

## Chemotherapy of Genital Warts

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### ABSTRACT

Genital warts are the most commonly sexually transmitted viral infection of humans caused by Human Papillomavirus, affecting both male and female sexes, clinically characterized by the appearance of external warts on the genital organs including penis, scrotum, vulva, anus and perineal area. The present study was designed for the investigation of chemotherapeutic agents for the successful treatment of genital warts in terms of recovery of patients and clearance percentage of genital organs from the warts. For this purpose, a total of 12 patients infected with genital warts were selected and randomly distributed into four different groups, each group comprising 03 patients. Group A was treated using locally available wart removal preparation Dewart<sup>®</sup> (Verrugon, Milk Acid), Group B was treated using Podophyllotoxin 15-25%, acquired from chemical suppliers, Group C was treated using locally available Duofilm<sup>™</sup> (Salicylic Acid 16.7% w/v, Lactic Acid 16.6% w/v) and Group D served as negative control. The results of the current study revealed that the standard and most effective treatment of the genital warts is found to be Podophyllotoxin 15-25%, which showed 100% recovery of the patients and 100% clearance of their genital areas from the stubborn warts. However, Duofilm<sup>™</sup> was also found effective, because all the patients were recovered and 80% warts were cleared off from their genitalia. But the warts did not go off with the local brands of Dewart<sup>®</sup> nor spontaneously recovered.

**Keywords:** Genital warts, Dewart<sup>®</sup>, Podophyllotoxin, Duofilm<sup>™</sup>, Clearance percentage

### INTRODUCTION

Genital warts, scientifically known as *Condylomata acuminata*, are the sequel of venereal diseases infecting large populations, even endemic in some zones of the world. The etiological agent of the disease, Human Papillomavirus (HPV), is known to be the direct cause of genital warts in both males and females. In males it only infects epithelium of genitalia and is characterized by visible warts, while, in females it is more hazardous causing genital warts as well as cervical cancer [1,2]. Human Papillomavirus is potentially associated with ano-genital cancers [3]. Its predilection site for infection is stratified and squamous epithelium propagates as warty growths on the skin of genitalia and manifest dysplastic cellular proliferations. Over 100 subtypes of HPV are currently recognized, out of which 30 subtypes are found responsible for genital warts. Human Papillomavirus type 6, 11, 16, 18, 31, 33 and 35 are found responsible for clinical manifestation of genital warts (Figures 1 and 2). These are also associated with neoplasia, while, type 6 and 16 are strictly associated with cervical cancer in females [4].



**Figure 1.** Clinical representation of genital warts on scrotum.

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**Figure 2.** Clinical representation of genital warts on pubic area.

Genital warts are mostly transmitted through sexual contact with infected partner even close contact with the infected genitalia without intercourse. However, the infection may also be transmitted through non sexual routes including vertical transmission, colposcopes, transvaginal ultrasound probes, transplacental transmission, through saliva, digital contact, surgical instruments, infected needles or syringes, fomites, etc. [5]. These are clinically characterized by the warty outgrowth on the peri-genital and peri-anal anatomical locations, i.e., penis shaft, scrotum, vulva, pubic, perianal and perineal areas of the patients [6,7]. For the purpose of screening of the disease, Papanicolau (Pap) test in developed countries is preferably used and FDA approved HPV vaccines Cervarix® (bivalent vaccine) is recommended which confers immunity against HPV types 16 and 18, causing cervical cancers. The Cervarix® vaccine is used at the dosage schedule of 0, 1 and 6 months @ 0.5 ml intramuscular injection which gives immunity for 10 years [8].

Regarding the therapy of genital warts, the treatment particularly aims the elimination of the cutaneous lesions of warts rather than the elimination of underlying agent. However, for elimination of warts various topical treatment

regimens are implied, i.e., podophyllotoxin 0.05% solution, imiquimod cream 5%, Sinecatechins ointment 15% and podophyllin, with the clearance rate of 45-77%, 13%, 58% and 42-50%, respectively. Destructive or surgical implications for treatment include trichloro acetic acid 80-90% solution, cryotherapy (cold temperature induced dermal damages), electrocautery, scissor excision and carbon dioxide laser with the clearance rate of 70%, 79-88%, 94%, 72% and 23-52%, respectively. Systemic treatment of the disease is based on interferons administration topically as well as systemically with the clearance rate of 17-67% [9].

