ORIGINAL ARTICLE

MICRONEEDLING VERSUS ADAPALENE GEL IN THE MANAGEMENT OF FACIAL PLANE WARTS: A HEAD-TO-HEAD CLINICAL TRIAL

Jahangir Khan[1], Huma Gul[2], Irfan Ullah[2], Mehran Khan[2], Muhammad Adnan Rashid[3]

[1]Department of Dermatology, Al Adan Hospital-Kuwait

[2]Department of Dermatology, Khyber Teaching Hospital, Peshawar-Pakistan, [3]Department of Community Medicine Ayub Medical College Abbottabad-Pakistan

Background: Development of Plane warts (verruca plana) on face is not uncommon and warrants treatment due to its unsightly appearance. A number of treatment options have been explored till date exhibiting variable efficacy. Adapalene gel is a 3rd generation retinoid that upon application onto the surface of skin can result in clearance of warts. Microneedling, a procedure in which skin is pricked with needles via a device recently gain popularity as it is utilized for a number of dermatological procedures including acne scars, alopecia, vitiligo and for skin rejuvenation. It is hypothesized that the resultant injury induces immune response that can result in clearance of warts. Lack of head-to-head clinical trials comparing the efficacy of microneedling and topical adapalene Gel for treatment of cutaneous warts compelled us to design this clinical research. Objective was to compare the efficacy of microneedling versus Adapalene gel in treatment of facial plane warts. **Methods**: The research commenced with the assent from hospitals ethical review committee. Clinical diagnosis of plane warts was done and then the study participants were recruited. This clinical trial was managed at Khyber Teaching Hospital, Peshawar, from January 2022 to December 2022. Block randomization was utilized to allocate 100 study participants equally into group A and group B. Patients gave written consent and were warned about the possible adverse events. Microneedling was performed on the participants in group A, while the other group was advised to apply topical adapalene gel daily onto the surface of warts at night. A total of three microneedling sessions were done, i.e., one session every four weeks. Clinical assessment was done monthly, and the final evaluation was done after 4 months of initiating treatment. The intervention was considered successful if all the warts resolved completely. Monthly follow-up for a total of 6 months was done to document the recurrences. **Results:** Twenty-nine (58%) study subjects from group A had complete resolution of lesions. In group B, 22 (44%) participants exhibited complete remission. p=0.1614. Partial response was appreciated in 7 (14%) participants who were treated with the Microneedling procedure and 8 (16%) patients from the adapalene-treated group showed partial improvement. **Conclusion:** Both Topical adapalene and microneedling are effective in treating facial plane warts.

Keywords: Facial warts; Plane warts; Adapalene; Verruca plana; Microneedling; Needling

Citation: Khan J, Gul H. Microneedling versus adapalene gel in the management of facial plane warts: A head-to-head clinical trial. J Ayub Med Coll Abbottabad 2025;37(1):132–5.

DOI: 10.55519/JAMC-01-13120

INTRODUCTION

Warts are one of the common dermatological disorders that we regularly see in our outpatients with a reported prevalence of 10.3% amongst school students.[1] The culprit behind the manifestations of this contagious nuisance is DNA virus known as the Human Papillomavirus (HPV). There are more than 200 known variants of HPV that can cause different types of warts. Types 1, 2, 4, 5, 7 and 28 can result in the development of plane warts (Verruca plana), that are usually multiple.[2,3]

Development of Plane warts (verruca plana) on face is not uncommon and warrants treatment due to its unsightly appearance. Several treatment options have been explored to date, exhibiting variable efficacy. Treatment of facial verruca plana is no easy task as destructive therapies like freezing the lesion with liquid nitrogen or electrodessication are generally avoided due to post-procedural risk of blistering, scarring and dyspigmentation.[4,5] Lack of availability of LASERS in many outpatient clinics makes them less accessible for many.[6]

Retinoids have been utilized topically for the management of facial verruca plana, specially in children. Retinoids act by inhibiting viral multiplication in keratinocytes and can also induce

death in virus infected cells. Regulation of cellular differential and translation are their known biological effects.[7] Adapalene gel is a 3rd generation retinoid that upon application onto the surface of skin can result in little to no irritation. Adapalene can effectively clear warts in young population as reported by Gupta *et al* who noticed its excellent results in 59.09% patients in their research.[8]

Microneedling has been recently utilized in a number of dermatological procedures including acne scars, alopecia, vitiligo and for skin rejuvenation. During the procedure, skin is pricked multiple times by needles via a device at a certain depth to cause the injury. It is hypothesized that the resultant injury induces immune response that can result in clearance of warts. Research has shown that treatment with this procedure is quite effective in clearing viral warts and researchers have documented an efficacy of 82% in one study.[9]

Lack of head-to-head clinical trials comparing the efficacy of microneedling and topical adapalene Gel for treatment of cutaneous warts compelled us to design this clinical research.

