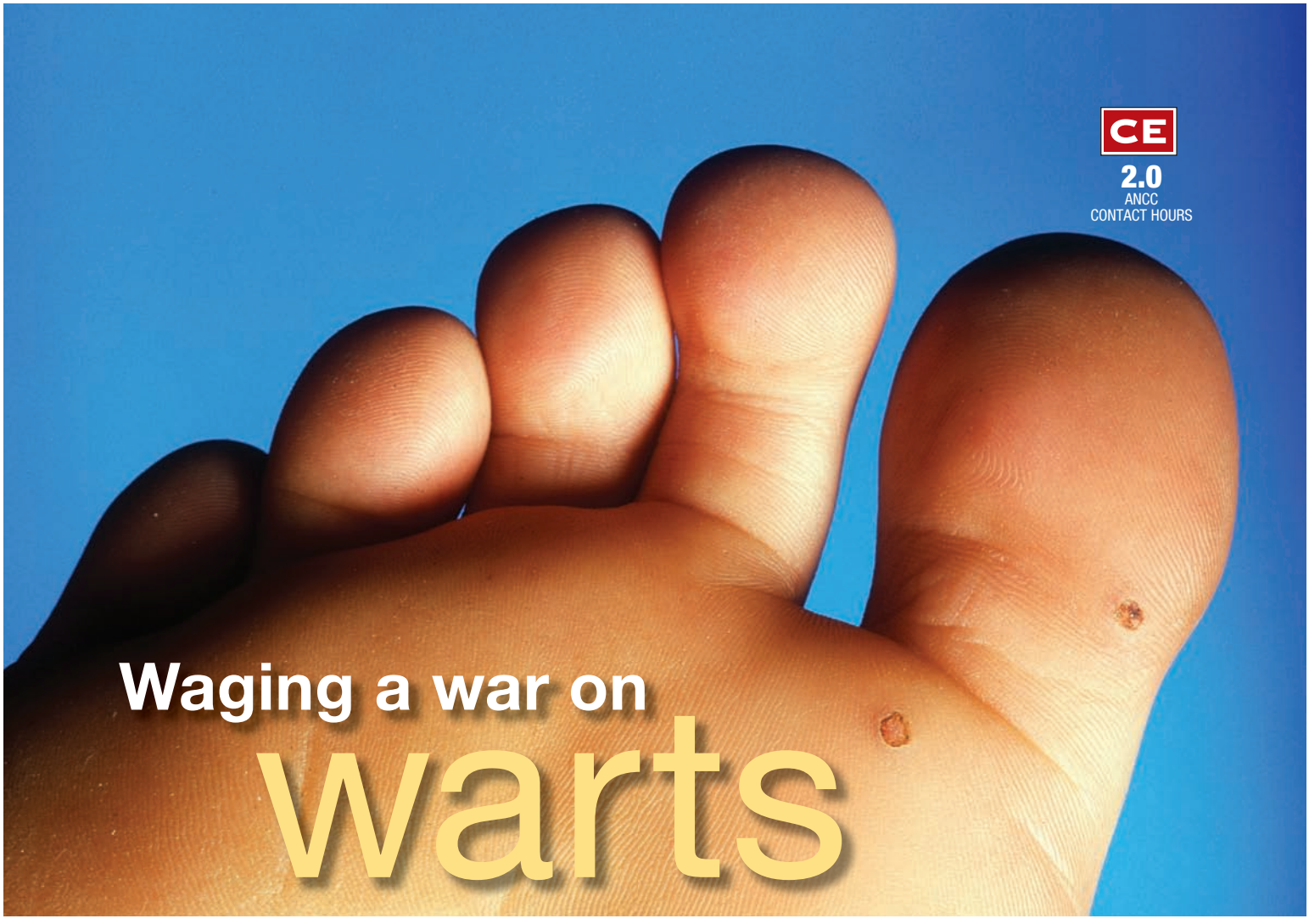

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Waging a war on warts

Usually considered a benign skin disease, warts can be painful and unsightly, affecting your patients' comfort and body image.

