[FC04.5] Topical photodynamic therapy for treatment of acne vulgaris: Comparison of short and long pulse durations

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Introduction: PDT involves the application of a photosensitizing chemical which, when exposed to various lights, results in excitation of the photosensitizer and consequent production of a reactive oxygen species that leads to cytotoxicity. Although it is already being widely used for acne and epidermal cancers in practice, disease specific optimal light source and parameters of photodynamic therapy are not established for various disease conditions.
ALA-PDT has a dual role in the treatment of acne: selective absorption resulting in destruction of sebaceous glands and exfoliation of epidermis, thereby opening the pores. Effective destruction of bulky sebaceous glands requires high concentration of photosensitizer in the glands, a light source with longer wavelength that penetrates into 3 to 4mm in dermis, and sufficient generation of ROS. To date, conventional acne PDT was carried out in short pulse durations usually recommended for facial rejuvenation. Therefore, our study was designed to determine the optimal pulse durations by delivering the same energy in short and long pulses.
Methods: Fifteen volunteers with moderate to severe acne vulgaris had been treated with the ALA (Levulan®) all over the face. An occlusive dressing followed all treatments. Two hours after ALA application, one half-face was irradiated for 3.5ms and the other half for 40ms with a fixed dose of 9J/cm^2 and 600-950nm wavelength of IPL (Ellipse®, DDD, Denmark). The effects were evaluated by clinical and chromometric examinations, and light microscopy.
Results: Rapid acne improvements were seen in longer pulse durations and acute acne flare-ups were observed in shorter pulse durations. With same energy dose, shorter pulse durations resulted in more severe exfoliation and more intense erythema. Maximal erythema resolved within 3 days and interindividual variation in ALA-phototoxicity was observed. Intense erythema was noted especially in patients with flushing.
Discussion: Photodynamic therapy is not a photoablation but a photochemical interaction. Longer pulse durations within same power density have more favorable results and less side effect profile, signified by faster clearing of acne, less intense erythema, less severe exfoliation, and less incidents of acne flare-up.

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