MATERIAL AND METHODS

Patients from the Dermatology outpatient department at Khyber Teaching Hospital, Peshawar, satisfying the inclusion criteria were chosen, following the assent from the Hospital's ethical review board (209/der/LRH). Information regarding the details of study was explained to the participants and their consent was obtained. Hospital Id number, sexual identity, age and name of the patient were noted. Detailed medical anamnesis was taken from the patients and a clinical assessment was done.

Participants from either gender having age over 12 years, with clinically diagnosed two are more verruca planna lesions on the face and neck, were randomly assigned by Block method into two groups. Patients who had received any previous therapy in the last one-month, pregnant females and immunocompromised patients were excluded from study. Informed consent was taken and procedure was explained to the research participants. Topical Adapalene was prescribed to the subjects in group A to applied once daily at night. Participants from group B were advised microneedling. Microneedling was done by a wireless derma Pen. To avoid the risk of spread to rest of the face only a single needle tip was used. And only one wart at a time was pricked after cleaning the lesion with alcohol. The depth of the needle was kept between 1.5–2 mm and local anaesthetic cream was applied to all the subjects an hour before the procedure. Device was kept perpendicular to the lesions and the pin point bleeding was the end point. The researcher repeated the same procedure every 4 weeks with a total of 3 sessions.

The final assessment of therapeutic response was done after 4 months of initiation of therapy. Complete resolution of all the lesions and return to normal skin was labelled as effective response. Partial response was labelled as more than 50% decrease in lesion count at 1st visit. A follow up at 6 months was done to record the number of recurrences.

Interpretation of the data was done by using SPSS-29. Total time span of disease and age were computed in terms of mean and standard deviation. The sexual identity and efficacy were estimated in terms of frequencies and percentages.

Stratification was used to control the confounding variables like time span, number of lesions, age and gender. Chi-square test was applied to establish the efficacy within groups. *P*-value of 0.05% or lower was labelled as significant.

RESULTS

Hundred participants that were inducted in our study were divided equally by block randomization into group A and group B. Forty-six (46%) research subjects were males while, 44 (44%) participants were females. 64% of the participants were younger than or equal to 20 years and overall, the average age was 20.26±5.903 years. Patients that received microneedling had an average age of 20.38±5.617 while participants who applied adapalene gel had an average age of 20.14±6.230 years. Average time span of the lesions before receiving the therapy was 9.19±4.431 months, i.e., of group A had disease for 8.94±4.424 months and group B had lesions for 9.44±4.468 months Table-1.

Lesions resolved completely in 29 (58%) study subjects from group A. In group B 22 (44%) participants exhibited complete remission. *p*=0.1614 Table-2. Partial response was appreciated in 7 (14%) participants that were treated with Microneedling procedure and 8 (16%) patients from adapalene treated group showed partial improvement.

Stratification of efficacy with respect gender, number of years, total time of illness was computed. (Table 3).

Table-1: Descriptive statistics of Age, duration of disease (Months)

Demographics	Group A (No. of patients=35) (Mean±SD)	Group B (No. of patients=35) (Mean±SD)
Age (in Years)	20.38±5.617	20.14±6.230
Duration of illness (in months)	9.19±4.431	8.94±4.424

Table-2: Efficacy (*n*=100)

	Efficacy Yes	Efficacy No	*p*-value
Microneedling treated group	29 (58%)	21 (42%)	0.1614
Adapalene Gel treated group	22 (44%)	28 (56%)	

Table-3: Stratification of efficacy with respect to identity, Patients age, duration of illness

		Efficacy	Microneedling group(*n*=50)	Adapalene Gel group (*n*=50)	*p*-value
Identity	Male	yes	18	15	0.861
		no	12	11	
	Female	yes	11	14	0.824
		no	9	10	
Patients Age in years	≤ 20	yes	19	15	0.637
		no	15	15	
	>20	yes	10	7	0.100
		no	6	13	
Disease Duration	Up to 6 months	yes	9	8	0.861
		no	9	9	
	More than 6 months	yes	20	14	0.105
		no	12	19	

DISCUSSION

Our clinical research compared mirco needling with topical adapalene Gel in managing facial plane warts. Both the treatments were found to be comparable, and the overall efficacy of Microneedling was 58% while topically applied adapalene Gel depicted an efficacy of 44%.

