

Verruca Vulgaris: Novel Treatment With A 1064nm Nd:YAG Laser

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ABSTRACT

Background: Verruca Vulgaris is common benign neoplasm. However, it can present a therapeutic challenge. Previous studies have suggested that the Nd:YAG laser may be beneficial in the management of warts.

Objective: To determine the effectiveness and safety of a novel 100 microsecond pulsed 1064nm Nd:YAG laser for the treatment of Verruca Vulgaris

Method: 25 adult subjects with a total of 63 hand verrucae were enrolled in the clinical trial to receive treatment with a low energy (200mjoule) 1064nm Nd:YAG laser (PinPointe FootLaser, NuvoLase, Inc.). Each subject was eligible for 3 treatments administered at monthly intervals. All verrucae were measured before each treatment session and at 6 months after the final treatment.

RESULTS: A complete response was seen in 19 subjects and in 41 verrucae. A complete response was defined as complete absence of verruca with the presence of normal skin dermatoglyphics. All other lesions showed at least partial response. A partial response was defined as a 50% or greater reduction in verruca size. No adverse events were noted.

CONCLUSION: Low energy 1064nm Nd:YAG laser treatment may be a promising safe and effective therapeutic modality for the treatment of verruca vulgaris. However, more treatment sessions may be needed for complete clearance and increased efficacy in some subjects.

Key words: Nd:YAG, warts, verruca, lasers

INTRODUCTION

Verruca vulgaris (VV), is a benign cutaneous neoplasm resulting from infection with the human papillomavirus (HPV). Transmission of HPV occurs via direct skin-to-skin contact or indirectly from contaminated inanimate objects when the skin's protective barrier is compromised. Studies have suggested a prevalence rate of 5-30% in children and young adults (1, 2). The natural history for 2/3 of warts is spontaneous regression in 2 years however, a lack of ability to mount an adequate cell mediated immune response to HPV may prohibit resolution (3, 4). Autoinoculation often occurs from digital warts which present a therapeutic challenge due to their resistant and recurrent nature.

Patients present for medical intervention due to a variety of reasons including social embarrassment, interference of function, pain and discomfort, bleeding or frustration with failed at home remedies. To date all treatment modalities have limited efficacy and there is no antiviral treatment that is specific for HPV. The basic therapeutic strategy for treating warts is extirpation of the epidermal stem cells infected by the virus (5). Conventional therapies for verruca vulgaris include cryotherapy, chemical cautery with agent such as salicylic acid, cantharidin, electrocautery, surgical excision, intralesional bleomycin and carbon dioxide lasers. Immunotherapy approaches include oral cimetidine, topical imiquimod and intralesional antigen (6). To date no single therapeutic modality has been shown to be 100% effective in achieving complete remission. Higher remission rates have been reported with combined therapy, the most common approach being cryotherapy and salicylic acid (7).

Photodynamic therapy, pulse dye lasers (PDL) and long-pulsed Nd:YAG lasers (LP-Nd:YAG) have emerged as promising alternative treatments. The proposed mechanism of action for both PDL and Nd:YAG lasers has been coagulation and destruction of blood vessels in the papillary dermis of warts (8, 9, 10). In this clinical study we

determine the effectiveness and safety of a novel low energy long pulsed 1064 nm Nd:YAG laser for the treatment of verruca vulgaris.

METHOD: 25 adult subjects (18F/7M; age range 23-46 years) with a total of 63 hand verrucae were enrolled in a clinical trial to receive treatment with a low energy (200mjoule) 1064nm Nd:YAG laser (PinPointe FootLaser, NuvoLase, Inc.). Settings were P3, (5.5 watts, 1msec pulses and 30Hz). Topical anesthesia was offered as an option; however it is not required and was not used by most subjects. Each subject was eligible for 3 treatments administered at monthly intervals. All verrucae were measured before each treatment session and at 6 months after the final treatment. The number of laser passes was between 4 and 8 depending on thickness of lesion. The endpoint was visible erythema of the treated area.

RESULTS: A complete response was seen in 19 patients and in 41 verrucae. A complete response was defined as complete absence of verrucae with the presence of normal skin dermatoglyphics. All other lesions showed at least partial response. A partial response was defined as a 50% or greater reduction in verruca size. Minimal discomfort was reported with only 7 patients asking for topical anesthesia. No scarring was noted (Figure 1-4).

DISCUSSION:

Treatment of verrucae has remained a therapeutic challenge to dermatologists. Verrucae are more common in Caucasians, school aged children and in the immunocompromised. It is not uncommon for warts to remain persistent in adults for 5-10 years. While the goal of therapy is complete resolution to address the physical and psychological impact of warts, acceptable treatment modalities need to minimize the risk of pain, infection, dyschromia and scarring. There are numerous treatments for warts,

and whether used singly or in combination they often show variable results (1). Cryotherapy is considered a reasonable 1st line therapy for most common warts. Therapy is relatively easy but pain control can be an issue and the effectiveness is limited.

