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Successful treatment of recalcitrant plantar warts: Pretreatment with superficial shaving is vital before photodynamic therapy

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1. Introduction

Finding a treatment for recalcitrant plantar warts, an immune-related disease caused by human papilloma virus (HPV), has been a clinical problem. Current therapies, including surgical excision, cryotherapy and laser cauterization, are often invasive and painful. Moreover, these therapies are often performed with poor efficacy, allowing recurrence of the warts [1]. Photodynamic therapy (PDT) has been one of the commonly used therapies in treating plantar warts. However, because of the unreliable efficacy and recurrence rate of plantar warts, patients are suggested to get 3 treatments of PDT [2], although there are plenty of successful cases with PDT combination therapy for plantar warts [3]. Based on our previous work, we speculated that the unreliable efficacy of single PDT may be related to the limited penetration depth of the photosensitizer. Pretreatment such as shaving can increase the penetration ability. Thus, we reported a case of successful treatment using the combination of PDT and superficial shaving in a patient with recalcitrant plantar warts.

2. Case report

An 18-year-old female was referred to our department with a two-year history of multiple phyma in the right foot. The patient complained of pain and walking discomfort. Previous treatment with cryotherapy, laser cauterization and injection of 5-fluorouracil were suggested to be ineffective, and there was recurrence.

With the consent of the patient, we tried superficial shaving combined with PDT. First, after routine disinfection and lidocaine local anesthesia induction, the lesions were pretreated with a sterilized razor blade (brand: Gillette). The range of shaving was only local to the lesion. We gently removed the protruding part of the surface, from the punctate hemorrhage to as deep as the dermal papilla layer. Second, 10% 5-aminolaevulinic acid cream (5-ALA, Shanghai Fudan-Zhangjiang Bio-Pharmaceutical Co. Ltd, Shanghai, China) was applied externally to the lesions with 5 mm enlargement. After the thin film was covered, the multilayer gauze was pressure-wrapped, which could enhance the absorption of 5-ALA. Then, after light avoidance for 4 h, 635 nm semiconductor laser irradiation was applied for 20 min, and the output power was 80 mW/cm^2. The patient was treated with PDT once a week for a total of three sessions, but superficial shaving was applied only for the first session. After two treatment sessions, the skin lesions turned into brownish red scabs (Fig. 1a–b). After the third treatment, the brown-red scabs remained, but the healing tendency was obvious without phototoxic reaction (Fig. 1c). During the process, the patient suffered mild to moderate pain. Erythromycin ointment was given after the surgery, and the healing time of the wound was six days. No side

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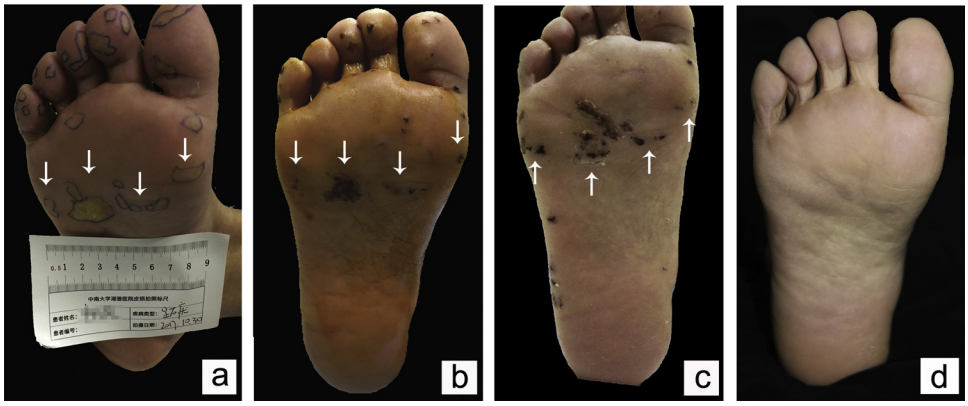

Fig. 1. The clinical pictures of pre- and post-treatment. (a) Lesions on the right foot before treatments with ALA-PDT. (b) After the second treatment the skin lesions turned into brownish red scab. (c) After the third treatment, there was still brown-red suede in the area of skin damage, and the healing tendency was obvious. (d) After 3 months follow-up, the warts disappeared and there was no obvious scar.

effects, such as erythema or vesicles, were observed. After three months, the warts disappeared, and there was no obvious scar (Fig. 1d). The patient was satisfied with both efficacy and cosmesis, and the DLQI decreased from 16 to 6. No recurrence was observed during almost 16 months of follow-up.

3. Discussion

PDT, known as a noninvasive therapy, is widely used in skin diseases, such as condyloma acuminata, actinic keratosis and basal cell carcinoma. The mechanism is currently understood to be related to antiviral activity, local immunity, ROS, etc. [4]. Recent guidelines indicate that salicylic acid is a first-line therapy for warts [2]. Unfortunately, there is no product with salicylic acid in China at present. In addition, Schroeter CA. et al. found that PDT can treat plantar warts with 88% total clearance (42 of 48 cases) [5], which is much higher than with using imiquimod to treat recalcitrant warts (40% complete clearance achieved). However, PDT used in dermatology does not seem to have substantial advantages over previous clinical cases, which indicated that the efficacy of PDT was unreliable. At present, compared with the curative effect of PDT alone, the curative effect of PDT combination therapy is satisfactory. This idea was also supported by our review and analysis of the literature (Supplementary material 1). For example, Ziolkowski P. et al. adopted the pretreatment of Azone to enhance penetration of 5-ALA in tissues and thus increased the effectiveness of PDT. They found that the complete responses to the treatment in mosaic warts and myrmecia increased from 37.5% to 66.7% and 70% to 100%, respectively. Furthermore, Silke M. Fuchs et al. used pretreatment with keratolysis (salicylic acid) combined with PDT, and 72% of the warts disappeared. Ida-Marie Stender et al. found that when combing PDT with shaving, the median relative reduction in the wart area was 100% after 18 weeks [6]. According to the review and analysis of the literature, we believe that pretreatment is very important because it can increase the osmotic absorption of drugs and improve the efficacy of PDT, thereby reducing the recurrence rate.

At present, there are many PDT combination therapies for Bowen's disease (BD), such as laser therapy, plum-blossom needle therapy and cryotherapy. We have proposed a therapy combining PDT with superficial shaving with a razor. We believe that for plantar warts that are abnormally active in the stratum corneum, shaving is more effective, suitable, convenient, and low-cost and thus is worth promoting. In our case, the skin barrier was destroyed through superficial shaving, which promoted the absorption of 5-ALA and increased the accumulation of the photosensitizer effectively. Thereby, this therapy enhanced the treatment efficacy and overcame the limitation of 5-ALA penetration depth.

For two subsequent similar patients (Supplementary material 2), we used the same pretreatment of superficial shaving combined with PDT. After follow up, the warts demonstrated high clearance and low recurrence rates. Our results are promising for the use of 5-ALA-PDT combined with superficial shaving as a safe and effective therapy for patients with recalcitrant plantar warts. Pretreatment is very important for PDT, especially in the treatment of thicker cuticle diseases such as plantar warts. Future randomized clinical trials should be applied in the Chinese population.

Conflicts of interest

The authors have no conflicts of interest to disclose.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.pdpdt.2019.05.040.

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