Oren-Shabtai M *et al* conducted a system review and concluded that topical retinoid were effective in treating cutaneous warts and resulted in complete resolution of lesions in 64% of the cases, with a relapse rate of 6% at the cost of mild local side effects.[10]

An open label clinical study in which a total of 10 participants having 118 plantar warts were treated, claimed that adapalene gel application onto the surface of the lesion has completely cleared all the lesions.[11] A randomized control clinical trial designed by the same author, inducted 50 subjects having a total of 424 warts and compared liquid nitrogen with Topical adapalene. Topical adapalene gel 0.1% was able to completely clear all the lesions in 36.71±19.24 Days. Liquid nitrogen took 52.17±30.06 days to achieve a similar response. Treatment failure was noticed in only one participant from each group. Adaline didn't exhibit any significant side effects while blistering and scarring were documented cryotherapy treated arm.[12]

Topical Adapalene was reported to induce complete remission in 26 (59.09%) children having common and plane warts and satisfactory response in 11 (25%) cases as mentioned by Gupta *et al.* Treatment failure was noticed in 7% of the cases.[7] In a national research that recruited 42 patients in each arm, Adapalene gel under occlusion was found more capable of completely clearing all the warts in 35.619±3.154 days as compared to cryotherapy.[13] Like adapalenene another topical retinoid, tretinoin 0.05% in a case-control study showed excellent response in 84.6% of cases in comparison to a control group that depicted clearance in 32% of the cases.[14]

De Vita *et al* conducted clinical research to determine the effectiveness of microneedling in cutaneous warts. Researchers came to a conclusion that 82% warts were completely resolved while 10% showed partial improvement. 8% of the warts were refractory to treatment. The study didn't document any significant adverse event and range for resolution of lesions was from 14 to 42 days.[15]

Researchers have managed a clinical trial, in which Ninety patients were randomly allocated to 3 groups to evaluate intralesional 5-fluorouracil against microneedling either alone or as an adjuvant to 5-fluorouracil solution in the treatment of warts. Micro needling alone showed comparable efficacy, i.e., 70% as compared to 76.7% shown by intralesional 5 fluorouracil.[14] On the contrary another clinical research documented the efficacy of microneedling alone to be around 26% in comparison to 73.4% shown by micro-needling plus topically applied bleomycin.[16]

A systemic review that evaluated the performance of Fire(hot) needle therapy in the treatment of verruca plana depicted that the use of fire needle therapy alone is superior to immunomodulators.[17] This procedure is a type of acupuncture in which the lesions were pricked by a preheated hot needle.

Cunningham DJ *et al* reported in their research, that 64.7% participants who received liquid nitrogen, i.e., 11 out of 17 showed full resolution of the primary plantar wart while only 1 (6.2%) patient out of 16 was able to clear the warts in microneedling-treated arm.[18]

Kumari P *et al* have documented in their non-randomized clinical research that Falkner's needling

method achieved an efficacy of 70.7% in the treatment of warts.[19]

Our clinical research proves the efficacy of both microneedling and topical adapalene Gel. Our study results found the efficacy of topical adapalene gel to be around 38%, unlike other published national studies that have reported the efficacy of adapalene to be more than 90%.[13]

CONCLUSION

Both Topical adapalene and microneedling can be used as a treatment option for facial plane warts. Microneedling has a slightly higher efficacy than topical adapalene Gel. Further clinical trials incorporating the combination of microneedling and Topical adapalene should be prioritized and long-term follow-up to document the recurrences and associated adverse effects should be encouraged.

AUTHORS CONTRIBUTION

JK: Conceptualization, data collection, literature review, manuscript writing. HG: Concept, data collection, literature review, manuscript writing. IU: Concept, literature review. MK: Literature review, proof reading. MAR: Data analysis, proof reading.

