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Published in:
Clinical and Experimental Dermatology

DOI:
10.1111/ced.14518

Publication date:
2021

Citation for published version (APA):
A new approach to Actinic Folliculitis: prophylactic narrowband UVB phototherapy

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Funding sources: none

Conflicts of interest: none declared

This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/CED.14518

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What’s already known about this topic?

- Actinic folliculitis is a rare idiopathic photodermatosis presenting with a photodistributed monomorphic pustular eruption.
- Actinic folliculitis encompasses both acne aestivalis and superficial actinic folliculitis. The aetiology currently remains unknown.

What does this study add?

- We demonstrate the successful use of phototesting, using UVA provocation as a diagnostic tool in actinic folliculitis.
- We report on the first cases of successful management of actinic folliculitis using prophylactic narrowband Ultraviolet B (nb-UVB) phototherapy.
Summary

Background: We have observed an increasing number of patients referred to the Scottish Photobiology Service (SPS), who are diagnosed with Actinic Folliculitis (AF) and have positive phototesting. Treatment options for AF are limited, with only few reports in the literature. The use of prophylactic narrowband Ultraviolet-B (nb-UVB) phototherapy for AF has not previously been described and we report on this for the first time.

Aim: We analysed the clinical characteristics, phototesting results and responses to treatment for patients with AF diagnosed in the SPS.

Methods: We undertook a retrospective review over a ten-year period of all case notes of patients who were assessed and diagnosed with AF through the SPS, based in the Photobiology Unit, Dundee, Scotland.

Results: All 10 patients were female. Mean age of onset was 25 years; mean time to referral for investigation was seven years. The commonest site involved was the face, with the main clinical feature being monomorphic pustules appearing following sunlight exposure. The eruption was provoked with iterative doses of broadband UVA irradiation in five patients. All patients were offered photoprotective advice and prophylactic nb-UVB phototherapy. Five patients proceeded with phototherapy; four completed the desensitisation course and all four reported either a delay in symptom onset or total prevention of rash induction, with complete efficacy of desensitisation maintained for three years in one patient.

Conclusion: We demonstrate the successful use of UVA provocation testing as a diagnostic tool in AF. Additionally, we recommend the use of prophylactic nb-UVB phototherapy in AF as an effective and well-tolerated approach.

Introduction

Actinic folliculitis (AF) is a rare photodermatosis, which classically presents with clusters of monomorphic pustules on photo-exposed sites following sunlight exposure. We have been increasingly aware of such patients referred to the Scottish Photobiology Service (SPS), a tertiary photodiagnostic service, based at the Photobiology Unit in Dundee, Scotland. We sought to
describe the clinical features and phototesting findings of these patients diagnosed with AF and offer insights into the successful use of Narrowband UVB (nb-UVB) phototherapy.

**Patients & Methods**

This case series included all patients with a diagnosis of AF who presented to the SPS between January 2010 and December 2019. We retrospectively reviewed the case notes and investigation findings of patients identified. Consent was obtained from all patients.

Phototesting was undertaken on the back using a monochromator irradiation device (Bentham, Reading UK), with dose-series at UVB, UVA and visible wavebands (305±[half maximum bandwidth]5nm, 335±27nm, 365±27nm, 400±27n and430±27nm). Erythemal responses (minimal erythema doses; MEDs) were assessed immediately and at seven and 24 hours. Broadband UVA provocation (5-20 Jcm⁻²) was performed at a typically affected site using the metal halide UVASPOT 400T (Hönle, Munich Germany), with responses reviewed 24 hours following iterative doses over two days.

**Clinical Features**

All 10 patients were female. Mean age of onset was 25 (range 16 - 35) years, with mean time to presentation for investigation being 7 (range 2 - 12) years. Photo-exposed sites were commonly involved, typically the face (100%, n = 10), followed by chest (50%, n = 5), neck (50%, n = 5), back (40%, n = 4) and limbs (20%, n = 2) *(Table 1)*.

The most notable clinical feature was clustered monomorphic pustules, seen in all patients *(Figure 1)*. Other common features were erythema (80%, n = 8), scale (30%, n = 3), itch and a preceding tingling sensation (20%, n = 2). Papules were reported in one, tightness in another and resolution with fine scars that eventually resolved was also reported by one patient (10%, n = 1 respectively). All patients reported symptoms developing shortly after exposure to sunlight with a range of onset of 15 minutes to one week. The eruption resolved between two days and three weeks. Two patients also reported the phenomenon of hardening by the end of summer.

Both UK and overseas sunlight exposure was reported as a trigger. Two patients reported sunlight in the UK triggered the eruption, 3 patients reported sunlight on holiday alone and 5 patients reported both sunlight in the UK and on holiday triggered the eruption. Window glass-
transmitted sunlight could induce the eruption in six patients. Medications were the combined oral contraceptive (n=2) and amitriptyline (n=1), but were not considered relevant. Sunscreens could delay symptom onset in 3 patients.

