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**Original Article**

# Efficacy of intralesional vitamin D3 in plantar warts

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## Abstract

***Objective*** To determine the efficacy of intralesional vitamin D3 in treatment of plantar warts.

***Methods*** Total 65 participants, of either gender, with clinical diagnosis of plantar warts were enrolled in the study after taking informed written consent. In each session, selected wart was first injected with 0.2ml (20mg/ml) lignocaine and then 0.6 ml of intralesional vitamin D3 injection (2,00000 IU) was injected with 27-gauge insulin syringe at the base of selected wart. Total 4 sessions were performed every 2 weeks. All patients were clinically assessed for change in size of wart before the first session, every two weeks for the next four sessions, and then at the follow-up period of two weeks after the last session. The treatment was considered effective if there was complete resolution of wart on inspection and palpation at the end of 10 weeks, as final assessment was done 2 weeks after last injection.

***Results*** The patients' average age was 26.69±4.63 years. Out of 65 patients, 57.7% (n=57) were between the ages of 18-30; and 8.3% (n=8) were between the ages of 31-45. There were 26.2 percent females (n=17) and 73.8 percent were males (n=48). Treatment was considered effective on complete clearance of wart. In a total of 65 patients, procedure was found to be effective in forty-six patients (70.8%).

***Conclusion*** In our study intralesional vitamin D3was effective in 70.8% patients.

***Key words***
Intralesional; Vitamin D3; Warts.

## Introduction

Cutaneous warts are benign skin proliferations of epidermal origin caused by Human Papilloma Virus (HPV).[1,2] A plantar wart presents as a firm papule or nodule on the plantar aspect of foot with rough horny surface and well-defined roughened border and hyperkeratotic surface.[3]

Warts are common worldwide. Annual incidence of plantar warts is about 14% in general population.[4] Warts can spread quickly. Common risk factors of acquiring a wart include a prior wart, intimate touch with anyone else who has a wart, and contact with any contaminated surfaces.[4] They may spontaneously resolve after a few months to a few years. The time it takes for a plantar wart to spontaneously heal varies with age, with a mean time of one year in children but up to several years in adults.[1] The majority of plantar warts, especially those on the pressure points of the soles, are painful, which limits activity and may result in social, physical, and psychological misery. Patients are worried because of their slowly growing size, number, and ability to infect other family members.[1,4-6]

For the treatment of viral warts, there are many options. Treatment failure and recurrences are frequent despite the use of topical treatments

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such as salicylic acid, 5-fluorouracil, Imiquimod, formalin soaks, caustics, and retinoic acid. Cryotherapy, excision, electrical fulguration, laser therapy, and photodynamic therapy are further invasive therapeutic options. HPV infiltrated epidermal cells are destroyed by these treatments.[1,7]

Oral medications including zinc sulphate, cimetidine, systemic retinoid, and intravenous cidofovir are examples of systemic therapy.[6]

These therapy options call for multiple sessions and may result in non-compliance. Scarring, hypo/hyper pigmentation, blister formation, and frequent recurrences are all potential adverse effects.[7,8] A more modern choice for therapy is required, one that has fewer side effects and achieves full resolution in fewer sessions.

Topical, systemic, and intralesional immunotherapeutic techniques are now increasingly used to treat warts due to their demonstrated success. Intralesional immunotherapeutic options include measles, mumps, and rubella (MMR) vaccine, Mycobacterium vaccine, BCG vaccine, candida albicans antigen, and intralesional vitamin D3.[5,8-10]

These therapeutic solutions are non-destructive, economical, and do not cause scarring.[5,11] Immunotherapy increases the host's cell-mediated immunity against HPV, totally eliminating the wart and reducing the risk of recurrence.[6] A vitamin D derivative regulates cytokine production, differentiation and proliferation of keratinocytes, and also increases cell mediated immunity.[5,7] The use of vitamin D3 derivatives in the treatment of warts has only recently been documented in a few local trials with good results. Because of this, it is intended that this study will assess how well vitamin D3 injections work to treat plantar warts.

## Methods

This study was carried out over a period of six months from 18.03.2021 to 18.09.2021 in Jinnah hospital Lahore.

A total of 65 patients of either gender were enrolled in this study. All these patients were instructed not to use any home remedies for warts in this time period. Pregnant and lactating women, patients taking immunomodulators, having connective tissue disease, those who had known hypersensitivity to vitamin D3 and patients who had undergone any topical or destructive treatment were excluded from study.

All patients received intralesional vitamin D3 treatment after providing written informed consent, receiving approval from the hospital ethical board, and briefly discussing the process. The selected wart was first given a 0.2 ml (20 mg/ml) injection of lidocaine. A 27-gauge insulin syringe was used to slowly inject 0.6 ml of vitamin D3 at the base of the selected wart every 2 weeks for a maximum of 4 sessions, or until complete clearance, whichever came first. Clinical changes and adverse effects were noted before every session i.e. every 2 weeks. After eight weeks, the treatment was considered successful if the wart had completely disappeared upon observation and palpation. Data stratification was used to address effect modifiers like age, gender and duration of warts.

## Results

The age of patients ranged from 18-45 years with a mean age of 26.69±4.63years. The maximum number of patients were in age group of 18-30 years (87.7%) and 12.3% were in age group 31-45. Out of 65 patients 33 were male and 32 were female. The mean duration of warts was 4.71±3.57 months. In a total of 65 patients, forty-six patients (70.8%) patients reported

**Table 1**Distribution of efficacy (n= 65).

| *Efficacy* | *Frequency* | *Percent* |
|---|---|---|
| Yes | 46 | 70.8 |
| No | 19 | 29.2 |
| Total | 65 | 100.0 |

efficacy of the procedure while nineteen (29.2%) patients did not find the procedure effective, When response of patient was stratified according to age, gender and duration of warts, it was found that there was no statistically significant difference in the groups (p value>0.05).