REFERENCES

1. Essa N, Saleh MA, Mostafa RM, Taha EA, Ismail TA. Prevalence and factors associated with warts in primary school children in Tema District, Sohag Governorate, Egypt. J Egypt Public Health Assoc 2019;94(1):6–7.
2. Redzic N, Pereira AR, Menon S, Bogers J, Coppens A, Kehoe K, *et al.* Characterization of type-specific HPV prevalence in a population of persistent cutaneous warts in Flanders, Belgium. Sci Rep 2023;13(1):17492.
3. Ghadgepatil SS, Gupta S, Sharma YK. Clinicoepidemiological Study of Different Types of Warts. Dermatol Res Practice 2016;2016(2):7989817.
4. Truong K, Joseph J, Manago B, Wain T. Destructive therapies for cutaneous warts: A review of the evidence. Aust J Gen Pract 2022;51(10):799–803.
5. Sterling JC, Gibbs S, Haque Hussain SS, Mohd Mustapa MF, Handfield-Jones SE. British Association of Dermatologists' guidelines for the management of cutaneous warts 2014. Br J Dermatol 2014;171(4):696–712.
6. Le M, Conte S, Hsu JTS, Li MK. Energy-Based Devices for the Treatment of Cutaneous Verrucae: A Systematic Review. Dermatol Surg 2024;50(4):345–53.
7. Sivasankari M, Adityan MS. Oral isotretinoin as first-line systemic therapy in a case of extensive genital warts. Indian J Sex Transm Dis AIDS 2022;43(1):70–2.
8. Gupta M. Adapalene in the Management of Warts in Pediatric Population. Indian J Paediatr Dermatol 2019;20(1):29–31.
9. De Vita V, Goldust M. Efficacy and Safety of Microneedling for the Treatment of Cutaneous Warts. Hand (N Y) 2019;14(5):705–6.
10. Oren-Shabtai M, Snast I, Noyman Y, Lapidoth M, Sherman S, Mimouni D, *et al.* Topical and systemic retinoids for the treatment of cutaneous viral warts: A systematic review and meta-analysis. Dermatol Ther 2021;34(1):e14637.
11. Gupta R. Plantar warts treated with topical adapalene. Indian J Dermatol 2011;56(5):513–4.
12. Gupta R, Gupta S. Topical adapalene in the treatment of plantar warts; Randomized comparative open trial in comparison with cryo-therapy. Indian J Dermatol 2015;60(1):102.
13. Mahboob M, Ahmed N, Rahman A, Naz K, Niaz F, Farooq O. Comparison of topical 0.1% adapalene gel versus cryotherapy in patients with plantar warts. J Ayub Med Coll Abbottabad 2022;34(3):417–21.
14. Kubeyinje EP. Evaluation of the efficacy and safety of 0.05% tretinoin cream in the treatment of plane warts in Arab children. J Dermatol Treat 1996;7(1):21–2.
15. Ghonemy S, Ibrahim Ali M, Ebrahim HM. The efficacy of microneedling alone vs its combination with 5-fluorouracil solution vs 5-fluorouracil intralesional injection in the treatment of plantar warts. Dermatol Ther 2020;33(6):e14179.
16. Ali AA, Darwish HM, Galal SA. Comparative study between microneedling alone and microneedling followed by topical bleomycin or topical green tea extract (polyphenone E) in treatment of plantar warts. Sci J Al-Azhar Med Fac Girls 2021;5(3):651–60.
17. Zhang Y, Jiang JS, Kuai L, Luo Y, Chen JL, Wang YJ, *et al.* Efficacy and Safety of Fire Needle Therapy for Flat Warts: Evidence from 29 Randomized Controlled Trials. Evid Based Complement Alternat Med 2021;221:9513762.
18. Cunningham DJ, Brimage JT, Naraghi RN, Bower VM. Needling versus liquid nitrogen cryotherapy for the treatment of pedal warts a randomized controlled pilot study. J Am Podiatr Med Assoc 2014;104(4):394–401.
19. Kumari P, Yadav D, Vijay A, Jain SK, Kumar M, Kumar R *et al.* Falknor's needling method as a potential immunotherapy in palmo-plantar warts. Indian J Dermatol Venereol Leprol 2019;85(1):129

Submitted: March 19, 2024	*Revised: July 14, 2024*	*Accepted: November 2, 2024*

Address for Correspondence:

Dr. Muhammad Adnan Rashid, Department of Community Medicine, Ayub Medical College Abbottabad-Pakistan
Cell: +92 333 9974207
Email: dr.adnanrashid@gmail.com