One patient reported her mother had a similar sunlight-induced eruption, which resolved over time. There was a family history of atopy (n=2), psoriasis (n=2) and acne (n=2).

Investigation findings

Bacterial and fungal swabs and culture and antinuclear antibodies and extractable nuclear antigen were negative in all patients. Fungal scrapings showed hyphae on microscopy in one patient who also had concurrent pityrosporum folliculitis. Importantly, we felt this was a coincidental to the main presentation as she only had the eruption provoked by sunlight exposure. Scraping from the UVA positive site were negative for pityrosporum.

Monochromator phototesting was normal in all cases except one (patient 9), who had abnormally low 24-hour UVA MEDs (centred at 335 and 365nm). Iterative broadband UVA irradiation provoked a pustular rash in keeping with described symptoms in five patients (Table 1 & Figure 2). In one further patient minimal erythema was induced, whilst the remaining four cases were negative. Photopatch testing was performed in two patients and was negative. Nb-UVB MED was in the normal reference range in all cases including those who did not receive nb-UVB as a treatment.

Management

Photoprotection in the form of behavioural modification, environmental advice, clothing and hat choices and broadspectrum sun protection factor 50 sunscreen was advised for all patients. The patient with coincidental pityrosporum folliculitis was treated with topical ketoconazole.

All patients were offered prophylactic nb-UVB phototherapy (Philips, Eindhoven) and five proceeded with treatment, planned for three times weekly over 5 weeks. The remaining five either declined treatment due to inconvenience, opted for alternative treatment or have yet to initiate treatment due to suspended services in the context of the 2020 COVID pandemic. Of those who proceeded with nb-UVB phototherapy two reported full resolution of their symptoms in terms of complete prevention of induction of further episodes, one patient reported a
moderate reduction in symptoms and delayed onset, indicative of partially effective prophylaxis and they have planned further sessions. Another patient reported mild improvement in the form of delayed onset of rash induction. One of the patients reported no improvement with phototherapy but discontinued early, after only six treatments. No side effects were reported.

One patient had trialled a tetracycline (type unknown) prior to referral to our centre, with resolution of rash, although recurrence on drug cessation. We also recommended lymecycline 408mg once daily for one patient, but with no effect.

Discussion

Hjorth et al described a seasonal acneiform eruption in 1972 and called this ‘Acne Aestivalis’ (AA) or ‘Mallorca Acne’\(^1\). A monomorphic pustular eruption on photodistributed sites following sunlight exposure was reported in 40 Scandinavian patients vacationing in the Mediterranean during springtime. Similar to our cohort, this predominantly affected women (female = 37) and young adults, between 20 - 30 years old. Conventional acne treatment was not found to be helpful.

An analogous entity Actinic Superficial Folliculitis (ASF) was described in 1985 by Neiboer. He reported two cases of a photoinduced non-pruritic superficial pustular eruption presenting in a similar distribution to AA\(^2\). In 1985 Verbov postulated that AA and ASF were the same entity due to the prominent overlap of clinical features and suggested they both be classified as AF\(^3\).

Phototesting has not always been reported to produce the eruption in AF. However, in our case-series we were able to induce the eruption in half of the patients, through the use of iterative broadband UVA provocation. The pathogenesis of AF is thought to predominantly implicate UVA radiation, as supported by the spring time incidence and the trigger of sunlight exposure through window glass\(^4,5\). An additional hypothesis is that follicular gland occlusion may result from epidermal thickening induced by UV radiation\(^6\). However, the aetiology remains elusive and as such AF remains an idiopathic photodermatosis.

Few successful treatment options have been described in the literature, with three cases of response to topical tretinoin\(^1,6\) and three cases to oral isotretinoin\(^4,7\) being described. Several of
our patients reported the phenomenon of hardening toward the end of summer supporting our proposition for the use of prophylactic nb-UVB phototherapy. The majority of those who did engage with the full course of treatment found a moderate to complete resolution of AF induction for the duration of that year, with the hardening effect being maintained for three years in one subject. We think that narrowband UVB should be discussed as a treatment option with patients. For many patients an advantage is not having to take a systemic medication. A disadvantage of phototherapy is that treatment often requires repeated hospital visits, although this inconvenience can be mitigated with the use of home phototherapy. We wished to highlight the use of prophylactic nb-UVB phototherapy as an effective and safe therapy for AF.

