CASE REPORT

Successful treatment of an extensive verrucous carcinoma with topical 5-aminolevulinic acid-mediated photodynamic therapy

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Our recent study found that a new topical 5-aminolevulinic acid-mediated photodynamic therapy (ALA-PDT) protocol composed of multiple 3-min fractionated irradiations with a light emitting diode (LED) red light at 635 ± 5 nm for a total of 1000 s (fluence rate: 100 mW/cm²; light exposure dose: 100 J/cm²) after topical application of 20% ALA for 1.5 or 2 h can be used successfully for the treatment of oral verrucous hyperplasia. In this case report, we tested the efficacy of this new treatment protocol of ALA-PDT for an extraoral verrucous carcinoma (VC) lesion at the right mouth angle and an intraoral VC lesion at the right buccal mucosa of a 56-year-old male areca quid chewer and smoker. The extraoral tumor was cleared after six treatments of topical ALA-PDT and the intraoral tumor showed complete regression after 22 treatments of topical ALA-PDT. No recurrence of the VC lesion was found after a follow-up period of 6 months. We suggest that PDT using a topical application of 20% ALA followed by multiple 3-min fractionated irradiations with an LED red light is also an effective and successful treatment modality for VC.

Keywords: 5-aminolevulinic acid; photodynamic therapy; verrucous carcinoma

Case report

This 56-year-old male patient heard from the newspaper that we had successfully treated five patients with oral verrucous hyperplasia (OVH) with topical 5-aminolevulinic acid-mediated photodynamic therapy (ALA-PDT). Thus, he came to our outpatient dental clinic and asked for treatment of a verrucous lesion at the right mouth angle and buccal mucosa by ALA-PDT. The extraoral verrucous tumor at the right mouth angle measured about 3 · 2.5 · 1 cm (Fig. 1a); it connected with an intraoral verrucous mass which occupied the whole right buccal mucosa of a 56-year-old male areca quid chewer and smoker. The extraoral tumor was cleared after six treatments of topical ALA-PDT and the intraoral tumor showed complete regression after 22 treatments of topical ALA-PDT. No recurrence of the VC lesion was found after a follow-up period of 6 months. We suggest that PDT using a topical application of 20% ALA followed by multiple 3-min fractionated irradiations with an LED red light is also an effective and successful treatment modality for VC.


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Figure 1  (a) Extraoral verrucous carcinoma (VC) lesion at the right mouth angle before treatment. (b) Extraoral and intraoral VC lesions at the right mouth angle and buccal mucosa before treatment. (c) One previous biopsy of the lesion showing verrucous hyperplasia (hematoxylin and eosin stain; original magnification: ×10). (d) Clinical picture of the extraoral VC lesion after three treatments of 5-aminolevulinic acid-mediated photodynamic therapy (ALA-PDT) showing partial regression of the VC lesion. (e) Clinical picture of the patient after six treatments of ALA-PDT showing complete regression of the extraoral VC lesion. (f) Clinical picture of the intraoral VC lesion after 11 treatments of ALA-PDT showing partial regression of the VC lesion. (g) Clinical picture of the right buccal mucosa after 12 treatments of ALA-PDT showing complete regression of the intraoral VC lesion. A small residual white hyperkertotic lesion could be found at the middle portion of the right buccal mucosa and a diffuse white lesion of submucous fibrosis could also be found at the right buccal mucosa, especially the posterior part of the buccal mucosa. (h) Clinical picture of the right buccal mucosa 6 months after completion of ALA-PDT showing no recurrence of the VC lesion. The small residual white hyperkertotic lesion (as seen in g) disappeared spontaneously 6 months later. However, the diffuse white lesion of submucous fibrosis was still present on the right buccal mucosa.
In view of the recent reports of efficacy of topical ALA-PDT, it was decided that a similar approach would be undertaken with the present patient after informed consent was obtained from the patient.

The extraoral tumor at the right mouth angle was treated first by the topical ALA-PDT followed by the intraoral tumor at the right buccal mucosa. The treatment protocol for the present patient was the same as that for the OVH patients as described previously (1). In brief, at the first visit of the treatment, we determined when the protoporphyrine IX (PpIX) reached its peak level in the lesional epithelial cells by ALA-induced PpIX fluorescence spectroscopy. We found that the PpIX reached its maximum level in the lesion 2 h after local ALA application. Therefore, the subsequent light treatments were set at 2 h after topical application of ALA to the lesion. The topical ALA-PDT was performed once a week starting from the patient’s second appointment of treatment. At the day of treatment, 0.8 ml of 20% ALA was applied to the extraoral tumor upon patient’s arrival. The light treatment composed of multiple 3-min irradiations with a light emitting diode (LED) red light at 635 ± 5 nm separated with several 3-min rests for a total of 1000 s (fluence rate: 100 mW/cm²; light exposure dose: 100 J/cm²) was delivered 2 h after topical ALA application. Light treatments were carried out under local anesthesia using 2% lidocaine with the patient in clear consciousness. The tip of the LED light device was kept as close to the surface of the lesion as possible. Alginesics (acetaminophen, 500 mg/tablet, one tablet four times a day) were prescribed to the patients after PDT treatment. As stated by the patient, this prescription could well control the post-PDT pain. The extraoral tumor was cleared after six treatments of ALA-PDT (Fig. 1d,e) and the intraoral tumor showed complete regression after 22 treatments of ALA-PDT (Fig. 1f,g). The patient was then followed up once a week in the first month and once a month thereafter. Because of the systemic condition of atrial fibrillation, the patient refused to do any post-treatment biopsy. No recurrence of the lesion was found after a follow-up period of 6 months (Fig. 1h).

Comments

In this case report, we treated an extensive verrucous lesion, possibly a verrucous carcinoma (VC), at the right mouth angle and buccal mucosa of a 56-year-old male AQ chewer and smoker by topical ALA-PDT. The large verrucous lesion showed complete regression after a total of 28 treatments of ALA-PDT. Our recent study found that a new topical ALA-PDT protocol composed of multiple 3-min fractionated irradiations with an LED red light at 635 ± 5 nm for a total of 1000 s can be used successfully for the treatment of OVH (1). The result of the present report confirms that this new protocol is also very effective for the treatment of an extensive VC. However, because the effects of AQ and tobacco upon the oral mucosa can last for a further 10–15 years, a close follow-up is needed to see whether there is a recurrence of the lesion.
five periods of 180 s and a period of 100 s. These six periods of light treatment were interrupted by five periods of 3-min rest. Because an efficient PDT needs sufficient and continuous supply of new PpIX and oxygen, multiple 3-min stops were supposed to give the opportunities for tissues to regenerate new PpIX and to obtain new oxygen. This, in turn, resulted in a successful clinical outcome with this new protocol of treatment.

In this case report, we succeeded in treating an extensive VC with a new protocol of topical ALA-PDT. Although further studies are needed to verify the real efficacy of this new treatment protocol, we suggest that our new topical ALA-PDT protocol is also an effective and successful treatment modality for VC.

References


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