

Successful Treatment of Generalized Facial Verrucae Vulgaris with a Combination of Curettage and Photodynamic Therapy in an Adolescent: A Case Report

Na Zhang^{1,*}, Xinru Chen^{1,*}, Tianhui Ye¹, Hongping Ge¹, Xiaoli Zhai², Jun Wu¹, Min Zhang¹, Meiyan Wang¹

¹Department of Dermatology, Affiliated Jinhua Hospital, Zhejiang University School of Medicine, Jinhua, People's Republic of China; ²Department of Pathology, Affiliated Jinhua Hospital, Zhejiang University School of Medicine, Jinhua, People's Republic of China

*These authors contributed equally to this work

Correspondence: Na Zhang, Department of Dermatology, Affiliated Jinhua Hospital, Zhejiang University School of Medicine, No. 365 Renmin East Road, Jinhua, 321000, People's Republic of China, Tel +86 18757806099, Email sallyzhang1986@163.com

Abstract: Verrucae vulgaris are highly contagious keratotic lesions occurring on the skin caused by human papillomavirus. Generally, verrucae vulgaris are harmless to the body, but when they occur in specific areas such as the face or soles of the feet, they can profoundly impact an individual's quality of life and necessitate therapeutic intervention. Although several pharmacological and physical topical treatments are available, the results are often unsatisfactory in terms of efficacy and cosmetic outcome. Verrucae which typically occur widely on the face are usually Verrucae Planae. When Verrucae vulgaris does occur, it usually presents as single or occasional multiple lesions, rather than covering almost the entire face. In immunocompromised situations, verruca vulgaris can exhibit rare proliferative behavior. In this report, we present a 17-year-old male adolescent who was successfully treated for generalized facial verrucae vulgaris by using a combination of curettage and photodynamic therapy (PDT). The patient's prolonged use of topical corticosteroids and tacrolimus ointment on the face for eczema over several years is believed to have led to a localized immunosuppressive state of the facial skin, which is considered a significant factor in the outbreak of verrucae vulgaris. Additionally, the patient has a history of acne and frequently scratched face. The appearance of the Koebner phenomenon following scratching is considered another potential reason. This treatment achieved complete resolution and improved the patient's pre-existing acne problem, resulting in a satisfactory cosmetic outcome without any notable adverse effects or recurrence during the follow-up period. This highlighted that pre-treatment with curettage before PDT enhanced the efficiency of verrucae vulgaris treatment and reduced the cost.

Keywords: photodynamic therapy, curettage, verruca vulgaris, adolescent, cosmetic

Introduction

Verrucae vulgaris are benign skin papillomas caused by human papillomavirus (HPV) infections. Verrucae vulgaris most frequently occur in pediatric and young adult populations and are spread through contact, affecting up to 10% of the population: most people experience it at least once in their lives.¹ Verrucae vulgaris present as papules with hyperkeratotic surfaces that can appear alone or in a group, normally occurring on the fingers, dorsum of the hand, foot margin, and other parts of the body. Facial verrucae vulgaris is not commonly encountered, and when they do occur, they are not usually widespread. However, in certain immunosuppressed conditions, verrucae vulgaris can exhibit abnormal proliferation, resulting in rapid and extensive growth.² Though verrucae vulgaris normally have a 60% spontaneous remission within 2 years, some can persist several years despite treatment and cause significant psychosocial effects. Wart eradication can be challenging despite the availability of a large variety of treatments. Treatment is based on several

variables, including location, patient goals, immune status, and pain tolerance. Photodynamic therapy (PDT) is a noninvasive, effective treatment for superficial skin conditions, offering superior cosmetic outcomes and is overall a well-tolerated treatment even in a pediatric setting compared with traditional therapies.³ Here we report the case of generalized facial verruca vulgaris successfully treated by curettage and PDT in a 17-year-old male adolescent.

