà, A., Mariotti, E. B., Aimo, C., Ruffo di Calabria, V., Volpi, W., Quintarelli, L., & Caproni, M. (2022). An update on the management of refractory cutaneous lupus erythematosus. In *Frontiers in Medicine* (Vol. 9). https://doi.org/10.3389/fmed.2022.941003