Evaluation of a Blue Light Treatment System for the Self-Treatment of Mild to Moderate Acne

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INTRODUCTION

Propionibacterium acnes is a major cause of acne vulgaris. As part of their normal metabolism, these bacteria produce porphyrins which, when exposed to blue light at wavelengths of 407-420 nm, become photoexcited and generate free radicals that are bactericidal to P. acnes.1 Blue light can therefore be helpful not only in treating existing acne lesions but also in helping to prevent the development of new lesions. In addition, blue light therapy also appears to have anti-inflammatory effects on keratinocytes.2 A hand-held device using light-emitting diodes to emit blue light at ~415 nm has recently been cleared by the US Food and Drug Administration for the self-treatment of mild to moderate inflammatory acne at home3—offering effective therapy that is both more convenient and less costly than in-office blue light therapy. A study has been performed to evaluate use of this new blue light device at two doses: ~2 J/cm2 per day (representing the typical full-face treatment dose) and ~29 J/cm2 per day (as may occur during treatments of a localized flare of acne). In the study, the device is evaluated in conjunction with a proprietary foaming cleanser and a proprietary serum. These are designed to be complementary to the antibacterial and anti-inflammatory effects of blue light treatment as, together, they contain glycolic acid, salicylic acid, niacinamide, and azelaic acid. Glycolic, salicylic, and azelaic acids are keratolytic,11 and azelaic acid also has antibacterial activity.2 Niacinamide may have anti-inflammatory actions,2 may speed keratinocyte differentiation,12 and has been reported to reduce hyperpigmentation, blotchiness, sallowness,13 and sebum levels or sebum excretion.11

METHODS

Main inclusion criteria
- Mild to moderate inflammatory facial acne
- 3 cm x 5 cm target area on the cheeks, forehead, or jawline containing 3-25 inflammatory lesions
- 25-45 years old

Treatment regimen
- Subjects instructed to use the following regimen for 8 weeks:
  - Blue light device twice daily (~29 J/cm2 per day on the 3 cm x 5 cm target area, ~2 J/cm2 per day on the rest of the face)
  - Proprietary foaming cleanser containing 5% glycolic acid and 2% salicylic acid
- Subjects instructed to use the following regimen for 8 weeks:
  - Blue light device twice daily (~29 J/cm2 per day on the 3 cm x 5 cm target area, ~2 J/cm2 per day on the rest of the face)
  - Proprietary foaming cleanser containing 5% glycolic acid and 2% salicylic acid
- Subjects instructed to use the following regimen for 8 weeks:
  - Blue light device twice daily (~29 J/cm2 per day on the 3 cm x 5 cm target area, ~2 J/cm2 per day on the rest of the face)
  - Proprietary foaming cleanser containing 5% glycolic acid and 2% salicylic acid
  - Proprietary serum containing 1.25% salicylic acid, 0.5% niacinamide, and 0.08% azelaic acid on the entire face after each evening treatment
  - Continued use of make-up, sunscreen, perfume, and body spray was allowed.
- Use of non-study facial astringents, cleansers, creams, and lotions was prohibited.

RESULTS

Subjects
- Among 33 subjects enrolled, 88% completed:
  - 71% median reduction at week 4
  - 25% median reduction at week 4
  - 53% median reduction at week 4
  - Photographic documentation is shown in Figure 2.
  - Between baseline and week 8:
    - 100% of subjects reported flares occurred less frequently
    - Flare severity was reduced (from median grade of moderate to mild)
    - Flare redness was reduced (from median grade of mild-to-moderate to mild).
  - The proportion of subjects considering their skin was improved at week 8 in terms of the following parameters was:
    - 96% for overall appearance (Figure 3)
    - 96% for clarity
    - 100% for radiance
    - 96% for tone
    - 93% for texture
    - 96% for smoothness.
- Flare severity was reduced (from median grade of moderate to mild)
- At week 8, the majority of subjects also reported:
  - Better improvement than with their prior skin care regimen (82%)
  - Significantly faster improvement than with their prior regimen (56%)
  - Satisfaction with the study treatment (82%).

Tolerability
- At week 8, 86% of subjects agreed that the blue light system was much gentler than traditional acne treatments (Figure 4).
- The majority of adverse events at least probably related to treatment were attributable to the topical products rather than the blue light device:
  - 25% median reduction at week 1
  - 7 minimal (predominantly transient skin dryness and transient erythema)
  - 8 events probably related to the device:
    - 1 moderate (transient skin dryness)
    - 7 minimal (predominantly transient skin dryness and transient hyperpigmentation).

CONCLUSION

The blue light treatment system offers rapid, effective, convenient, and well-tolerated treatment of inflammatory and non-inflammatory lesions without the need for antibiotics or potentially irritating topical treatments—thus avoiding the risks and other disadvantages associated with such medications. The blue light treatment system is attractive both as an alternative to traditional acne treatments and as an adjunctive treatment to complement existing therapies.

REFERENCES


DISCLOSURE

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