Case Report

A 17-year-old male adolescent was admitted to our department with a 6-months history of hyperplastic lesions on the face and head. Initially, the patient noticed the appearance of papillomatous papules on the face. While cryotherapy managed to eliminate some of the lesions, the rate of new lesions appearing surpassed the rate of elimination. Within six months, the papules rapidly spread to the forehead, both eyebrows, both cheeks, and the chin, sparing the lips and nose. The patient has a history of eczema for several years and had intermittently used topical corticosteroid ointments and tacrolimus ointment for treatment. Additionally, the patient has mild acne. Physical examination showed lesions measuring 1–3 mm in diameter were scattered on the entire face (Figure 1). The extensive papillomatous papules on the face severely impacted the patient's psychological well-being, causing the patient to become depressed and anxious. The patient feared being perceived as abnormal by others and were reluctant to engage in daily life and social activities. As a result, the patient sought a treatment method that could quickly clear the lesions and restore the appearance.

Because generalized facial verrucae vulgaris is very rare in clinical practice, we obtained pathological confirmation of the diagnosis before treatment. The biopsy revealed mild hyperkeratosis in the epidermis, thickening of the spinous layer, and atypical koilocytes (Figure 2B).

We used surface anesthesia with lidocaine cream for 30 minutes before treatment. After surface anesthesia, we opted to scalp away visible verrucae vulgaris lesions with a curette (Figure 2A). Following application of 10% 5-aminolevulinic acid (5-ALA) gel (Shanghai Fudan-Zhangjiang Bio-pharmaceutical Co., Ltd., Shanghai, China) to the lesion area with 3 hours of incubation, irradiation was performed for 20minutes with 80 J/cm² using 635 nm Light Emitting Diode red light (Yage Medical Equipment Co., Ltd, Wuhan, China). Pain was assessed using the Numerical Rating Scale, and no pain intervention was initiated because the patient reported a pain level of ≤ 2 . No additional adverse effects were observed except for local swelling. After the first treatment, we advised the patient to avoid water for 5–7 days after treatment while mupirocin cream was applied to the wound and to avoid daylight for the following 24 hours. The patient complained only of a mild burning sensation. After four sessions of consecutive 5-ALA-PDT with 2-week intervals, there were no verrucae vulgaris lesions on the face or head. Physical examination showed that no lesion recurrence was found at the 3-month follow-up (Figure 3).

We observed that the patient's acne showed some improvement after treatment. However, the patient's eczema persisted. We provided the patient with topical crisaborole ointment treatment. We advised the patient to take antihistamines to control



Figure 1 Facial lesions in the patient before treatment. Widespread small papules on the face, about 1–3 millimeters in size, some of which are clustered but not confluent.

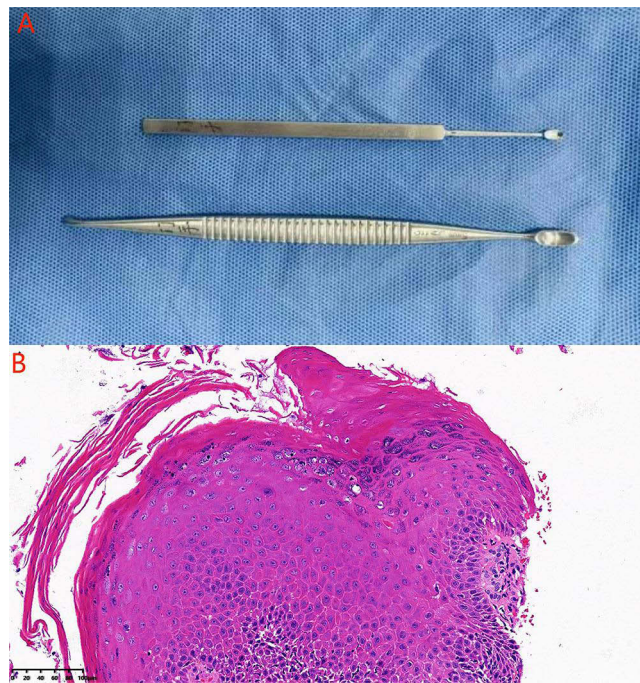


Figure 2 The curette used for treatment and facial biopsy. Curette (A); hematoxylin and eosin (H&E) staining (B): showed mild hyperkeratosis of the epidermis, and thickening of the spinous layer, and atypical koilocytes were observed. Magnification: $\times 20$.



