TOPICAL PHOTODYNAMIC THERAPY FOR TREATMENT OF ACNE VULGARIS: COMPARISON OF TWO IPL APPLICATORS AND TWO APPLICATION TIMES OF ALA

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Introduction

Photorhododynamic therapy (PDT) is increasingly used for treatment of acne. PDT involves the application of a photosensitizing chemical - aminolevulinic acid (ALA) - which, when exposed to various lights, results in activation of the photosensitizer (protoporphyrin IX, PpIX) and consequent production of a reactive oxygen species that leads to cytotoxicity.

PpIX has a large absorption peak in the Soret band (400~430nm) and smaller absorption peak at longer wavelengths (544, 584, 630, 690nm), which enables us to utilize many different light sources for ALA-PDT. Shorter blue light wavelengths are more effectively absorbed by ALA, but has limited ability to penetrate skin. On the other hand, the longer red wavelengths can activate ALA deeper in the skin. In Korean Asian skin, hypopigmentation can occur during PDT using blue light may be diminished with the use of longer wavelengths.

Intense pulse light (IPL) therapy as a light source of PDT may provide an assist, faster method of treating inflammatory acne, with a low risk of side effects. The IPL (IPL8000, Diodomed, Denmark) provided wavelengths of VL (555~950nm) and HR (600~950nm). We compared the efficacies of two light spectra of IPL to find out if longer wavelength is more effective in ALA-PDT.

Topical application of 20% aminolevulinic acid (ALA) initiates time-dependent accumulation of the endogenous photosensitizer protoporphyrin IX (PpIX) in subacute gland and P-acnes. We determined the safer and efficacious incubation time of ALA (Levulan®-PDT) for treatment of acne vulgaris in Asians. In addition, we assessed risk factors for hypopigmentation in Asians.

Materials and Methods

Study populations
- Twenty-nine volunteers (19 females and 10 males; mean age: 24 ± 3 years)
- moderate acne vulgaris: Cuncliffe grading 1.5 ~ 5. skin phototypes III~IV.

Treatment
- Application of Levulan®
  - Levulan® was applied on one half face for 1 hour and the other half face for 4 hours in all volunteers.
  - IPL
    - IPL (IPL8000, Diodomed): applicator: VL wavelengths of VL (555~950nm) and HR (600~950nm).
    - One group randomly had been treated with the VL (555~950nm) and the other with the HR (600~950nm) applicator.
  - Incubation time of ALA
    - 1 hour incubation
    - 24-week treatment

Efficacy and Statistics
- Change of mean number of acne over time (paired t-test; significance at the level of p ≤ 0.05, see 8.1)
- Comparison of VL/HR applicator and incubation time of Levulan® (t-test; significance at the level of p ≤ 0.05, see 8.1)
- Risk factor analysis of hypopigmentation (multiple logistic regression, see 8.1)

Discussion

1. Change of average number of comedones and inflammatory acnes over time

2. Comparison of HR and VL applicator

3. Comparison of 1 hr and 4 hrs incubation time of Levulan®

4. Risk factors and each odd ratio of hyperpigmentation

5. Clinical photographs

References