By Richard L. Pullen, Jr., EdD, MSN, RN, CMSRN, and Kim Pinter, MSN, RN

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Warts are a common skin disorder caused by human papilloma virus (HPV). According to the CDC, 6.2 million new cases of HPV infection occur each year, and there are currently at least 20 million people in the United States who've been diagnosed with HPV infection. The incidence of nongenital warts in the general population may be at least 20% or more. In this article, we discuss the management of warts from a global perspective.

A wart by any other name

Warts occur when the surface of the skin grows faster than normal due to infection with one of many HPV subtypes. The virus enters through a break in the skin anywhere on the body. Warts can be easily spread through close skin-to-skin contact. The infection results in a benign skin growth that may be bumpy, cauliflower-like, or smooth, with a gray, white, dark, or flesh-tone color. Under the microscope, warts have a thickened epidermis and dermis, and blood vessels that appear as black dots.

There are several types of warts: common, plantar, oral, flat, filiform, anogenital, periungual, and subungual (see *Picturing warts*).

Caused by HPV types 1, 2, 4, 27, and 29, ***common warts*** are often referred to as

Picturing warts

Common wart

From Goodheart HP. *Goodheart's Photoguide to Common Skin Disorders*. 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.

Oral wart

Plantar wart

Photo courtesy of Denise W. Metry, MD.

Flat wart

From Burkhart C, Morrell D, Goldsmith LA, et al. *VisualDx: Essential Pediatric Dermatology.* Philadelphia, PA: Lippincott Williams & Wilkins; 2009.

verruca vulgaris. They're typically found on the fingers, but can be located on any skin surface. Common warts vary in shape and size. They can be flat, round, or oblong-shaped and may appear grainy or have small black specks.

Caused by HPV type 1, ***plantar warts*** are also known as verruca plantaris. Occurring at the pressure points on the bottom of the feet, they're hard, painful bumps with black specks in the center. The majority of the wart isn't seen because pressure from standing pushes it beneath the surface of the skin. Individuals with plantar warts sometimes feel as if they have rocks in their socks.

Caused by HPV types 2, 6, 11, 13, and 32, ***oral warts*** may appear as either a single bump or a cluster in the mouth. They feel rough and lumpy, are dome-shaped, and may be white or pink in color.

Caused by HPV types 3, 10, 28, and 49, ***flat warts*** appear smooth and flat on the surface. The skin may appear either light brown, yellow-brown, pink, or flesh-colored. Flat warts are round or oval and usually affect the face and back of the hands.

Periungual wart

Filiform wart

From Lugo-Somolinos A, McKinley-Grant L, Goldsmith LA, et al. *VisualDx: Essential Dermatology in Pigmented Skin.* Philadelphia, PA: Lippincott Williams & Wilkins; 2011.

Anogenital wart

From Goodheart HP. *Goodheart's Photoguide to Common Skin Disorders: Diagnosis and Management.* 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009.

Subungual wart

From Goodheart HP. *Goodheart's Photoguide of Common Skin Disorders.* 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2003.

Caused by HPV types 1, 2, 4, 27, and 29, ***filiform warts*** may be located on the eyelids, lips, face, or neck. They appear as long, slender, finger-like growths.

Caused by HPV types 6, 11, 16, and 18, ***anogenital warts*** are sometimes referred to as condyloma acuminata. They're cauliflower-like lesions that may be singular or in clusters on the labia, vagina, penis, scrotum, anus, or the skin around the anus and groin. They may appear flesh-colored, gray, or white and may feel smooth or bumpy. It's common for the dermatologist to send a suspected genital wart for biopsy to rule out cancers such as squamous cell carcinoma.

Caused by HPV type 2 or 4, ***periungual warts*** occur around the end of the nail bed and have a cauliflower-like appearance. They're sometimes difficult to treat due to the proximity of the nail, and some of the wart may be underneath the nail.

Caused by HPV type 2 or 4, cauliflower-like ***subungual warts*** grow under the nail, causing the nail to deform or detach. It can be difficult to treat subungual warts because a good majority of the wart is underneath the nail. Sometimes the nail

has to be removed to expose the entire wart for treatment.

