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Photorejuvenation induced by 5-aminolevulinic acid photodynamic therapy in patients with actinic keratosis: a histologic analysis.

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Abstract

BACKGROUND:
Repeated exposure to ultraviolet radiation from the sun results in premature photoaging. Photodynamic therapy (PDT) has been shown to be effective for treatment of photoaging, although the data from most studies have been based on clinical observation.

OBJECTIVES:
We investigated whether 5-aminolevulinic acid (ALA)-PDT induced histologic changes suggesting photorejuvenation.

METHODS:
Fourteen patients with one to three actinic keratoses on the face were treated twice with ALA-PDT by using a 1200 W metal halogen lamp at 1-month intervals. Skin biopsy before and 1 month after the PDT was performed. Twenty-five pairs of specimens were obtained. We examined the specimens with routine and immunohistochemical staining and evaluated the parameters associated with photoaging by using image analysis.

RESULTS:
After ALA-PDT, the mean epidermal thickness and dermal inflammatory infiltrate were reduced. The total collagen volume in the dermis significantly increased with expression of type I and III procollagen. The level of transforming growth factor beta and transforming growth factor beta type II receptors in the epidermis also increased. The elastotic material with co-localizing fibrillin-1 and tropoelastin expression in the dermis decreased after treatment. The expression of matrix metalloproteinases-1, -3, and -12 also decreased.

LIMITATIONS:
The study was limited by the small sample size.

CONCLUSIONS:
ALA-PDT resulted in histological changes indicating restoration of photoaged skin. These data suggest that ALA-PDT could be effective for photorejuvenation.

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