



EXCISION OF WARTS USING 980NM DIODE LASER: A CASE REPORT

Cosmetology

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ABSTRACT

Cutaneous warts are common viral skin lesions caused by human papillomavirus that can be challenging to treat and frustrating for physicians and patients. Although several treatment options exist, there is no single treatment that can ensure a complete response with lack of lesion recurrence. Laser light has been tried in the treatment of resistant warts with effective results in different studies. Many studies have used diode laser with great success for wart clearance.

In our case report, three cases of wart removal with 980nm diode laser are presented. In all cases successful treatment of the wart was achieved. Apart from the transient pain for 4 hours in one patient, there were no other discomforts during the treatment and side effects. There were no signs of recurrence also after one year. Also, recurrence or signs of it were also absent at the end of one year.

We can conclude that diode lasers could be considered as a valuable alternative to all other traditional methods. The procedure was well-tolerated, safe and effective treatment and that the diode lasers could eliminate the verrucae and their sequelae of recurrence, scarring and post-operative pain.

KEYWORDS

Human Papilloma Virus, Wart, Diode Laser, Laser Parameters.

INTRODUCTION

Warts are the cutaneous manifestations of human papilloma virus (HPV) and may exist in different forms depending on the virus type and the epithelial surface involved.¹ Cutaneous warts are benign epidermal proliferation of HPV infected epidermal cells which results in cell proliferation and a thickened, warty papule on the skin.² The papilloma viruses comprise a large family of small (50–55 nm diameter), double-stranded DNA viruses found in humans and many other species.¹ Individual variations in cell-mediated immunity may explain differences in severity and duration of warts.³ The most common warts on the hands and feet are caused by HPV types 1, 2, 4, 27 and 57.⁴

Cutaneous warts are generally diagnosed by their clinical appearance. However, a histological examination may need to be performed for warts resistant to treatment and for verrucous lesions in immunocompromised individuals.⁵ The characteristic appearance of the different types of warts are as follows:⁶

- *Common warts* are firm and raised with rough edges like a cauliflower;
- *Plane warts* are round, flat-topped and yellow, and they are commonly seen on the back of hands;
- *Filiform warts* are long, finger-like warts common on the face and neck;
- *Palmar and plantar warts* grow on palms (palmar) and soles of feet (plantar). Often seen with thrombosed capillaries, which appear as a central black dot (these do not appear in corns and calluses);
- *Periungual warts* occur around fingernails and toenails, and appear as thickened, cauliflower-like skin;
- *Mosaic warts* are multiple palmar or plantar warts that coalesce on hands or feet.

Treatments may initially be effective but recurrences after treatments are common.^{7,8} Warts that fail to respond to conventional treatment have been considered as recalcitrant.³ The treatment of warts can be broadly classified into destructive, antimetabolic, virucidal, immunotherapy, combination therapies and some folk and alternative therapies which have recently become popular again.^{1,5}

Here we present three cases where 980nm diode laser for destructive therapy was used successfully for the excision of filiform and palmar type of recalcitrant warts from the face, neck and palms, proving the efficacy and safety of this mode of treatment.

CASE DESCRIPTION

All three cases were treated in the outpatient department at Mary

Queens Mission Hospital, Kottayam, Kerala, India. Patients presented with a history of surgical removal of the wart under local anaesthesia one year ago which reappeared after 3-4 months. After briefing the patients about the laser procedure and follow up protocol, a signed consent form was obtained. Patients were evaluated for a period of one year.

Case 1 & 2

Two patients, a 38 year old female and 33 year old male patient visited the hospital complaining of recurrent wart on the right side of the neck and anterior to the tragus of the right ear respectively. The patients desired to get it removed because of regrowth and/or persistence, discomfort and social stigma. Filiform warts are most often seen on the face and neck with characteristic frond-like projections that exhibit quick proliferations.^{9,10} The lesion was diagnosed as *Verruca vulgaris*/recurrent cutaneous filiform type of wart, with the help of patient's previous medical history and clinical appearance (Fig.1&3).

