



Case Report

Two Cases of Palmoplantar Pustulosis Treated with Oral Rinse Using Ozone Nano-bubble Water in Addition to Conventional Topical Therapy

Yasuhiro Horiuchi

Division of Dermatology, Tsuruse Orthopedic Clinic, Saitama, Japan

Email address:

tshoriuchi15@gmail.com

To cite this article:

Yasuhiro Horiuchi. Two Cases of Palmoplantar Pustulosis Treated with Oral Rinse Using Ozone Nano-bubble Water in Addition to Conventional Topical Therapy. *International Journal of Clinical Dermatology*. Vol. 2, No. 1, 2019, pp. 7-9. doi: 10.11648/j.ijcd.20190201.12

Received: July 30, 2019; **Accepted:** August 28, 2019; **Published:** October 4, 2019

Abstract: Background: Palmoplantar pustulosis (PPP) is a unique, chronic inflammatory skin disease characterized by pustules and erythematous lesions on specific sites, such as the palms and soles; however, the etiology and treatment of the condition are not clearly established. Recently, oral bacteria have been proposed as the possible causative factor of PPP. Ozone nano-bubble (ONB) water, treated with nano-sized ozone gas particles, shows strong sterilizing activity and has been attracting attention as a new treatment method not only for periodontal disease but also for PPP. Case history: This report presents the cases of two female patients with PPP who underwent treatment using a mixture of topical vitamin D and steroid ointments for over 6 months. However, the skin lesions did not show much improvement. Owing to the antimicrobial activity of ozone, they voluntarily agreed to rinsing their oral cavities with ozone water, particularly the periodontal areas, for a couple of minutes with 10–20 ml of ONB water, each night, in conjunction with the previous topical treatment. Results: Their skin lesions resolved completely within several months of addition of ONB water oral rinse to the routine topical treatment. Conclusion: The results support the usefulness of ONB water as an effective therapeutic means for the resolution of skin lesions in patients with PPP.

Keywords: Palmoplantar Pustulosis, Oral Bacteria, Ozone Nano-bubble Water

1. Introduction

Palmoplantar pustulosis (PPP) [1, 2] is a unique, chronic inflammatory skin disease, presenting with pustules and erythematous lesions on specific sites, such as the palms and soles. Lesions vary in severity and may persist for many years [2]. The cause is still unknown, but periodontal bacteria have been proposed as a triggering factor for PPP [3]. Periodontal therapy with mechanical debridement has been reported to resolve the skin lesions in PPP patients [4], suggesting the involvement of periodontal bacteria. The conventional treatment regimen [1, 2] includes topical vitamin D and/or steroid ointments [5], and PUVA (psoralen plus ultraviolet A light) [6], although reliable means for treating PPP are yet to be adequately established. As the author has suggested that ozone is effective for treating PPP [7], the antiseptic effects of ozone against oral bacteria are also expected promising potential as a treatment method for PPP. Ozone (O₃) [8]

shows strong antimicrobial activity against bacteria, fungi, and viruses mechanically [9]. The ozone nano-bubble (ONB) water [9], which is treated with nano-sized ozone gas particles, has been made available as a new and safer antiseptic agent (NAGA Co., Ltd. Japan). So far, this report presents two cases of PPP that were successfully treated with ONB water in conjunction with routine topical therapy.

2. Case Reports

2.1. Case 1

A 47-year-old female patient with severe PPP lesions [1] that manifested over the past 3 years was maintained on a mixture of topical vitamin D and steroid ointments [5] for over 6 months at the clinic. However, even after treatment with these topical ointments, her skin lesions showed scaly delimited erythematous plaques which developed mainly on the lateral borders of the feet (Figure 1a). The lesions

included several vesiculo-pustules on both soles, which had become less noticeable after topical treatment, and mild scales on the palms. Extra-palmoplantar lesions and systemic symptoms, such as joint pain, were absent. Additionally, she had dental caries, gingivitis and prosthesis. On the basis of the antimicrobial activity of ozone [9], I explained the therapeutic possibility of ozone to her. Subsequently, she voluntarily offered to perform ozone therapy. In conjunction with the former topical treatment, each night, she rinsed her oral cavity, particularly the periodontal areas, for a couple of minutes with 10–20 ml of ONB water. Following this oral rinse with ONB water for about 3 months, her skin lesions nearly completely resolved (Figure 1b). It is notable that even after termination of the ozone treatment at about 6 months, there has been no recurrence of this disease for more than 6 years.



Figure 1. a. The scaly delimited erythematous plaques, including several pustules, that were found before the ozone treatment still remained on the soles of Case 1, despite becoming less noticeable after topical ointment therapy for around 6 months. b. Nearly normal appearance of the patient's soles after 3 months ozone treatment, although slight scales and faint erythematous appearance can still be observed.

