Dermatology Practical & Conceptual

Photodynamic Therapy with 5-Aminolevulinic Acid for Cosmetic-Induced Acne Fulminans: Case Report and Literature Review

Ran An[1], Rui Liu[1], Hui Gu[1]

1 Department of Dermatology, The People's Hospital of Jianshui, Jianshui, Yunnan, China

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Corresponding Author: Rui Liu, MD, Department of Dermatology, The People's Hospital of Jianshui, Jianshui, Yunnan 654399, China. E-mail: ar506529014@outlook.com

Introduction

Acne fulminans (AF) is a rare, explosive variant of inflammatory acne marked by rapidly progressing nodulocystic lesions, hemorrhagic crusts, and systemic symptoms. Standard therapy combines oral corticosteroids with isotretinoin, but teratogenic risk and systemic adverse effects may limit acceptance among females of reproductive age [1,2]. We report a non-systemic regimen—5-aminolevulinic acid photodynamic therapy (ALA-PDT) plus supramolecular salicylic acid (SSA)—for AF occurring after use of a non-compliant cosmetic product, with positive patch-test reactivity to the product.

Case Presentation

A 25-year-old female with a history of acne developed intense facial burning and erythema shortly after using a non-compliant "whitening and anti-acne" cosmetic. Within three days she had extensive inflammatory papules, pustules, hemorrhagic nodules, and purulent crusts on both cheeks and the jawline, with fatigue, fever (38.5° C), and elevated inflammatory markers (WBC, CRP, ESR), consistent with acne fulminans. She declined systemic steroids and isotretinoin because of concerns about adverse effects and teratogenicity. Standardized closed patch testing with the patient's product (neat and 1:10 in petrolatum; 48-h occlusion) yielded positive (++) reactions at 48/72 h, while petrolatum and blank controls were negative. VISIA® imaging showed diffuse inflammatory erythema with telangiectatic dilation in the same regions, and dermoscopy at the test site revealed diffuse background erythema with scattered dotted and short linear vessels (Figures 1A–E).

Because she declined systemic therapy, we initiated weekly ALA-PDT plus 30% supramolecular salicylic acid (SSA) for four sessions. Each visit included gentle cleansing, a 3-minute application of 30% SSA (controlled-release) to affected areas, removal with a mild cleanser, application of

