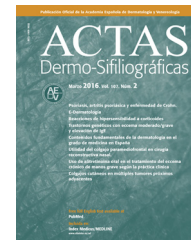




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REVIEW

Treatment of Warts in Children: An Update[☆]



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Abstract Warts are among the most common skin infections in children. Although numerous treatment options are available, none are completely effective in a single session. Treatment is particularly complicated in children, not only because certain treatments are poorly tolerated, but also because parents frequently have unrealistic expectations. In this article, we offer an update on the treatments available for warts, focusing specifically on pediatric patients. We do not discuss treatments for oral and anogenital warts.

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PALABRAS CLAVE

Verrugas vulgares;
Niños;
Tratamiento;
Ácido salicílico;
Crioterapia;
Candidina

Actualización sobre el tratamiento de las verrugas vulgares en los niños

Resumen Las verrugas víricas son una de las infecciones cutáneas más frecuentes en los niños. Aunque existen múltiples opciones de tratamiento, no hay ningún tratamiento que garantice una total eficacia con una única sesión terapéutica. En la edad pediátrica el tratamiento es particularmente complicado, no solo porque algunos métodos son mal tolerados, sino también porque a menudo las expectativas de los padres respecto a la eficacia del tratamiento son poco realistas. Este artículo proporciona una actualización sobre las diferentes terapias antiverrugas, particularmente enfocado a los pacientes pediátricos, excluyendo el tratamiento de las verrugas de la mucosa oral y anogenital.

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Introduction

Human papillomavirus (HPV) is a DNA virus that belongs to the papillomavirus genus within the Papovaviridae family. There are at least 189 different strains of papillomavirus and 151 of these have been detected in human DNA (Table 1).¹ HPV affects the skin and mucosa of humans, producing benign proliferations known as warts (Fig. 1). Some types of HPV have been associated with the development of malignant epithelial lesions in immunosuppressed patients or patients with anogenital warts, but this possibility is very rare during childhood.

According to data from family medicine registers in the United Kingdom and the Netherlands, the annual incidence of cutaneous warts is between 3 and 5 cases per 100 children aged between 5 and 14 years. The estimated prevalence in primary school children ranges from 4% to 33%, and between 9.1% and 21.7% of visits to the dermatologist are related to warts.² Warts are transmitted directly through contact with infected skin or indirectly through contaminated surfaces. An affected family member or classmate has been identified as a risk factor for acquiring warts, even more so than the use of swimming pools or communal showers.³ The use of socks or other protective coverings to protect against the spread of infection in swimming pools has not been proven to be effective, and some authors have even indicated that it could stigmatize children and discourage them from going swimming altogether.⁴

The main goal when treating warts is to eradicate the lesions, while attempting to minimize pain, avoid scarring, and prevent recurrence. Choice of treatment will depend on the location, size, number, and type of warts, as well as on the age and level of cooperation of the patient. The experience of the treating physician may also have an influence.⁵

In this article, we provide an update on the treatments available for warts, with a specific focus on pediatric patients. We do not cover treatments for oral or anogenital warts.

Types of Treatment Available

There are many types of treatment for warts (Table 2). The fact that so many treatments exist is indicative of their varying degrees of effectiveness, with success rates ranging between 32% and 93%.^{6,7}

Table 1 Correlation Between Clinical Manifestations of Warts and Type of Human Papillomavirus (HPV).

Nongenital Skin Lesions	Type of HPV
Common wart (verruca vulgaris)	1, 2, 4, 26, 27, 29, 41, 57, 60, 63, 65
Plantar wart	1, 2, 4, 63
Flat wart (verruca plana)	3, 10, 27, 28, 29, 38, 41, 49
Butcher's wart	1, 2, 3, 4, 7, 10, 28
Mosaic wart	2, 27, 57
Epidermodysplasia verruciformis	3, 4, 5a, 5b, 8, 9, 12, 14, 15, 17, 19-25, 36-38, 47, 49, 50

Destructive Methods

Destructive methods are those that cause nonspecific damage to infected keratinocytes and surrounding skin. Although these methods are associated with high recurrence, the fact that they are simple to use and relatively cheap explains why they are the most widely used treatments in routine practice.

Salicylic Acid

Salicylic acid is a keratolytic agent that destroys the epidermis infected by the virus. It is available in different vehicles at concentrations of between 10% and 30%. Topical salicylic acid is still the treatment with the best evidence base and it is the only option approved by the US Food and Drug Administration for warts.⁸ It is therefore considered the treatment of choice. Approximately two-thirds of all warts clear within 3 to 6 months of treatment with topical salicylic acid.⁸ One systematic review of 6 randomized controlled trials comparing salicylic acid with placebo for the treatment of warts in adults and children reported cure rates of 75% and 48%, respectively.⁹ A Cochrane review of a meta-analysis of 6 studies with 486 participants showed statistically significant results in favor of the topical application of salicylic acid for warts in any location.¹⁰ Although no adverse effects have been reported (with the exception of local irritation), in one study that compared 60% salicylic acid and monochloroacetic acid versus placebo, a patient developed cellulitis in the treated area.¹¹

Cryotherapy

Cryotherapy consists of freezing the wart with liquid nitrogen for 10 to 20 seconds every 2 to 3 weeks. Although the exact mechanism of action is unknown, the freezing is thought to cause local irritation, thereby stimulating an immune response. One multicenter clinical trial found no significant differences between the efficacy of cryotherapy with liquid nitrogen and 50% salicylic acid in patients with plantar warts. The fact that cryotherapy is more expensive, however, would appear to tip the balance in favor of salicylic acid.¹² Another randomized controlled trial compared the efficacy of cryotherapy, salicylic acid, and a wait-and-see approach for common and plantar warts. The authors found that cryotherapy was more effective for nonplantar warts, but observed no clinically significant differences after 13 weeks of treatment. Finally, patients treated with cryotherapy experienced more adverse effects than those in the other 2 groups.¹³ Some authors are of the opinion that cryotherapy should not be used for longer than 3 months or for more than 4 procedures, as there is no evidence of any benefit of continuing treatment for longer, particularly in the case of warts on the hands and feet.¹⁴ The main disadvantage of cryotherapy is that the procedure can be painful and cause blistering; there is also a risk of residual scarring, hyperpigmentation, and hypopigmentation (Fig. 2).

Cantharidin

Cantharidin is a blistering agent produced by beetles of the order Meloidae Coleoptera. It is used at a concentration

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