Original Article

Clinical epidemiology and management outcome of non-genital cutaneous viral warts

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Conflict of interest: None
Funding source: None

Article received: 11-11-22
Article accepted:08-05-23

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ABSTRACT

Objective: This study aims to profile the epidemiology of non-genital cutaneous viral warts in our population and compare the effectiveness of topical salicylic acid treatment with surgical ablation.

Methodology: This quasi-experimental study was conducted at the National Institute of Rehabilitation Medicine, Islamabad, spanning seven years. The study encompassed all patients with non-genital cutaneous viral warts, excluding cases of genital/mucosal warts and immunocompromised individuals. Primary outcome measure was lesion clinical resolution, with secondary measures including side effects and recurrence within a year.

Results: Among 214 patients, 165 (77.10%) were males, and 49 (22.89%) were females, aged 5-51 years (mean age: 17.83±8.88 years). Adults (n=146; 68.23%) exceeded pediatric cases (n=68; 31.77%). Predominant wart types were palmoplantar (n=99; 46.26%), common (n=86; 40.18%), periungual (n=13; 6.07%), filiform (n=9; 4.20%), and verruca plana (n=7; 3.27%). Affected sites included hands/upper limbs (n=104; 48.59%), feet/lower limbs (n=74; 34.57%), face/head (n=17; 7.94%), neck (n=13; 6.07%), and trunk (n=6; 2.80%). Most patients (n=166; 77.57%) were students, followed by housewives (n=35; 16.35%), shopkeepers (n=7; 3.27%), and office workers (n=6; 2.80%).

Conclusion: Palmoplantar and common warts constituted the commonest morphological subtypes. Majority of the sufferers were students. Treatment with topical Salicylic acid was associated with higher rates of treatment failure, adverse events as well as recurrence after successful treatment. On the contrary, surgical ablation was associated with higher rates of successful treatment as well as lesser recurrence rates.

Key words: Non-genital viral warts; Viral warts; Common warts; Plantar wart; Genital warts; Salicylic acid; Surgical ablation; Cryotherapy; Human papillomavirus.

Introduction

Cutaneous viral warts of the non-genital variety represent one of the most common cutaneous presentations in plastic surgery clinics. Both children and adults are equally affected. These are also known as verrucas or papillomas and typically follow a benign course. They result from infection of the epidermal cells with the human papillomavirus (HPV). The infected keratinocytes undergo proliferation, leading to localized thickening of the affected skin. These lesions may appear anywhere on the body; however, they are most commonly found on the skin of the hands and feet.[1-3]

The reported prevalence of non-genital cutaneous viral warts varies significantly among different regions of the globe. In the United States, the population-based prevalence is reported to be 0.84%, whereas in Russia, it is 12.9%. Certain factors, particularly age groups, influence this prevalence. It is higher among young adults and children. In the United Kingdom, school children aged 4-6 years have a prevalence of 12%. In Australia, the prevalence is 24% among young adults aged between 16-18 years.[1]

The warts are either cosmetically disfiguring or these cause considerable discomfort and pain. Also these are contagious and may spread not only to other body areas of the same individual but also to other close contacts in the house, institution or workplace. Therefore, the sufferers are often prompted to seek medical advice. A plethora of therapeutic options have been employed to treat the warts; however, no single therapy has resulted in universally accepted satisfactory results. The goal of treatment is to eliminate the infective lesions without causing serious side effects and to minimize the risk of their recurrence. The various available treatments

include topical application of salicylic acid, cryotherapy, electrodesiccation, contact immunotherapy, intralesional bleomycin, intralesional candida antigens, duct tape occlusion, retinoids, pulsed dye laser, photodynamic therapy, CO2 laser and surgical ablation.[1, 4-6]

The current study aimed to document the epidemiologic profile of non-genital cutaneous viral warts in our population and compare the efficacy of treatments with topical salicylic acid versus surgical ablation. The primary outcome measure was the clinical disappearance of lesions within eight weeks of the intervention. Secondary outcome measures included the side effects of the intervention and recurrence over a one-year period.

Methodology

This quasi-experimental study was carried out at the Department of Plastic Surgery, National Institute of Rehabilitation Medicine (NIRM), Islamabad, over a period of seven years. Written informed consent was taken from the patients. Ethical approval was taken from the hospital's ethical committee. The study conformed to the principles of the Helsinki's declaration of 1975, as revised in 2008. Anonymity of the patients was guaranteed. Non-probability consecutive sampling was done. All patients who presented with non-genital cutaneous viral warts during the study period were included. Patients with genital/ mucosal warts and those who had immunocomprise were excluded.

The patients were initially evaluated with history, systemic examination and in-depth local examination of the involved cutaneous regions. Baseline investigations were performed to assess the general health and rule out any associated systemic comorbidities. The warts were categorized into five morphological subtypes: 1) Common warts; 2) Palmoplantar; 3) Periungual; 4) Filiform and 5) Verruca plana (flat warts). The demographic profile of the patients, morphological subtypes of the warts, anatomic locales affected, type of treatment instituted, success of treatment over 8-weeks, adverse effects encountered and recurrence at one year following successful treatment were all recorded.

