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Case Report

Acquired Reactive Perforating Collagenosis Successfully Treated with Narrow-band Ultraviolet B: A Case Report

Alessandro Alfieri[1], Arief Budiyanto[1*], Viensa Ryoto[1], Satiti Retno Pudjiati[1]

[1]Department of Dermatology and Venereology, Faculty of Medicine, Nursing, and Public Health, University of Gadjah Mada/ Dr. Sardjito General Hospital, Yogyakarta, Indonesia.

Abstract

Acquired reactive perforating collagenosis (ARPC) is a form of dermatoses, that is characterized by transepidermal elimination of collagen fibers through the epidermis. Management of ARPC becomes a challenge due to the lack of an established standard treatment protocol. In patients who do not respond to conventional therapy, narrowband ultraviolet B (NB-UVB) has become an option. In our case report, a 51-year-old male patient presented with erythematous papules and nodules throughout his body with a history of chronic kidney disease, hepatitis B infection, diabetes mellitus, and hypertension. A diagnosis of ARPC through clinical examination, histopathology, and immunochemistry examination was confirmed. After one year course of therapy, including oral therapy (corticosteroid and antihistamine) and topical therapy (a combination of topical salicylic acid with corticosteroid), the patient still showed no improvement. After the administration of NB-UVB phototherapy (three times a week for two and a half months), the lesions were significantly improved. This case report highlights the efficacy of NB-UVB in ARPC that did not improve with traditional management.

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Introduction

Acquired reactive perforating collagenosis (ARPC) is a form of acquired perforating dermatosis associated with various chronic systemic diseases and is characterized by transepidermal elimination of altered collagen through the epidermis.[1-3] Although a clinical practice guide for perforating dermatoses has been published, there is currently no universally accepted standardized treatment protocol for ARPC.[4] Furthermore, the recommendations provided in the guideline are largely based on low-level evidence, primarily derived from case reports, case series, and expert opinion.[4] Therapeutic agents such as keratolytics, retinoids, and corticosteroids are often used in daily practice, and more innovative approaches such as the use of narrowband ultraviolet B (NB-UVB) in ARPC has shed light into improving pruritus and cutaneous manifestations of ARPC, which is generally the main goals of ARPC treatment.[5]

It is widely known that individuals receiving hemodialysis for chronic renal failure can effectively decrease their pruritus with broadband UVB phototherapy. Degradation or inactivation of prurigenic components, modifications to the sensory nerve, and inhibition of mast cell degranulation are some potential mechanisms of the antipruritic impact. NB UVB can have comparable outcomes.[6]

Additionally, a severity classification has been established for perforating dermatoses, particularly adapted from the Eczema Area and Severity Index

Address for correspondence
Dr. Arief Budiyanto, MD, Ph.D
Department of Dermatology and Venereology, Faculty of Me dicine, Nursing, and Public Health, University of Gadjah Mada/ Dr. Sardjito General Hospital, Yogyakarta, Indonesia.
Ph: +62811250725; Email: drariefb@ugm.ac.id

(EASI) to aid in determining treatment efficacy or clinical improvement, which may be useful in determining therapeutic effects of a particular drug.[4]

This study aims to underline important therapeutic effects of NB-UVB in ARPC patients irresponsive with conventional treatment.

Case Report

A 51-year-old male patient with skin rash and severe pruritus all over his body for one and a half years was referred to the Dermatology and Venereology Outpatient Clinic. The patient stated that his pruritus worsened, especially during sweating and in hot weather. His medical history revealed chronic kidney failure due to urinary tract stones, hepatitis B, diabetes mellitus, hypertension, and smoking habit. This patient consumed a few medications: valsartan 80 mg, amlodipine 10 mg, and metformin 500 mg daily.

The examination of skin lesions showed multiple erythematous papulonodular lesions, and some with central umbilication and keratinous plugs. Histopathological results showed an invaginated epidermis with neutrophils, lymphocytes, histiocytes, and eosinophils **(Figure 1)**. There were collagen fibers in the invaginated epidermal area on Masson's trichrome. These findings supported the diagnosis of acquired reactive perforating collagenosis (ARPC), a subtype of acquired perforating dermatosis (APD).