Acknowledgment: We would like to thank Hannah Naasan for her contribution to these cases.
References


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<th>Patient</th>
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<th>Site</th>
<th>Time to onset/clearance</th>
<th>Clinical features</th>
<th>Iterative UVA provocation</th>
<th>Management</th>
<th>Follow up</th>
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<tbody>
<tr>
<td>1</td>
<td>28/F/II</td>
<td>Lower face (chin, cheeks, nose, upper lip)</td>
<td>2 hours/6 days</td>
<td>Small erythematos papules, evolves to monomorphic pustules</td>
<td>2 x 20 Jcm⁻²</td>
<td>Forearm: grade 1 erythema</td>
<td>Photoprotection*</td>
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<td>Back: grade 1 erythema</td>
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<tr>
<td>2</td>
<td>34/F/II</td>
<td>Face, neck, upper chest, back, frontal scalp</td>
<td>15 minutes/5 days</td>
<td>Erythema, pruritus, monomorphic pustules</td>
<td>2 x 20 Jcm⁻²</td>
<td>Right chest: Pustular response</td>
<td>Photoprotection*</td>
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<td>Back: grade 1 erythema</td>
<td>Prophylactic nb-UVB phototherapy</td>
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<tr>
<td>3</td>
<td>38/F/II</td>
<td>Chin, cheeks, forehead, neck and anterior chest</td>
<td>unknown/4 days</td>
<td>Monomorphic pustules, preceding tingling</td>
<td>1 x 10 Jcm⁻² and 20 Jcm⁻²</td>
<td>Neck: pustular response</td>
<td>Photoprotection*</td>
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<tr>
<td>4</td>
<td>25/F/III</td>
<td>Central forehead, left cheek, left chin, left neck</td>
<td>72 hours/2-3 weeks</td>
<td>Erythema, monomorphic pustules, scale on clearance</td>
<td>1 x 10 and 20 Jcm⁻²</td>
<td>Jaw: brown pigment</td>
<td>Photoprotection*</td>
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<td></td>
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<td>Back: grade 1 erythema</td>
<td>No improvement</td>
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<td><strong>5</strong></td>
<td><strong>44/F/II</strong></td>
<td>Forehead, chin, neck, anterior chest, upper back</td>
<td>2-3 hours/1-2 weeks</td>
<td>Erythema, pustules, resolve with scale</td>
<td>Chest: grade 2 erythema and pustules</td>
<td>Photoprotection*</td>
<td>Tetracycline antibiotic</td>
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<td><strong>6</strong></td>
<td><strong>25/F/II</strong></td>
<td>Face, upper chest and back, neck, occipital hair line, dorsal arms</td>
<td>30 mins/5 days</td>
<td>Erythema, pustules, resolves with scale</td>
<td>Left upper back: grade 2 erythema + pustules and follicular response</td>
<td>Photoprotection*</td>
<td>Reduced flares with photoprotection</td>
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<td><strong>7</strong></td>
<td><strong>30/F/II</strong></td>
<td>Lower cheeks, jaw line, sides of neck and forehead</td>
<td>24 hours/7 days</td>
<td>Pruritus, monomorphic pustules</td>
<td>1 x 10 Jcm⁻² and 20 Jcm⁻² Jawline: negative response</td>
<td>Photoprotection*</td>
<td>Prophylactic nb-UVB phototherapy (at home)</td>
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<td><strong>8</strong></td>
<td><strong>36/F/II</strong></td>
<td>Mid face, nasolabial folds, cheeks, chin and forehead</td>
<td>12 hours/2-3 days</td>
<td>Erythema, preceding tightness, monomorphic pustules</td>
<td>2 x 20 Jcm⁻² Back: grade 1 + pigment 2 x 5 Jcm⁻² Neck: negative response</td>
<td>Photoprotection*</td>
<td>Lymecycline 408mg</td>
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<td><strong>9</strong></td>
<td><strong>27/F/II</strong></td>
<td>Face, upper chest</td>
<td>2 days/4 days</td>
<td>Erythema, preceding tingling, monomorphic pustules, resolving with fine scars</td>
<td>2 x 20 Jcm⁻² Left check: pustular response</td>
<td>Photoprotection*</td>
<td>Prophylactic nb-UVB phototherapy</td>
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<tr>
<td>No</td>
<td>37/F/III</td>
<td>Chin, back of shoulders, thighs</td>
<td>1 week/3 weeks</td>
<td>Erythema, pustules</td>
<td>2 x 20 Jcm$^2$</td>
<td>Right inner forearm: brown pigment</td>
<td>Photoprotection*</td>
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</tbody>
</table>

Table 1. Clinical features, phototesting results, treatment and outcomes of patients with actinic folliculitis. *Photoprotection advice includes behavioural and environmental advice as well as protective clothing & topical sunscreen use (all were advised to use a broadspectrum sunscreen). ^Fitzpatrick skin phototype.
Figure 1. (a) Distinct monomorphic pustules appearing across a photodistributed site, the forehead, of a patient following sunlight exposure. (see table, patient 5). (b) Widespread pustules scattered across the back in the same patient.

Figure 2. (a) Naturally provoked eruption, following exposure to sunlight, consisting of monomorphic pustules (see table, patient 6). (b) The appearance of erythema and early pustule formation, appearing at 24 hours following artificial UVA provocation, on the left upper shoulder. (c) At 48 hours post artificial UVA provocation there was clear evidence of monomorphic pustules.