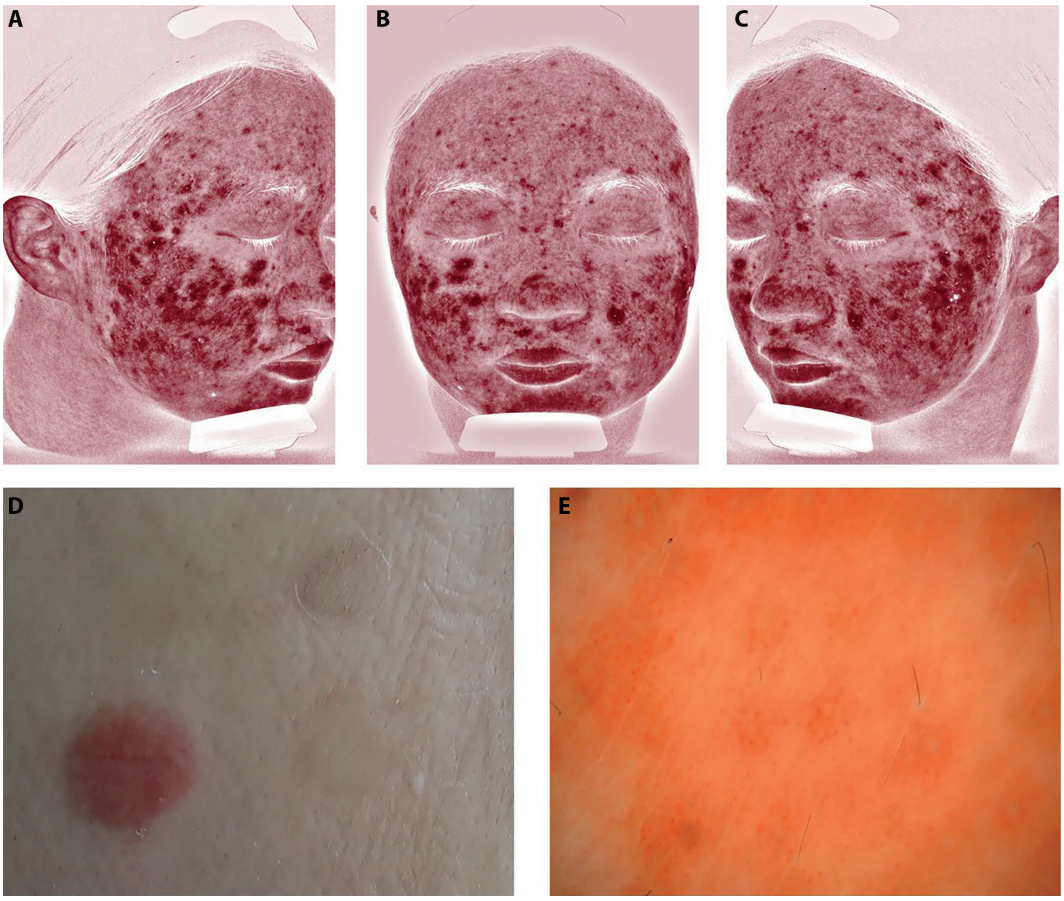

Figure 1. (A–C) VISIA® skin analysis of the cheek demonstrates pronounced, diffuse inflammatory erythema with noticeable capillary/telangiectatic dilation in the same area. (D) At 72 h after standardized closed patch testing with the patient's non-compliant cosmetic product, the left cheek test site showed erythema, infiltration/induration, papules, and small vesicles with marked pruritus, whereas the contralateral right cheek control (petrolatum vehicle) showed no reaction. (E) Dermoscopy of the test site revealed diffuse background erythema with scattered dotted and short linear vessels.

5% ALA cream under sterile gauze occlusion for 30 minutes, and illumination with 635 nm LED at 50 mW/cm² to a total fluence of 150 J/cm². After one session, most hemorrhagic/purulent crusts and suppurative nodulocystic lesions had subsided. By the fourth session, inflammatory papules had improved by approximately 80%, with marked reductions in pain, erythema, and swelling; only mild atrophic scarring persisted. No notable adverse event occurred, and no recurrence was observed on follow-up (Figures 2A–F).

Conclusion

This case highlights AF—occurring after exposure to a non-compliant cosmetic product with positive patch-test reactivity—successfully managed without systemic agents using ALA-PDT plus SSA. Published evidence on ALA-PDT for AF remains scarce but includes two case-level reports describing rapid clinical improvement and good tolerability, despite heterogeneous parameters and use as mono- or adjunct therapy [4,6] (Table 1). Mechanistically, ALA-PDT promotes intrafollicular protoporphyrin IX accumulation and reactive oxygen species formation, reducing Cutibacterium acnes, modulating inflammation, and attenuating sebaceous activity [3,4], while SSA provides keratolysis and additional anti-inflammatory effects that relieve follicular occlusion and may aid barrier recovery [5]. For reproductive-age patients who decline or cannot tolerate systemic therapy, this topical/physical combination may offer rapid disease control with favorable tolerability. Larger series are warranted to confirm efficacy, refine parameters (photosensitizer concentration, occlusion time, fluence, session number), and define its role within stepwise AF management alongside careful identification and avoidance of potential external triggers.

