

## Topical Application of the Hydroalcoholic Extract of *Allium porrum L.* as a Novel Treatment for Common Warts based on Persian Medicine

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Received: 6 June, 2017

Accepted: 25 February, 2018

### ARTICLE INFO

#### Article type:

Case report

#### Keywords:

Common warts

Persian medicine

*Allium porrum L.*

Herbal medicine

### Abstract

**Background:** Common warts are the infectious viral diseases that occur in the epidermal layer of skin and are transmitted through skin contact. They are caused by a diverse range of human papillomaviruses (HPV). So, there is no vaccine or definite anti-viral medication for the prevention of this disease. Also, the treatments of common warts often have some limitations and numerous side effects as well as the risk of recurrence or superficial spreading. Persian medicine is one of the oldest traditional medicines which described common warts as a kind of skin disease and recommended several herbal medicines like *Allium porrum L.* for the treatment of this disease. The aim of this study was to evaluate the effect of the hydroalcoholic extract of the aerial parts of *Allium porrum L.* on common warts.

**Methods:** In this study, five patients with common warts on their hands were included. The hydroalcoholic extract of *Allium porrum L.* were applied on the site of the lesion just for 2 hours every day over a three-week period. The patients were followed up for 18 weeks to check any case of recurrence.

**Results:** After completing the treatment, the wart lesions in all five patients were completely healed within three weeks. During the follow-up phase (18 weeks), no case of recurrence was observed.

**Conclusion:** This study shows that the topical application of hydroalcoholic extract of *Allium porrum L.* has therapeutic effects for common warts. Since the extract is cost-effective, without complications and highly accepted by the patients, it seems that it can be further investigated in future studies.

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**Citation:** Alizadeh M, Changizi-Ashtiyani S, Hamidi H, Gorji N. Topical Application of the Hydroalcoholic Extract of *Allium porrum L.* as a Novel Treatment for Common Warts based on Persian Medicine. Journal of Kerman University of Medical Sciences, 2018; 25 (1): 93-100.

### Introduction

Common warts are the most usual warts, characterized by papules or nodules with a hard surface,

firm and hyperkeratotic consistency, found in any part of the skin; however, they are mostly found on the dorsum of the hands and fingers (1). They are often

asymptomatic but can cause ugly appearance, disability or pain (2). The known cause of warts is the infection of the epidermis caused by the human papillomavirus (HPV) transmitted through skin contact. The virus' DNA duplicates in the nucleus of the basal cells, and because of its high resistance against heat and dryness, it remains in the tissue for a long time (3). The common warts incubation period has been mentioned between one to six months, and in some studies, it has also been noted to last up to 20 months (2, 3).

In 65% of the cases, the lesion heals spontaneously within two years, though, it can also engage surrounding tissues and create numerous contiguous warts (2, 3). HPV has various species. For this reason, there is no vaccine or definite anti-viral medication for its prevention. Also, because of the low level of viral protein expression in the lower layers of the epidermis, the immune system cannot defend against it (3).

The treatment of warts often takes a long time and is associated with recurrence and superficial spreading. The current treatments have limitations and involve numerous side effects. Despite the relatively positive therapeutic results, due to the lack of comprehensive knowledge on the pathophysiology of the disease and the involved factors, there is no definite cure to reduce the existing damages yet (2-4).

Today, the tendency to use medicinal plants for the treatment of diseases is rapidly increasing in medicine with the aim of seeking easier, more effective and cheaper treatments. This tendency, however, has its roots in the history of medicine since physicians have prescribed herbal medicinal products to control and treat

diseases for a long time, so that there is a variety of inexpensive and established methods that have been used in the traditional medicine for the treatment of warts (2). Persian medicine (PM), as a traditional medicine formed on Iran's plateau more than thousands of years ago, has been reconsidered today (5, 6). For instance, the impacts of Myrtus and fig syrup on the treatment of warts were first mentioned in PM, which its effectiveness has been also confirmed in the new scientific studies (2, 4, 7).

Jorjani, the author of *Zakhireye Kharazm Shahi (Treasure of Kharazm Shah)*, in the section devoted to "singular drugs", referred to an insect from the family of Gonepteryx cleopatra (*Cantharis vesicatoria*), which was used by him to treat warts, vitiligo, hair loss and rabies (8). In 1933, a French chemist conducted some research on this insect and could extract the stimulant cantharidin from it. The substance is presently used for the treatment of skin diseases such as warts around the nails (9). In the studies conducted between 2005 and 2014, the effect of alcoholic extract of garlic (*Allium sativum*) in the treatment of warts and corns was proven (10, 11). The main idea for this treatment method was taken from medical textbook of PM like Makhzan-al-advieh (*Drug Treasure*) by Aqili Khorasani MH (17<sup>th</sup> to 18<sup>th</sup> century AD)(12), Canon of Medicine by Avicenna (980–1037 AD) (13), And Al-Havi (The Large Comprehensive) by Razi (865–925 AD) (14).