Laser therapy has been used during the last decade as a new effective treatment for warts, especially the recalcitrant types (11). Ablative carbon dioxide laser use for verruca has largely been replaced by non-invasive PDL and Nd:YAG lasers which result in fewer adverse effects both for the patient and clinician. PDL has been the laser most frequently studied and used. It acts by destroying wart vessel vasculature through hemoglobin's absorption peak at 585–595 nm. Direct thermal injury to the heat-sensitive HPV virus may also play a role. Cohort studies have reported patient clearance rates with PDL of 32–75%. The main side-effects of PDL treatments include local pain, hemorrhagic bullae, pigmentary changes and scarring (1).

The long-pulsed 1064 Nd:YAG laser can also serve as an effective device for the treatment of VV. The mechanism of action is thought to be similar to that of PDL though hemoglobin has a more modest absorption peak between 800 and 1,100 nm. The longer wavelength with lower hemoglobin and melanin absorption coefficients allows delivery of light energy deeper onto the hyperkeratotic epidermis often associated with warts (10). Moreover, decreased light absorption by melanin at 1064nm reduces the risk of pigmentary side effects(13).

Han et al conducted one of the largest studies reporting a 96% complete clearance rate of recalcitrant common, palmoplantar and periungual warts in 369 patients treated with long-pulsed, high fluence Nd:YAG laser. Significant side effects were noted and included transient pain during treatment (82%), post-treatment numbness (15%), hemorrhagic bullae (7%), hyperpigmentation (5%), and hypopigmentation (4%) when fluences of 200 J/cm² were utilized (12). Kimura et al had a lower complete clearance rate of 56% for

their study using fluences 150-185 J/cm² (10). In a comparative study for the treatment of recalcitrant plantar warts using PDL vs Nd:YAG, El-Mohamady et al noted similar success rates with both the PDL and Nd:YAG lasers. However high fluence Nd:YAG laser treatment led to quicker clearances, but more complications than were seen with the PDL (11).

Long-pulsed Nd:YAG laser is a novel treatment for verruca vulgaris. Our study has demonstrated that this therapeutic modality is safe and effective for the treatment of warts. We chose a lower fluence system and saw no complications. Treatment was also easily tolerated. As a treatment option the Nd:YAG laser also has the potential to improve patients quality of life by decreasing the time period needed for clearance. There is no system that is specifically anti-viral and more treatments may have led to even greater results.

Figure 1: Before Treatment



Figure 2: 6 months after 3 treatments. 50% improvement



Figure 3: Before treatment



Figure 4: 6 months after 3 treatments. 100% improvement and normal dermatoglyphics.



REFERENCES

1. Sterling JC, Gibbs S, Haque Hussain SS et al. British Association of Dermatologists' Guideline for the management of cutaneous warts 2014. Br J Dermatology Oct 2014;133:10
2. Housman TS, Jorizzo JL. Anecdotal reports of 3 cases illustrating a spectrum of resistant common warts treated with cryotherapy followed by topical imiquimod and salicylic acid. J Am Acad Dermatol. 2002 Oct; 47(4 Suppl):S217-20
3. Bruggink SC, Eekhof JA, Egberts PF et al. Natural course of cutaneous warts among primary school children : a prospective cohort : a prospective cohort
4. Perrett CM, Harwood C, Brown V et al. Topical 5% imiquimod treatment for refractory cutaneous warts. J Am Acad Dermatol 2004; 164(Suppl):41.
5. Egawa K. Do human papillomaviruses target epidermal stem cells? Dermatology 2003; 207: 251–254.
6. Dall'oglio F, D'Amico V, Nasca MR. Treatment of cutaneous warts: an evidence-based review. Am J Clin Dermatol 2012; 13: 73–96.
7. Van Brederode RL, Engel ED. Combined cryotherapy/70% salicylic acid treatment for plantar verrucae. J Foot Ankle Surg 2001; 40:36–41.
8. Fabbrocini G, Di Costanzo MP, Riccardo AM et al. Photodynamic therapy with topical delta-aminolaevulinic acid for the treatment of plantar warts. J Photochem Photobiol, B 2001;61:30–4.
9. Kauvar AN, Geronemus RG. Pulsed-dye laser versus conventional therapy in the treatment of warts. J Am Acad Dermatol 2001;45:151–2
10. Kimura, U., Takeuchi, K., Kinoshita, A et al. Long-pulsed 1064-nm neodymium:yttrium–aluminum–garnet laser treatment for refractory warts on hands and feet. J Dermatol. 2014 Mar;41(3):252-7.
11. El-Mohamady AE, Mearag I, El-Khalawany M, Elshahed A et al. Pulse dye laser versus Nd:YAG laser in the treatment of plantar warts: a comparative study. Lasers Med Sci (2014) 29:1111–1116
12. Han TY, Lee JH, Lee CK et al. Long-pulsed Nd:YAG laser treatment of warts: report on a series of 369 cases. J Korean Med Sci 2009; 24:889–93.
13. Park HS, Choi WS. Pulsed dye laser treatment for viral warts: a study of 120 patients. J Dermatol 2008; 35:491–8.
14. Ross BS, Levine VJ, Nehal K et al. Pulsed dye laser treatment of warts: an update. Dermatol Surg 1999; 25:377–80.
15. Sethuraman G, Richards KA, Hiremagalore RN, Wagner A. Effectiveness of pulsed dye laser in the treatment of recalcitrant warts in children. Dermatol Surg 2010; 36:58–65.



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