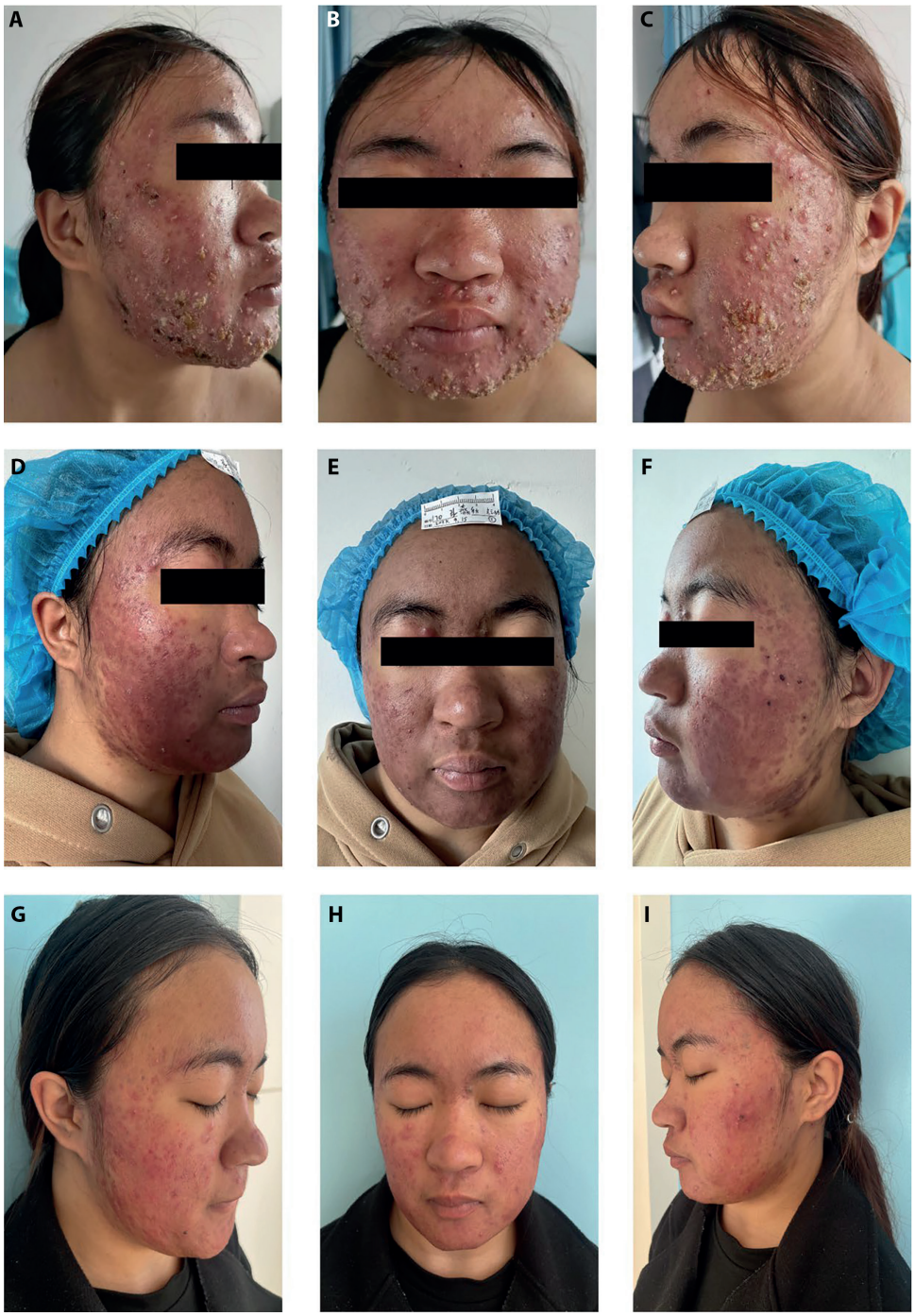

Figure 2. (A–C). The cheeks exhibit extensive hemorrhagic and purulent crusts covering coalescent suppurative nodulocystic lesions. (D–F) After a single session of photodynamic therapy combined with supramolecular salicylic acid, most hemorrhagic and purulent crusts as well as purulent nodulocystic lesions had subsided. (G–I) Following four sessions, the majority of inflammatory papules resolved, with no recurrence observed during follow-up.

Table 1. 5-ALA Photodynamic Therapy in Acne Fulminans: Summary of Published Cases and the Present Case.

Author (Year)	Age/Sex	PDT Parameters	Adjunct Therapy	Outcome (Follow-up)
Hao & Wang, 2020, China	23 M	20 % ALA, 3 h occlusion; red-light LED (wavelength NR); 2 sessions	Oral isotretinoin 0.5 mg/kg/d	Complete remission after 2 sessions; no relapse at 6 months
Picone et al., 2022, Italy	18 M	ALA conc. NR, 3 h; red-light LED 630 nm; 3 weekly sessions	None reported	Complete clearance; scar remodeling at 2 months

Patient Consent: The authors have obtained the consent of the patient for clinical images.

Data Availability: Data will be made available on request.

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