The main objective of this study was to investigate the chemotherapeutic agent for the treatment and removal of stubborn genital warts and to analyze the comparative efficacy of various chemical agents used under different brands for the treatment of the disease.

**MATERIAL AND METHODS**

The experimental trial was conducted on the patients infected with genital warts which may reach the size of 10mm. The patients after clinical diagnosis were randomly distributed into four different groups, each group comprising 03 patients viz Group A, B, C and Group D (Table 1).

**Table 1.** Experimental layout.

Group	Patients	Chemicals used
A	A1, A2, A3	Dewart® (Verrugon, Milk Acid)
B	B1, B2, B3	Podophyllotoxin 15-25%
C	C1, C2, C3	Duofilm™ (Salicylic Acid 16.7% w/v, Lactic Acid 16.6% w/v)
D	D1, D2, D3	Negative control

Group A was treated using locally available wart removal preparation Dewart® (Verrugon, Milk Acid), Group B was treated using Podophyllotoxin 15-25%, acquired from chemical suppliers, Group C was treated using locally available Duofilm™ (Salicylic Acid 16.7% w/v, Lactic Acid

16.6% w/v) and Group D served as negative control that whether the infection is self-recoverable or not. The chemical agents were used topically on the cutaneous wart lesions on the infected genital areas using cotton buds or brush applicators and were washed with the tap water after 4

hours to minimize the systemic toxicity of the chemicals used. The treatment was continued till the complete elimination of the genital warts.

The preparation Dewart<sup>®</sup> was applied topically on the genital warts twice daily for the period of 1 month, Podophyllotoxin 15-25% was applied topically on the warts once after every 3-5 days for the period of 1 month, Duofilm<sup>™</sup> was applied topically on the warts once after 5 days (from the site where wart was removed, wounds were produced and application of this preparation on the wound sites were prohibited, as it would cause severe allergic reactions if applied directly on the wounds) for the period of 1 month and the comparative efficacy of these chemicals was determined accordingly.

## RESULTS AND DISCUSSION

Group A treated with Dewart<sup>®</sup> (Verrugon, Milk Acid) did not show any clearance of genital warts. The preparation

may be used for the treatment of corns, skin or digital warts but did not give any successful results for the treatment of genital warts. All the patients were topically applied with the preparation continuously for the whole month but no success rate was found in Group A. Group B treated with Podophyllotoxin 15-25%, showed 100% recovery and all the patients of Group B got rid of genital warts and their genitalia were cleared off without any complications. Group C was treated using Duofilm<sup>™</sup>, all the three patients of the group showed 80% clearance rate with this preparation from genital warts, while Group D did not show any clearance or recovery (**Table 2**). Our results are coinciding with the study of Wiley et al. [10], reporting in his studies that podophyllin (15-25%) solution was the standard treatment for genital warts. The podophyllin solution was applied twice daily for 3 days and thereafter rest of 4 days. Similar studies were also conducted by Beutner et al. [6] and Charles et al. [11] in which they successfully treated the genital warts using podophyllin 15-25% solution.

**Table 2.** Treatment regimens of various groups and their success rate in terms of recovery and clearance percentage of the patients.

Groups	Chemicals used	Number of patients recovered	Clearance of each patient (%)
A	Dewart <sup>®</sup> (Verrugon, Milk Acid)	0 out of 3 (0%)	0%
B	Podophyllotoxin 15-25%	3 out of 3 (100%)	100%
C	Duofilm <sup>™</sup> (Salicylic Acid 16.7% w/v, Lactic Acid 16.6% w/v)	3 out of 3 (100%)	80%
D	Negative control	0 out of 3 (0%)	0%

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