

Photodynamic therapy of oral dysplasia with topical 5-aminolevulinic acid and light-emitting diode array

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摘要

BACKGROUND AND OBJECTIVES: In Taiwan, more than two million people have the betel quid (BQ) chewing habit which is a risk factor related to premalignant lesion and squamous cell carcinoma of oral cavity. We developed a light-emitting diode (LED) array combined with topical 5-aminolevulinic acid (ALA) for photodynamic therapy (PDT) and evaluated its effectiveness for the treatment of oral lesions. **STUDY DESIGN/MATERIALS AND METHODS:** We compared the ALA-PDT effect of the homemade LED array to that of a commercial light source on cultured Ca9-22 human gingival carcinoma cells and the DMBA-induced hamster buccal pouch carcinoma model. Furthermore, we treated several patients having an oral lesion using a topical ALA delivery system and the LED array. **RESULTS:** The LED array light source was as effective as the commercial light source for ALA-PDT in cultured Ca9-22 cells with LD(50) of 4.5 and 4.3 J/cm², respectively, using an MTT assay. This light source was also effective in the DMBA-induced hamster buccal pouch carcinoma model, and in the patients of oral leukoplakia. **CONCLUSIONS:** ALA-PDT is effective for premalignant lesions such as mucosal dysplasia and carcinoma in situ of oral cavity. Good results could be obtained by using the homemade LED array as light source. The LED array has the advantages of low cost, high reliability, and portability. It is safe, convenient and easy to use for the treatment of oral dysplasia.