## Discussion

Plantar warts are a very common skin disease occurring in children and young adults. More than 150 different kinds of the human papillomavirus (HPV) causing warts have been found, and it most likely spreads by minor skin damage. Use of shared showers, professional handling of meat, and immunosuppression are risk factors. In immunocompetent people, warts are harmless and disappear as a result of innate immunity, although HPV can stay contagious for months or years.[12]

Many warts are difficult to cure, notably palmoplantar warts, and typically require many electrocautery and cryotherapy sessions. Pigmentation and scarring are frequently associated with these procedures. Additionally, there is a high risk of recurrence and certain warts are resistant to some treatments. The best option for eliminating both treated and untreated warts is immunotherapy since it enhances the immune system against HPV. Furthermore, compared to destructive procedures, recurrence rates are quite low.[13,14-16]

Immunotherapy has been tried with various antigens and vaccines such as Bleomycin, PPD, MMR, Candida Albicans and Mycobacterium vaccine.[8]

Precise mechanism of action of vitamin D in treating warts is still not clear. Through a VDR-dependent pathway it exerts immunomodulatory effects by inhibiting the expression of interleukin-6 (IL-6), IL-8, tumour necrosis factor (TNF)- α and (TNF) -γ.[17]

In the current study 87.7% (n=57) of the 65 patients were in the age range of 18-30, and 12.3% (n=8) were in the 31-45 age group. The average age was 26.69±4.63. Average

**Table 2** Stratification for effectiveness with respect to age using chi-square test (n= 65).

| | | | *Effectiveness* | | *Total* | *p-value* |
|---|---|---|---|---|---|---|
| | | | *Yes* | *No* | | |
| Age group | 18-30 years | Count | 39 | 18 | 57 | 0.267 |
| | | % of Total | 60.0% | 27.7% | 87.7% | |
| | 31-45 years | Count | 7 | 1 | 8 | |
| | | % of Total | 10.8% | 1.5% | 12.3% | |
| Total | | Count | 46 | 19 | 65 | |
| | | % of Total | 70.8% | 29.2% | 100.0% | |

**Table 3** Stratification for effectiveness with respect to duration of warts using chi-square test (n= 65).

| | | | *Effectiveness* | | *Total* | *p value* |
|---|---|---|---|---|---|---|
| | | | *Yes* | *No* | | |
| Duration of warts | 1-3 months | Count | 26 | 8 | 34 | 0.290 |
| | | % of Total | 40.0% | 12.3% | 52.3% | |
| | > 3 months | Count | 20 | 11 | 31 | |
| | | % of Total | 30.8% | 16.9% | 47.7% | |
| Total | | Count | 46 | 19 | 65 | |
| | | % of Total | 70.8% | 29.2% | 100.0% | |

duration of warts was 4.71±3.57 months. Out of 65 patients, 33 patients (50.8%) were men and 32 patients (49.5%) were women. According to the effectiveness distribution, it was effective in 70.8 percent (n=46). The patients' ages in the study by Kavya *et al*. ranged from 12 to 66 years, with a mean of 20 years, and there were 27 men and 15 women. Mean duration of warts was 6 months. The number of warts varied from 2 to less than 30, and out of 23 patients with palmoplantar warts, full eradication was seen in 19 (82.60 percent), which is equivalent to our research.[8]

Forty patients were included in the comparative study by El-Magid *et al*. Patients were randomised into either the zinc or vitamin D3 groups. Patients in the vitamin D3 group got an intralesional injection of 0.3 ml of vitamin D3 (100,000 IU, 2.5 mg/ml), whereas those in the zinc group received an intralesional injection of 2 percent zinc sulphate. Patients who received vitamin D3 saw a full response in 80% of cases, while patients who received zinc sulphate saw a complete response in 70% of cases.[19]

The present study's findings are comparable to the study of Aktas *et al*. who also used intralesional Vitamin D3 to treat plantar warts. The trial had a total of 20 participants, and 7.5 mg of Vitamin D3 injection was administered once per month for a total of two sessions. At the end of 8 weeks, complete clearance was seen in 80% of patients.[20] The outcomes were comparable with our study. 93% response rate was noted in study carried out by Garg and Baveja, it can be attributed to more number of sessions. Furthermore, they reported systemic and local complications such as high-grade fever and redness, swelling, induration and ulcer formation at the injection site.[18]

There were 60 patients included in a research by Farah *et al*. Patients in the Intralesional D3 and cryotherapy groups had median ages of 32.80±8.65 and 32.87±1.13 years, respectively. 24 male and 6 female patients were included in the Intralesional-D3 group, while 22 male and 8 female patients were involved in the cryotherapy group. In the Intralesional-D3 and cryotherapy groups, the average number of warts was 2.50±1.00 and 2.47±1.07 respectively. In the Intralesional-D3 and cryotherapy groups, the average wart duration was 8.93±5.58 and 7.60±4.45 weeks respectively. 63.3% success rate was reported in intralesional D3 group as compared 43.3% in cryotherapy group.[12]

The present study shows that intralesional vitamin D3 has proven to be efficacious in treating plantar warts. It is simple, cost effective and has no potential side effect like scarring, hypo and hyper pigmentation.

## Conclusion

In current study we assessed the effectiveness of intralesional vitamin D3 in treatment of plantar warts. We found that out of 65 patients, 70.8% (n=46) got effectiveness. So we concluded that intralesional vitamin D3 is an effective treatment for plantar warts.

Plantar warts can be effectively treated with intralesional vitamin D injections. Larger studies with longer follow ups are required to draw substantial conclusions.

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