Figure 3 Facial lesions in the patient 3 months after treatment completion. The small papules have completely cleared.

symptoms if the eczema worsened and affected daily life. At the 6-month follow-up after treatment (Figure 4), the patient still had eczema, with a slight recurrence of acne. There were no signs of recurrence of verrucae vulgaris.

Discussion

Verrucae vulgaris are among the most frequent infectious skin conditions. The typical lesions present as taupe brown or leathery papules approximately the size of a soybean or larger, with a rough surface, firm texture, and frequently appearing as nipple-like protrusions. The occurrence of verrucae vulgaris with such density as in the present case on the face of adolescents is rare. Although several pharmacological and physical topical treatments are available, the outcomes frequently prove unsatisfactory in terms of efficacy (frequent recurrence) and cosmetic effects (scarring, inflammatory reactions, hyper- or hypopigmentation).⁴ Considering the patient's adolescence and the emergence of social withdrawal



Figure 4 The condition of face 6 months after treatment completion. There were no signs of recurrence of verrucae vulgaris.

tendencies in school due to this condition, we aimed to provide a treatment plan that maximized the restoration of the patient's appearance.

Conventional treatments for verrucae vulgaris include cryotherapy, salicylic acid, injectable immunotherapy, surgical removal, 5-fluorouracil, HPV vaccines, laser therapy, and PDT.⁵ For adolescent patients, the ideal treatment regimen should be safe and minimally painful, thereby alleviating parental anxiety and the patient's treatment-related apprehension. Moreover, this treatment approach should aim to maximize the esthetic outcome of the patient's facial appearance. Nevertheless, each treatment presents some limitations. Topical therapies normally require long-term application and may be accompanied by local inflammatory side effects, thereby negatively influencing family compliance. PDT, compared to other treatment methods, has been shown to significantly reduce the HPV viral load and decrease the risk of recurrence.⁶ Because it targets areas of lesions, reduces scarring, and decreases recurrence, 5-ALA-PDT is a better option in such a case.

PDT uses photosensitizers that, upon exposure to light, produce reactive oxygen species (ROS). These ROS have strong oxidative capabilities, damaging the cell membranes, proteins, and DNA of the wart tissue, leading to cell death. Curettage as a pre-treatment form of PDT, when compared to CO₂ laser, does not cause tissue carbonization or affect 5-ALA gel absorption. Additionally, curettage also offers advantages such as more rapid healing and less pigmentation deposition.⁷ In the use of 5-ALA, lower concentrations when compared to concentrations of 10% or 20% are less likely to induce pigmentation deposition and are, therefore, more suitable for verrucae vulgaris treatment. We ultimately chose to scrape superficial wart lesions, followed by applying dry gauze to achieve hemostasis, and subsequently applied 10% ALA gel after the wound ceased bleeding. This approach aimed to minimize adverse events such as pigmentation deposition in patients post-treatment. The final outcome observed in the patient was highly satisfactory. All verruca vulgaris lesions on the patient's face were cleared. Additionally, ROS can eradicate *Propionibacterium acnes*, suppress the activity of sebaceous glands, and decrease local inflammation. Consequently, while treating verrucae vulgaris, there was also an improvement in acne vulgaris. Both the patient and parents were very pleased with the treatment results.