2.2. Case 2

A 67-year-old female patient with relatively severe PPP lesions [1] that occurred over the past 2 years, exhibited scaly erythematous lesions, including several vesiculo-pustules on both soles and/or palms, but without extra-palmoplantar lesions and systemic symptoms, such as joint pain. Additionally, she had dental caries, gingivitis, dental prosthesis and loss of few teeth. She was maintained on a mixture of topical vitamin D and steroid ointments [5] for over 6 months at the clinic. Even with this therapy, the patient's skin lesions had not improved much. As in Case 1, this patient also purchased commercially available ONB water and voluntarily offered to perform oral rinses with ozone water daily in the periodontal area. However, at her own discretion, she discontinued this after two months because her lesions disappeared. There was relapse, but the lesions resolved again 1 month after resumption of ONB water treatment. Even following the termination of the ozone treatment after about 6 months, there has been no recurrence of this disease for more than 5 years.

3. Discussion

In both cases, the skin lesions resolved completely within several months by the addition of ONB water to the routine topical treatment. In case 2, the patient discontinued treatment after two months and showed relapse. Therefore, depending on the severity of the disease, I believe that the treatment should be continued for at least 3 months or more. So far, ozone water can be significantly effective for treating PPP, although complete removal of dental plaques and calculus by mechanical debridement may be very difficult sometimes. This agent has been attracting attention as an adjuvant treatment for periodontal disease, such as periodontitis [10]; thus, skin lesions of patients with PPP may heal following treatment of periodontal disease using ozone water oral rinse. Although ONB water [9] has been marketed in Japan, it has not been approved for medical use. However, we believe that the beneficial effects shown here should be evaluated further. Its safety, non-cytotoxicity in human oral tissues, and antiseptic effects have already been established [9]. Moreover, its effects are mechanical; hence, unlike antibiotics, tolerance is not induced so far [9]. Application or addition of ONB water oral rinse may be an effective and safer approach for treating PPP.

4. Conclusion

The results of this report support the use of ONB water as an effective therapeutic means for the resolution of skin lesions in patients with PPP. We hope that the usefulness of ONB water is established in the future as a reliable and safer treatment method for PPP that is suggested to be caused by oral bacteria, especially periodontopathic bacteria.

Acknowledgements

Ozone nano-bubble water treatment in the two cases was performed at the patient's own discretion.

The author would like to thank *Editage* for English language editing.

Consent

The examination of the patients in this report was conducted according to the Declaration of Helsinki principles.

Abbreviations

PPP-Palmoplantar pustulosis
PUVA -Psoralen plus Ultraviolet A light
ONB- Ozone nano-bubble

Source of Support

Nil.

Conflict of Interest

None declared.

References

- [1] Brunasso G, Massone C. Palmoplantar pustulosis: Epidemiology, clinical features, and diagnosis. Up To Date 2015 [open access]
- [2] Olazagasti JM, Ma JE, Wetter DA. Clinical features, etiologic factors, associated disorders, and treatment of palmoplantar pustulosis: The Mayo Clinic experience, 1996-2013. *Mayo Clinic Proc* 2017; 92 (9): 1351-8.
- [3] Kikuchi N, Yamamoto T. Dental infection as a triggering factor for palmoplantar pustulosis. *Acta Derm Venereol* 2013; 93 (6): 721-2.
- [4] Murai O, Suwabe K, Ohkawa Y, et al. Palmoplantar pustulosis and periodontal therapy. *Nihon Shishubyo Gakkai Kaishi* 2018; 60 (3): 131-8. [in Japanese].
- [5] Muro M, Kawakami H, Matsumoto Y, et al. Topical combination therapy with vitamin D3 and corticosteroid ointment for palmoplantar pustulosis: A prospective, randomized, left-right comparison study. *J Dermatolog Treat* 2016; 27 (1): 51-3.
- [6] Agren-Jonsson S, Tegner E. PUVA therapy for palmoplantar pustulosis. *Acta Derm Venereol* 1985; 65 (6): 531-5.
- [7] Horiuchi Y. Palmoplantar pustulosis: Oral bacteria as a causative factor and ozone as an effective therapeutic means? *Our Dermatol Online* 2019; 10 (4):398-9.
- [8] Dufresne S, Hewitt A, Robitaille S. Ozone sterilization: Another option for healthcare in the 21st Century. *Am J Inf Cont* 2004; 32 (3): e26-7.
- [9] Hayakumo S, Arakawa S, Takahashi M, et al. Effects of ozone nano-bubble water on periodontopathic bacteria and oral cells-*in vitro* studies. *Sci Tech Adv Mater* 2014; 15: 055003.
- [10] Hayakumo S, Arakawa S, Mano Y, et al. Clinical and microbiological effects of ozone nano-bubble water irrigation as an adjunct to mechanical subgingival debridement in periodontitis patients in a randomized controlled trial. *Clin Oral Investig* 2013; 17 (2): 379-88.