



Photodynamic therapy for the treatment of acne vulgaris

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Introduction

Acne vulgaris is a common condition affecting populations and age groups in varying severities worldwide. Acne vulgaris refers to common acne consisting of comedones, papules, pustules, nodules, and/or cysts.

Traditional approaches to treating acne vulgaris have long consisted of the use of retinoids and antimicrobials.¹ These antimicrobials most commonly consist of tetracyclines, macrolides, sulfonamides, and benzoyl peroxide.¹

Unfortunately, the favorable effects demonstrated by treating acne with antibiotics has led to over-prescription of the drugs and contributes to growing antimicrobial resistance.² In the US alone, there are more than 2.8 million cases of antimicrobial infections with an estimated 35,000 subsequent deaths each year.²

With high prevalence rates of acne vulgaris and its growing resistance to antibiotics, it is important to find alternative treatment options to mitigate this complication.

Photodynamic therapy (PDT) involves the use of a light source used for the destruction of abnormal cells with or without the use of light-sensitive medications.³ PDT has been successfully used in treating cancer and other skin disease processes like psoriasis and atopic dermatitis.³

PDT has been recently introduced for the treatment of acne vulgaris as it reputedly inhibits *Propionibacterium acnes* proliferation and promoting healthy tissue growth by altering gene expression of *P. acnes* and reducing tissue inflammation.⁴

Introduction cont.

The goal of this literature review was to evaluate PDT's effectiveness and to determine its practicality in the treatment of common acne.

Methods

A literature review was conducted utilizing databases to collect peer-reviewed primary research regarding the methodology and efficacy of PDT in the treatment of acne vulgaris.

Results

Results of interest regarded PDT's effectiveness and side effect profile when compared to that of blue and red-light emitting diodes (LEDs), Intense pulsed light (IPL), and sunlight in the treatment of moderate to severe facial acne vulgaris.^{5,6}

As expected, all methods of phototherapy were effective in treating moderate to severe acne vulgaris.^{5,6} However, PDT required the lowest number of treatment sessions to reduce inflammatory lesions and improve the appearance of acne by over 90%.^{5,6}

The addition of topical medications, like aminolevulinic acid, to PDT changed the skin microbiome by inhibiting *P. acnes* and *Cutibacterium acnes* and causing other residual bacteria to proliferate.^{4,7} This may be a contributing factor to the beneficial appearance changes demonstrated with PDT.^{4,5,7}

PDT had mild side effects of burning, redness, and irritation that subsided after treatments.⁸



(a) Baseline (week 0) (b) End of main study (week 12) (c) End of extension study (week 24)

Conclusion

Research suggests that PDT is effective in the treatment of acne vulgaris. Nonetheless, with varying lasers and light sources, the approach to acne vulgaris using PDT treatment is complex and evolving.

PDT treatment needs to be tailored to each patient to see results satisfactory to both the patient and provider—making most studies subjectively determining PDT's efficacy.

Conversely, the subjectivity seen during treatment may allow for patients' treatments to be more specialized and enhance individuals' experience with PDT.

PDT shows clinical and statistical promise as another tool that dermatologists can use in the treatment of acne vulgaris to distance patients from the chronic use of antimicrobials.

Future Directions

Further research needs to be done regarding PDT's skin cancer risks, its use with other acne treatments, its impacts on pre-existing skin conditions, its long-term efficacy, and future studies need to be done with larger sample sizes using more objective ways in determining efficacy.

Sources

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