Based on the diagnosis, the patient received several therapies: cetirizine 10 mg (once a day) and 15g combination of 3% salicylic acid plus 0.25% desoximethasone ointment in 100 ml oleum cocos (coconut oil), twice daily. The patient routinely checked himself once a month for one year, but the pruritus and skin lesions persisted. Because of these complaints, the patient received other therapies such as methylprednisolone, doxycycline, and hydroxyzine, but there was no improvement.

Owing to persistent complaints, the patient's therapy was replaced with NB-UVB phototherapy three times a week with an initial dose of 400 mJ/cm^2 and the use of dexamethasone ointment was continued. The dose of NB-UVB phototherapy was increased by 20% per week. After 30 sessions of phototherapy, the pruritus and skin lesions improved. In calculating the severity of the classification of perforating dermatoses, the patient had a severity score of 22.8, or severe, at the time of arrival. After 30 sessions of NB-UVB phototherapy, the patient's severity score was 2.2 or mild (90.35% improvement) **(Figure 2)**.

Discussion

According to a study by Faver *et al*. (1994)[7], ARPC can be established if there are three criteria, namely (i) histopathological findings in the form of transepidermal elimination of collagen tissue, (ii) clinical features in the form of umbilicated papules or nodules with a central hyperkeratotic plug, and (iii) skin lesions appear after 18 years of age. In this case, the patient's diagnosis was established as ARPC because these three criteria were fulfilled. The pathogenesis of ARPC remains unclear, but

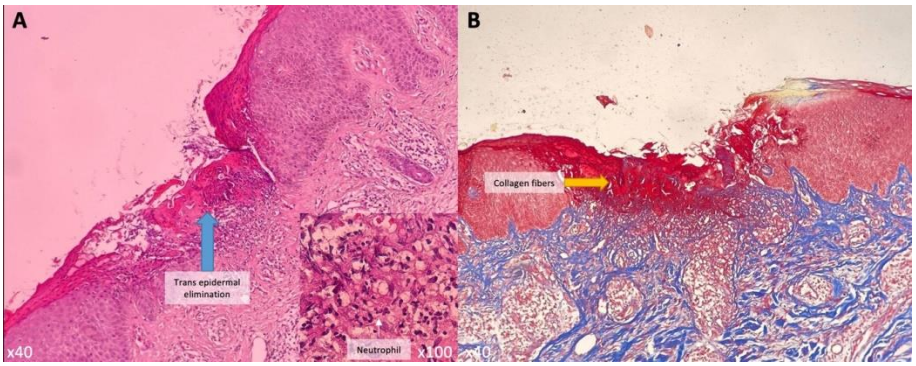

Figure 1 Histopathology diagnosis of ARPC. (A) Hematoxylin & Eosin staining showing an invaginated epidermis, accompanied by infiltration of neutrophils, lymphocytes, histiocytes, and eosinophils in the upper dermis, (B) Masson's Trichrome staining showing a strong blue-stained collagen fibers, including in the invaginated area

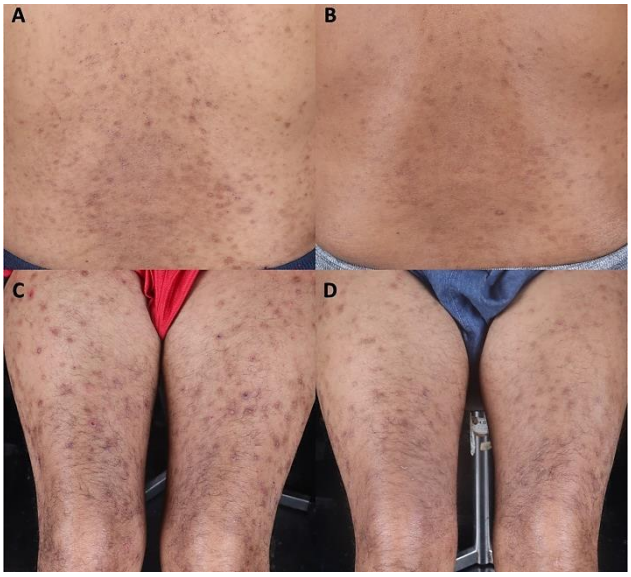

Figure 2 Improvement of ARPC after 30 session of NB-UVB treatment (A, C) Lower back and upper limbs area before phototherapy (total severity score: 22.8), (B, D) Lower back and upper limbs area after 30 sessions of NB-UVB phototherapy (total severity score: 2.2)