Leek (*Allium ampeloprasum* var. *porrum*) belongs to the *Allium* genus from *Lilaceae* family and its significant cultivation is found in Turkey, France, Belgium and Poland (15).

*Allium porrum* with its ribbon-shaped leaves, which are relatively flat and have long sheaths, grows in all over Iran (16).

In PM, *Allium porrum* is named "Korras" and among common people is called "Tare"; there are a lot of recommendations about the beneficial effects of this plant in the treatment of different diseases such as digestion problems, arteriosclerosis, joint pain, inflammation of the respiratory system, constipation and skin diseases including wart, which is called "soloul" in PM (4, 12, 16).

The anti-inflammatory and antiulcerogenic effects of this plant have been proven in *in-vitro* and *in-vivo* studies (17). *Allium porrum* also contains significant levels of polyphenols, organosulfur, vitamin E and C which have considerable antioxidant properties (15). The anti-viral replication, anti-tumor, anti-infection and immune-boosting properties of *Allium Ampeloprasum*, that is very similar to *Allium porrum*, have already been proven (15, 18). Also, the antioxidant properties of *Allium porrum* and the anti-fungal and anti-microbial properties of the aerial parts of garlic, scallion and other species of this genus have been demonstrated (19). However, no studies have investigated the impact of *Allium porrum* on common warts in several databases. Therefore, this study aimed to investigate the effect of the hydroalcoholic extract of *Allium porrum L.* on common warts.

## Method

### Extractpreparation protocol

500 g of the aerial parts of the *Allium porrum* (seeds and fresh leaves) were collected from Arak, Iran in May and June 2016 and were washed with distilled water and dried in the shade. *Allium porrum* was identified and authenticated by a botanist in the Department of Botany, University of Arak (Iran). The dried leaves and seeds were powdered in an electric blender, and 50 g of the obtained powder was suspended in 1000 ml of hydroethanolic solution (70%) for 96 h at room temperature. The mixture was filtered using a fine muslin cloth followed by filter paper (Whatman No 1). The suspension was then shaken at room temperature for 24 h. The extracts were used directly after dilution. The performance efficiency for *Allium porrum* extracts was 40% (20).

### Treatment protocol

This clinical trial was conducted on five patients with common warts on their hands in the Department of Dermatology, Arak University of Medical Sciences (IRCT2016081629392N1), Arak. At the beginning of the experiment, informed consent forms were taken from the patients and in all stages of the investigation, the related ethical codes were applied (IR.ArakMU.REC.1394.11). After diagnosis by a dermatologist, the patients with common warts on their hands and aged 5 to 65 years were included in the study. The exclusion criteria include: pregnancy, breastfeeding, immunodeficiency disorders, progressive systemic diseases, blistering disorders, history of skin allergy and prior treatment in the last 2 months.

Every day, the patients applied the extract to the lesion site which was already washed thoroughly with soap and lukewarm water and dried up, and then they wrapped it up. After 2 hours, patients unwrapped and washed it again with lukewarm water. If there were any dead skin layers, they would be debrided gently. This continued once a day for three consecutive weeks. At the beginning of the study, the diameter of warts was measured. Also, photos were taken from the location of each lesion with a 5-megapixel camera (Kodak, China) before and after the intervention (Figures 1 and 2). The

recurrence of disease was also checked over 18 weeks after the treatment.

**Results**

The results shown in Table 1 as well as the photos suggested a positive response to the treatment with the hydroalcoholic extract of *Allium porrum* resulting in the complete healing of the lesion. And during the follow-up phase (18 weeks), there was no case of recurrence.

**Table 1.** The clinical characteristics of the patients with common warts on their hands treated with the hydroalcoholic extract of. *Allium porrum* L.