Current research has consistently demonstrated that PDT offers significant clinical efficacy in the treatment of acne vulgaris. Guidelines for topical photodynamic therapy from both China and Europe recommend PDT for acne treatment.^{8,9} When using PDT for acne, lower concentrations of 5-ALA (3–5%), shorter incubation times (30 minutes), and low-dose, long-duration irradiation (630 nm, 40–60 mW/cm², 150 J/cm²) are recommended.¹⁰ This approach is favored because, although higher concentrations (10–20%) achieve better lesion clearance rates, they also increase the incidence of adverse events such as severe erythema and pigmentation.¹¹ For our patients, the concurrent clearance of acne lesions while treating verrucae vulgaris was an unexpected but logical benefit.

Conclusion

In conclusion, this case suggested that combining curettage with PDT may be a more effective method with good cosmetic outcomes for treating generalized facial verrucae vulgaris.

Statement of Ethics

Ethical approval is not required for this study in accordance with local or national guidelines. Written informed consent was obtained from the patient's mother for publication of the details of their medical case and any accompanying images.

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Disclosure

The authors report no conflicts of interest in this work.

References

1. Song W, Zhang J, Gao N, et al. A combination of 2940-nm laser and photodynamic therapy for treatment of recalcitrant facial flat warts. *Photodiagnosis Photodyn Ther.* 2019;26:97–100. doi:10.1016/j.pdpdt.2019.03.002
2. Iida S, Sugioka K, Kondo M, et al. Verruca vulgaris and seborrheic keratosis exacerbated by immunosuppression. *Case Rep Dermatol Med.* 2020;2020:6682694. doi:10.1155/2020/6682694
3. Borgia F, Giuffrida R, Coppola M, Cannavo SP. Successful photodynamic therapy in a pediatric patient with difficult warts. *Dermatol Ther.* 2020;33(3):e13391. doi:10.1111/dth.13391
4. Theresia C, Zheng J, Chen XY. Topical ALA-PDT as alternative therapeutic option in treatment-recalcitrant dermatosis: report of 4 cases. *Photodiagnosis Photodyn Ther.* 2017;20:189–192. doi:10.1016/j.pdpdt.2017.10.010
5. Friedman PC. Management of Difficult-to-Treat warts: traditional and new approaches. *Am J Clin Dermatol.* 2021;22(3):379–394. doi:10.1007/s40257-020-00582-4
6. Hu Z, Liu L, Zhang W, et al. Dynamics of HPV viral loads reflect the treatment effect of photodynamic therapy in genital warts. *Photodiagnosis Photodyn Ther.* 2018;21:86–90. doi:10.1016/j.pdpdt.2017.11.005
7. Liao C, Zhang G, Wang P, Sun X, Wang X. Combination curettage and modified ALA-PDT for multiple basal cell carcinomas of the face and head. *Photodiagnosis Photodyn Ther.* 2021;35:102393. doi:10.1016/j.pdpdt.2021.102393
8. Shi L, Wang H, Chen K, et al. Chinese guidelines on the clinical application of 5-aminolevulinic acid-based photodynamic therapy in dermatology (2021 edition). *Photodiagnosis Photodyn Ther.* 2021;35:102340. doi:10.1016/j.pdpdt.2021.102340
9. Morton CA, Szeimies RM, Basset-Seguín N, et al. European Dermatology Forum guidelines on topical photodynamic therapy 2019 Part 2: emerging indications - field cancerization, photorejuvenation and inflammatory/infective dermatoses. *J Eur Acad Dermatol Venereol.* 2020;34(1):17–29. doi:10.1111/jdv.16044
10. Wang P, Wang B, Zhang L, et al. Clinical practice guidelines for 5-Aminolevulinic acid photodynamic therapy for acne vulgaris in China. *Photodiagnosis Photodyn Ther.* 2023;41:103261. doi:10.1016/j.pdpdt.2022.103261
11. Yin R, Hao F, Deng J, Yang XC, Yan H. Investigation of optimal aminolaevulinic acid concentration applied in topical aminolaevulinic acid-photodynamic therapy for treatment of moderate to severe acne: a pilot study in Chinese subjects. *Br J Dermatol.* 2010;163(5):1064–1071. doi:10.1111/j.1365-2133.2010.09860.x

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