microtrauma in predisposed patients can trigger trans-epidermal elimination and collagen degeneration. It is possible that insufficiency of blood supply due to microangiopathy contributes to the breakdown of collagen and causes a local inflammatory reaction.[7] The presence of leukocyte infiltration is also a predisposing factor for focal necrobiosis in tissues.[7]

Currently, there is no effective single therapy for ARPC. In the literature, there are many therapeutic options with various efficacy, ranging from oral, intralesional, and topical corticosteroids; oral and topical retinoids, doxycycline, hydroxychloroquine, dapsone, methotrexate, antihistamines, allopurinol, cryotherapy, and phototherapy.[8] In this case, the patient has tried several available conventional therapeutic options for one year, ranging from topical corticosteroids, topical salicylic acid, and doxycycline, but the complaints of pruritus and skin lesions are still often felt by the patient. Due to persistent patient complaints, conventional therapies were replaced with NB-UVB phototherapy together with topical corticosteroids.

Kawakami *et al*. (2020) made a classification called the severity classification of perforating dermatoses, which was adopted from the eczema area and severity index (EASI) score used for atopic dermatitis.[5] Despite not reaching full remission, the patient's clinical symptoms improved from an initial severe state to a mild state based on the classification system.

A significant improvement in pruritic symptoms after the use of NB-UVB, with no recurrences when evaluated in monthly follow-ups, has been reported in Gambichler *et al.* study on a patient with perforating dermatoses.[9] The regimen consisted of 5 times per week for two weeks, and continues with a 3 times per week for an additional four week, which in total accumulated into a six-week NB-UVB administration. The initial dose was 0.1J/cm^2, gradually increasing into a cumulative dose of 12 J/cm^2. Gao *et al.* found that in addition to NB-UVB administration, 100mg/day of oral doxycycline is found to show good results in patients with perforating dermatoses.[10] The initial NB-UVB dose of 400 mJ/cm^2 was gradually increased to 1200 mJ/cm^2, for a total cumulative dose of 16,700 mJ/cm^2. A significant improvement in lesion and symptoms are observed after six weeks of consistent phototherapy.

Additionally, previous studies have proven the effectiveness of broadband UVB and NB-UVB in reducing pruritus in patients with chronic kidney failure who are undergoing hemodialysis. This may happen as a results of sensory neuron alteration, mast cell degranulation suppression, or breakdown or inactivation of pruritogenic components.[9] Despite that, the role of NB-UVB in ARPC remains in the grey area, where some postulates that NB-UVB helps inhibit neutrophil infiltration and modulate immune function in patients with ARPC.[10] The pathogenesis of perforating dermatoses highlighted the role of neutrophils as the major cells that induce disease progression by releasing matrix metalloproteinases and other serine proteases to obliterate the epidermis' basement membrane.[11]

Conclusion

Herein, we report a case of ARPC that was

successfully treated with NB-UVB phototherapy in a patient with a history of multiple chronic systemic diseases. We recommend the use of NB-UVB phototherapy in patients with ARPC in whom conventional therapy has failed. Phototherapy NB-UVB may represent a potential therapeutic option in selected patients; however, further studies with higher evidence-based level are required to establish its efficacy, optimal treatment protocol, and underlying mechanisms.

Declaration of patient consent Author certify that they had obtained all appropriate patient consent.

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Conflict of interest No conflict of interest.

Author's contribution

AA: Identification, diagnosis and management of the case, manuscript writing and critical review it.

AB: Diagnosis and management of the case, manuscript writing and critical review it.

VR: Identification, diagnosis of the case, manuscript writing.

SRP: Diagnosis and management of the case, critical review of the manuscript.

All authors have given final approval of the version to be published and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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