Pre-surgical preparation of warts lesion was done by sterilizing the area with 10% povidone iodine solution. Topical anaesthesia (lignocaine hydrochloride) was administered on the surface to be treated and after achieving adequate numbness, a 980nm semiconductor diode laser (Indilase, Medsol, Hosur, Tamil Nadu, INDIA) was used for excision. The wart was held with a sterile non-toothed tissue holding forceps and slightly stretched so that mild tension develops in the tissue which in turn enables precise and swift ablation of the lesion. The delivery system equipped with a 400µm flexible optic fiber laser tip was activated and directed towards the base of the lesion at 0.8 watts in a continuous wave and contact mode. Laser parameters used were: tip area- 0.0013cm² (spot area at tissue with 8 degrees of divergence), fluence (Total energy delivered) 48 Joules and power density (Irradiance) 637W/cm². The excision was done in such a manner that the tissue was slightly undermined from the base of the lesion with a radial pattern of hand movement (for lesions less than 0.5cm in diameter).

The procedure carried out was uneventful and well-tolerated by both the patients with no charring, pain or other side effects (Fig.2&4). The patients were seen on the next day looking for early post-operative complications and then recalled for follow up visits on a weekly basis for 3 weeks and thereafter on a monthly basis for one year to evaluate healing and wart clearance.

Case 3

A 24 year old male patient complaining of discomfort, irritant and recurrent wart on the palms of the right hand, claiming to have undergone two unsuccessful surgical treatments for the same, five

years ago. Palmar warts can be painful due to their callused, endophytic papules that have deeply penetrating slopes sides and a central depression.¹¹ Confirmatory diagnosis was made as *Verruca vulgaris*/ recurrent cutaneous palmar type of wart, according to patient's previous medical history and clinical appearance of the lesion.

After pre-surgical sterilization, unlike the previous cases, injectable local anaesthesia was administered owing to the chronic nature, extent and tissue bio-type of the lesion. After anaesthesia was procured, the laser tip was initiated and excision of the wart at 2.0 watts in continuous wave contact mode was done in a circular pattern of hand movement (for lesion larger than 0.5cm). The laser parameters were: tip area- 0.0013cm², fluence 600J and power density 1592W/cm². The patient tolerated the treatment well and exhibited no infections or adverse reactions (Fig.5). All three cases were done with a hand speed of 1mm/sec.

Laser Safety

Safety goggles for the corresponding laser device were worn by the operator, patient and assistant while the treatment done was in a closed cubicle with admission restricted to unauthorised personnel. Laser plume released during the procedure was vacuumed through a suction apparatus. Care was taken to avoid using laser in presence of explosive gasses and highly reflective or mirrored surface instruments, as there could be reflection of laser beam.¹²

DISCUSSION

Common warts have been a frustration for both patients and clinicians since early Greek and Roman times.¹³ They can greatly affect a patient's quality of life by causing embarrassment, fear of negative appraisal by others and frustration caused by persistence and/or recurrence. Moderate to extreme discomfort is reported in 51.7% of patients, and social or leisure activities are affected to a moderate to extreme degree in 38.8%.¹⁴

The ultimate wart treatment would resolve all or a great percentage of warts, be painless, need only one or a part of a wart treated, call for one to three treatments, create no scarring, offer HPV immunity for a lifetime and be available to all patients.¹⁵ Ideally, treatment should be simple with a minimal risk of adverse effects.¹⁶ In 1995, the American Academy of Dermatology developed criteria for the indications for wart treatment¹⁵ including: 1) *the patient's desire for therapy*, 2) *symptoms of pain, bleeding, itching or burning*, 3) *disabling or disfiguring lesions*, 4) *large numbers or large sizes of lesions*, 5) *the patient's desire to prevent the spread of warts to unblemished skin of self or others*, and 6) *an immunocompromised condition*.

Several treatment modalities have been suggested in the literature, ranging from folk and alternative remedies to immunotherapy, antimicrobial, virucidal therapy and lasers also.⁵ Different types of lasers like carbon dioxide (CO₂), Potassium-Titanyl-Phosphate (KTP), Erbium:Yttrium/Aluminum/Garnet (Er:YAG), Neodymium: YAG (Nd:YAG), diode laser, photodynamic therapy and pulse dye lasers have been described for treating recalcitrant warts with a clearance rate up to 89% using pulse dye laser.^{5,17} However, literature on diode lasers for wart ablation is limited.