For the purpose of treatment, half of the patients were randomly assigned to the salicylic acid treatment group whereas the remaining half was assigned to the surgical ablation group. The randomization was done by using computer generated random number table. Maximal possible matching of the two groups was ensured with respect to the various initial demographic and clinical variables.

In the salicylic acid treatment group, the following treatment protocol was adopted: The surface keratin was shaved off with surgical blade using 2% Xylocaine solution for local anesthesia. The patients were instructed to first soak the affected areas in warm water. Then dry them with towel and apply the topical salicylic acid once daily for 2-6 weeks. Disappearance of the warts over 8-weeks of initiation of treatment was regarded as successful treatment. Any side effects were documented. These included: skin blistering, skin ulceration, contact dermatitis from the application, irritation of skin, salicylism, pain from the topical agent and local infection. Recurrence at one year following successful initial treatment was also recorded.

In the surgical ablation treatment group, the warts were excised with 1-mm healthy margins all around. The procedures were carried out using 2% Xylocaine solution for effecting local anesthesia. The defects that resulted from the excisions were closed primarily using prolene sutures. The data regarding treatment success in resolving the lesions, adverse effects and recurrence at 1-year were collected as was done for the salicylic acid group. Figures 1 through 9 show some illustrative cases of the warts included in the study.

Figure 1: This clinical photograph shows a common wart on the volar aspect of right thumb. The lesion is a sharply demarcated round nodule, firm in consistency and has a characteristic rough surface.

Figure .2: Common warts on the volar aspects of the thenar and hypothenar eminences as well as in the periungual regions of the thumb. It is the right hand of a child aged 12 years.

Figure 3. This clinical photograph shows flat or plane warts on the neck. These are usually caused by HPV types 3 and 10, and rarely by the types 26-29 and 41. These warts are usually smooth, flat-topped, yellow-brown, pink, or skin-colored papules, most often located on the face and neck.

Figure 4. This clinical photograph shows the filiform warts in a male aged 27 years. These are usually long, narrow and frond-like growths. These are often found on the neck, face, eyelids, or other parts of the face.

Figure 5. This clinical photograph shows mosaic plantar warts in an adult male aged 19 years.

Figure 6. This clinical photograph shows the periungual warts. These are caused by HPV types 1, 2, 4, and 7. These warts often cause thickened, fissured, cauliflower-like skin around the nail plate. There may be associated paronychia too. These are more common among those who bite nails and among those individuals whose professions involve wet hands (e.g., dishwashers)

Figure 7. This clinical photograph shows the typical appearance of plantar warts.

Figure 8. Same patient as shown in Figure 7. The lesions have been excised and the resultant defects have been closed primarily.

Figure 9. This clinical photograph shows the typical excision specimen. The lesion is excised with healthy 1-mm margin all around, using Loup magnification.

The data were analysed through Statistical package for social sciences version 22. Various descriptive statistics were used to calculate frequencies, percentages, means and standard deviation. The numerical data such as age of the patient was expressed as Mean ± Standard deviation whereas the categorical data such as the anatomic locales affected were expressed as frequency and percentages. The percentages of various variables were compared by employing chi-square test and p-value of less than 0.05 was regarded statistically significant.

Results

Out of the total of 214 patients, there were 165 (77.10%) males whereas 49 (22.89%) females. The age range was 5-51 years. The mean age of the patients was 17.83±8.88 years. Majority of the (n=146; 68.23%) patients were adults whereas 68 (31.77%) patients were in the pediatric age group.

Morphologically, palmoplantar type was the most frequent (n=99; 46.26%) variety, followed by the common warts (n=86; 40.18%), periungual warts (n=13; 6.07%), filiform warts (n=9; 4.20%) and verruca plana warts (n=7; 3.27%)

The various affected anatomic sites included the following: hands and upper limbs (n=104; 48.59%); Feet and lower limbs (n=74; 34.57%); face and head (n=17; 7.94%); neck (n=13; 6.07%) and trunk (n=6; 2.80%)

Occupation wise, majority of the patients (n=166; 77.57%) were students of schools and colleges. The share of house wives was 16.35% (n=35), whereas 7(3.27%) patients were shopkeepers and 6(2.80%) patients were office workers.

Table No I shows comparison of the various outcome measures recorded for the two groups of the different treatment modalities.