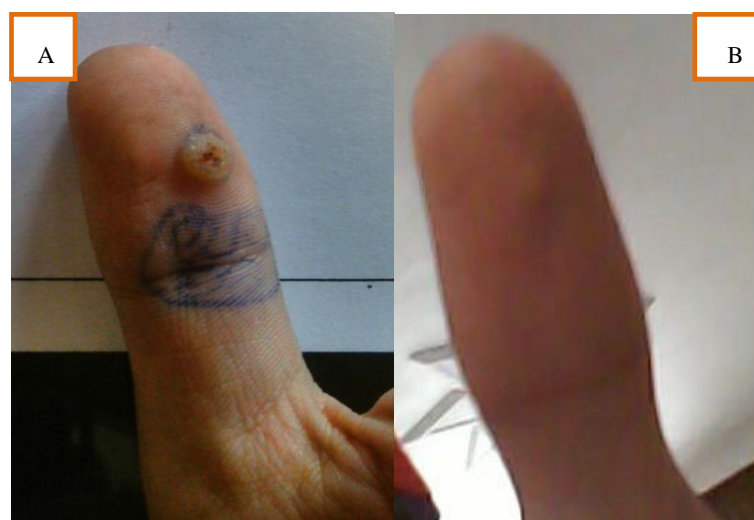
Clinical Data	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
Age (year)	18	18	18	15	14
Sex	Male	Female	Female	Female	Male
Location	Palmar of the right hand	Middle finger of the right hand	Ring finger of the right hand	Left hand	Thumb of the left hand
Symptom	Unpleasant	Unpleasant	Unpleasant	Unpleasant	Unpleasant
Diameter (cm)	0.6	0.8	0.5	0.5	0.8
Cure (week)	3	3	3	2.5	3
Pain with treatment	No	No	No	No	No
Adverse effects (Hypopigmentation/ Scar/ Blister/ Erythema)	No	No	No	No	No
Recurrence at 18 Months	No	No	No	No	No



**Figure 1.** A: Patient 1, a single wart on the right palm before the treatment; B: Patient 1, three weeks after the treatment.



**Figure 2.** A: Patient 2, a wart on the middle finger of the right hand, a week after onset of the treatment; B: Patient 2, three weeks after the treatment



**Figure 3.** A: patient 5, a wart under the first knuckle of the left hand thumb; B: patient 5, three weeks after onset of the treatment.

### Discussion and Conclusion

The study showed that the topical application of hydroalcoholic extract of the aerial parts of *Allium porrum* for two hours a day for three consecutive weeks can be considered as an effective treatment for common warts without any complications and pain.

This effectiveness can be due to the impact of the plant's active ingredients which have immune-boosting, antioxidant and protective effects against viruses and

other possible infectious agents (15, 18, 19). In addition, other mechanisms like the cytotoxic and genotoxic properties of Bisphenol A (BPA) (21), which induces skin peeling and inhibition of the duplication of viral DNA in the tissue, can explain this therapeutic effect. However, description of the precise mechanism of the plant which results in the treatment of the disease, needs more detailed studies.

Given that there is no specific viral treatment for HPV, the current treatments include physical removal, boosting the immune system and applying toxic substances in order to destroy cells; however, there are not enough positive reports on the effectiveness of such treatments. All of the above mentioned treatments may fail and the disease may recur (3).

Cryotherapy is in the first line of the treatments; however, the pain is not tolerated by children and has multiple side effects like hemorrhagic blisters and hypopigmentation as well as skin changes which may remain for one to two weeks. Moreover, it is not able to kill the virus. In addition, as it is necessary to refer to medical clinics and repeat the treatment every two weeks, the chance of full recovery is reduced (3).

Some researchers have preferred home topical treatments to cryotherapy as they are less painful, much cheaper and more convenient. Common topical treatments include salicylic acid and zinc oxide which are reported to have caused numerous cases of

### Acknowledgments

The authors gratefully acknowledge the research council of Arak University of Medical Sciences (Grant Number :1049) for the financial support.

### Authors' Contributions

Dr. Alizadeh and Dr Changizi-Ashtiyani developed the original idea and the protocol, collected and analyzed data, and wrote the draft. Dr. Hamidi and Dr Alizadeh also collected and analyzed the data and

dermatitis. Other methods involve regular heating and debriding which sometimes take several months of treatment. Some chemical medications including bleomycin, cantharidin and glutaraldehyde and also immune system modifiers are among the other common methods that used to treat the warts. Each of these treatments can be recommended for the treatment of warts depending on the resistance of the warts and advantages or disadvantages of the treatments (3). However, the treatment introduced in this study had no complication, recurrence, pain or inflammation, therefore, compared to the current treatments that are often associated with pain, recurrence and other restrictions, it can be considered as a great advantage (2-4).

Also, the reasonable price, availability, topicality and ease of application, which can be even done at home, have increased patients' satisfaction and leads to their adherence to the treatment.

contributed to the development of the protocol and collecting data.

### Funding Support

This article was carried out with the financial support from the deputy for Research and Technology at Arak University of Medical Sciences. Research has been submitted in Iranian Registry of Clinical Trials [IRCT] by code IRCT 2016081629392N1.

### Conflict of Interest

The authors declare no conflict of interest.

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