Diode lasers have been a part of surgical scenario for more than a decade. Affordable, effective, user friendly diode lasers have only recently arrived on the scene. In fact, the diode laser, in a very short time, has proven itself to be ideal "soft-tissue hand piece." The advantages of laser use include: 1) *a relatively bloodless surgical and post-surgical course*, 2) *the ability to coagulate, vaporize, or ablate tissues*, 3) *sterilization of the wound site*, 4) *Minimal swelling and scarring*, 5) *little mechanical trauma*, 6) *reduced surgical time*, 7) *high patient acceptance*, 8) *less post-operative pain*, which may be attributed to the protein coagulum that is formed on the wound surface, thereby acting as a biological dressing and sealing the ends of the sensory nerves 9) *smaller size of the device as well as lower financial costs*.¹⁸ Laser light at 800 to 980nm is poorly absorbed in water, but highly absorbed in haemoglobin and other pigments.¹⁹ Therefore, an attempt was done to prove the efficacy and build on the limited literature of 980nm diode lasers for wart removal.

In this report, we presented three cases of persistent warts which were successfully treated with 980nm diode laser and followed up for one year. In all cases the patient complied with the treatment and revealed

no discomfort or side effects. All cases showed uneventful healing and no infections; almost certainly due to the "hot-tip" effect at the end of the fiber providing a self-sterilizing action.

Apart from a transient post-operative pain for about 4 hours in Case 3, which was managed without analgesics, all other patients experienced a painless and comfortable session intra-operatively, immediately after the procedure and post-operatively. The pain probably could be because of the comparatively extensive lesion to be excised and higher power settings used in Case 3.

Variety of cases previously demonstrated scarring using different other types of laser. In our case, no scarring was seen and this could be attributed to the fact of choosing the ideal laser parameters and technique used to avoid deleterious effects. The lesion excised/ablated in all cases were slightly undermined to remove the entire lesion from the base, since the HPV has been demonstrated in apparently normal epidermis surrounding viral warts.²⁰ The wart clearance rate could largely depend on the complete removal of the lesion. Our cases showed no signs of reoccurrence with a clearance rate of 100%, even after one year, which could be courtesy the anti-microbial property²¹⁻²³ which has been well documented and the potential anti-viral effects of diode lasers (Fig.6).

Many different approaches exist, including observation and treatments that can be combined for greater effectiveness.²⁴ Different types of warts may need different site-dependent treatments and combination therapies possibly using diode lasers together with anti-viral remedies could influence the end results. Amid the wake of the novel virus, COVID-19, the probable anti-viral effects of diode lasers should be scrutinized with more evidence based trials on viruses which could be the reason for non-reoccurrence of the warts in this report.



Fig-1 Preoperative View (Case 1)



Fig-2 Immediate Postoperative (Case 1)

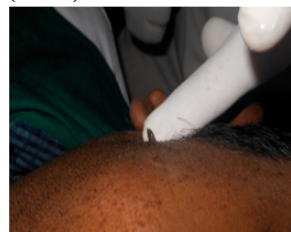


Fig-3 Preoperative View (Case 2)

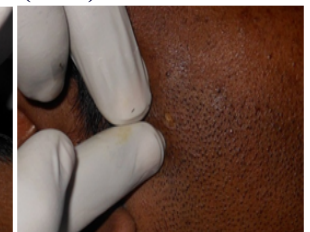


Fig-4 Immediate Postoperative (Case 2)



Fig-5 Immediate Post operative (Case 3)



Fig-6 One year Postoperative (Case 3)

CONCLUSION & OUTLOOK

Diode laser is a versatile and valuable device for a myriad of soft tissue procedures as long as the principles and fundamentals of lasers are applied. With complete patient acceptance, satisfaction, minimum collateral damage, decreased postoperative complications, absence of scarring and recurrence, the diode laser has substantiated to be a safe, effective and non-invasive alternative for the treatment of warts.

However, more comparative trials with larger sample size are necessary to establish the efficacy and ideal laser parameters.

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