Discussion

In the present study, the age of the patients ranged from 5 to 51 years. Previous literature has demonstrated varying age distributions among populations affected by warts. Karki et al.[7] conducted a study in Nepal, reporting the affliction of individuals within an age range of 7 to 64 years, with three-quarters of the cases falling between 11 and 40 years

Table I: Summary of the various outcome measures observed among the patients of the two treatment groups. (n=214)

Outcome measures	Salicylic acid Group (n=107) N(%)	Surgical ablation Group (n=107)N(%)	P value
Resolution of the lesion			
Yes	59(55.14%)	100(100%)	
No	48(44.85%)	0(0%)	0.000*
Recurrence after successful treatment			
Yes	12(20.33%)	3(3%)	0.001*
No	47(79.66%)	97(97%)	
Side effects encountered			
Skin blistering	7(6.54%)	0(0%)	
Skin ulceration	24(22.42%)	0(0%)	
Dermatitis	2(1.86%)	0(0%)	
Irritation of skin	8(7.47%)	0(0%)	0.000*
Salicylism	0(0%)	0(0%)	
Pain post intervention	9(8.41%)	16(14.95%)	
Local infection	5(4.67%)	8(7.47%)	

of age. Similarly, Ghadgepatil SS et al.[8] in India observed patient ages spanning from 9 to 67 years, with 82% of cases clustered between 11 and 40 years of age. Liu J[9] conducted research among Chinese school students, revealing patient ages ranging from 14 to 35 years. In the United States, Silverberg JI et al. [10] reported a prevalence rate of 0.3% to 8.6% among individuals aged 1 to 17 years. The reasons for the divergent frequencies of cutaneous warts across different age groups remain unclear. One conceivable explanation is the variance in physical and sports activities across different age brackets. Furthermore, the host's immune response varies at different life stages. Repetitive minor traumas to the skin, particularly in the hands and feet, create entry points for the human papillomavirus (HPV) to infect these areas.

In the current study, male predominance was observed, a finding consistent with the majority of related investigations. These studies have consistently indicated a pronounced prevalence of warts among males. For instance, Karki et al.[7] from Nepal reported 57.86% males and 42.14% females affected. Similarly, Essa et al.[11] from Egypt noted 55% males and 45% females affected. This observed gender disparity could be attributed to heightened male participation in outdoor and sports activities.

Among the participants in our study, a significant proportion were students enrolled in schools and colleges. This aligns with the findings of previous research. Karki et al.[7] from Nepal also reported a majority of their cases to be students (46.42%), followed by servicemen/businessmen (20%) and housewives (17.14%). Likewise, Gopal et al.[12] from India reported the highest incidence among student groups (42.7%), followed by housewives (13.7%). The elevated occurrence among students might be attributed to their heightened engagement in physical and sports-related activities, consequently increasing the risk of skin damage and subsequent infection. Historically, such lesions were more frequently reported among professionals such as butchers, barbers, and workers in intensive care units.[1-4]

Our study also revealed that hands and feet were the most commonly affected anatomical sites. This finding resonates with multiple published studies, which have consistently identified hands and feet as the principal sites of involvement. A plausible explanation for this prevalent manifestation on hands and feet is their susceptibility to minor traumas in daily activities. These breaches in the epidermis provide an opportune entry point for the HPV virus, initiating the infectious process that culminates in the development of characteristic lesions.[1-3]

In our study topical salicylic acid was successful in resolving the lesions of warts in 55% of the patients. Our finding is similar to that of Kwok CS et al 2 also reported a cure rate of 57% with use of topical salicylic acid. Most of the topical agents selectively destroy the cells infected with HPV. The destroyed cells are eliminated and the partially-damaged cells expose the HPV to the immune system which is activated to ensure immune-mediated eradication of the infection. Although used since decades, the exact mechanism by which salicylic acid cures the warts still continues to be a mystery. Though it is a keratolytic agent, however it is thought to act by breaking down the cohesion between corneocytes, leading to shedding of epidermal cells. Additionally, the salicylic acid is

thought to activate immune response that helps to eradicate the HPV infection.[2, 13-17]

Since the topical salicylic acid has been in use for decades, it is ubiquitously found in many over the counter products employed for managing warts. The concentration of salicylic acid in these preparations may range from 10% to 60%. The common warts respond even to low concentration (i.e., ≤17%); however, the more recalcitrant plantar warts often need higher concentrations. Many of the available preparations also have keratolytic agents such as the lactic acid. Some preparations have antibiotics too.[2,5, 17, 18]

In our study the surgical ablation yielded superior results in terms of curing the warts as well as having comparatively low recurrence rate. The attended side effects were also much lesser than those encountered in the salicylic acid treatment group. The treatment was non expensive and short termed.

Our study has certain strengths as well presents some limitations. This is among the few local studies that focused on the clinical epidemiology of warts in Pakistani population. The study also evaluated the efficacy of topical salicylic acid versus surgical ablation for treating warts. No such local study has been carried out till date. The current study also has some limitations. Firstly, it was conducted in a single hospital. Secondly, the study did not follow rigorous protocols of blinding. Thirdly, the study did not explore the causal relationships of risk factors and warts. As there is no specific single therapy that has been proven to be effective at achieving complete remission in every patient with warts, future well designed multicenter studies are recommended to improve upon these limitations.

Conclusion

Adult males in their second and third decades of life were the commonest sufferers of cutaneous viral warts. Hands and feet were the most commonly affected anatomic locales. Palmoplantar and common warts constituted the commonest morphological subtypes. Majority of the sufferers were students. Treatment with topical Salicylic acid was associated with higher rates of treatment failure, adverse events as well as recurrence after successful treatment. On the contrary, surgical ablation was associated with higher rates of successful treatment as well as lesser recurrence rates.

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