Individuals who are immunocompromised are especially susceptible to acquiring HPV infection and, therefore, warts. These individuals include those taking immunosuppressant medications to prevent organ transplantation rejection, those taking immunosuppressant medications to treat autoimmune disease, those taking chemotherapy medications, and those with HIV. Individuals born with a defect in the immune system are also at risk. Warts may become a chronic illness secondary to a defective immune system, which creates challenges for the patient and healthcare team. In this case, warts must be treated frequently with an aggressive approach.

Therapy options

In about 30% of cases, warts may disappear without treatment in individuals with a normally functioning immune system. If treatment is needed, it may include one or more therapies to achieve the desired effect. Patients may require a variety of therapies, especially when warts are resistant to treatment, and wart therapies may be frequent in patients who are immunocompromised. Therapies include the use of occlusive duct tape, salicylic acid, cryotherapy, cantharidin, immunotherapy, contact sensitizers, and bleomycin.

A common conservative treatment is the use of occlusive duct tape. Some theories suggest that a chemical in the duct tape triggers an immune response, causing the immune system to attack the wart. Additionally, the duct tape cuts off oxygen from the environment that the wart needs to survive. Some studies indicate that the duct tape method shows wart improvement in about 80% of cases. Improvement versus resolution of warts using the duct tape method needs further research (see *Improvement versus resolution*). Using duct tape to improve and/or resolve a wart takes time and requires persistence on the part of the patient. It's often necessary to implement more aggressive, and sometimes more uncomfortable or painful, approaches to manage warts.

Application of salicylic acid to soften the layers of skin that form the wart is another common, painless treatment. Once the skin layers are soft and weak, the wart can be removed using a pumice stone or emery board. There's some research evidence that the use of salicylic acid destroys the virus-infected epidermis and stimulates an immune response to get rid of the wart. It takes time for this treatment to be effective, which requires persistence on the part of the patient. The research evidence suggests that salicylic acid may have up to a 50% efficacy rate.

Cryotherapy (freezing) is highly effective (at least 90% in most people), inexpensive, and fast-acting, but it may be uncomfortable to painful. Liquid nitrogen is used to freeze the wart and surrounding tissue, which leads to the destruction of the wart. The wart tissue becomes necrotic in 7 to 10 days and is then scraped off by the healthcare provider. Repeated treatments are sometimes necessary. Light freezing is often effective when there are warts in the genital area. Healing tends to take longer when warts are in the anal area. Over-the-counter freezing medications may be effective in some superficial warts; however, these don't contain liquid nitrogen.

Improvement versus resolution

When a person has a normally functioning immune system, warts will usually resolve spontaneously or respond to traditional first-line treatments such as cryotherapy. Resolution isn't always possible when patients have compromised immune systems. The process of keeping warts under control may be an initial goal, with treatment typically every 4 to 6 weeks. Help the patient understand that warts are a chronic illness secondary to other chronic illnesses and it may take a variety of treatments to see improvement. It's important to provide the patient with encouragement during the treatment process. If the patient's immune system improves, then it's likely that warts will respond more readily to treatment.

Cryotherapy may sting during the procedure. After a few minutes following the procedure, a "frozen" period occurs, which may last approximately 1 to 2 hours when there may be minimal or no pain. When the treated site "thaws," pain described as a stinging, burning, and throbbing sensation can occur and may be severe. After approximately 12 hours, the pain gradually turns into a sore sensation.

If your patient undergoes cryotherapy, be on the lookout for blistering; the patient should notify the healthcare provider if this occurs. Keep in mind that freezing a wart on the face or forearm doesn't generally produce the severity of pain that's associated with the fingers, toes, and bottom of the feet. Topical steroids can be used before and after treatment. Anti-inflammatory medications and other more potent analgesics should be considered after treatment.

Usually used in cases where salicylic acid and cryotherapy haven't been effective, cantharidin is a toxic chemical that comes from the blister beetle. The healthcare provider places a drop of the chemical on the wart. An occlusive dressing holds the solution in place. A blister begins to form over the next few days. As the skin heals, the blister peels off. The procedure is repeated every 1 to 3 weeks. Blistering may cause pain, especially when the treatment is in dependent areas such as with plantar warts. The healthcare provider may elect to treat warts with cantharidin instead of cryotherapy in children because it tends to be less painful. The success rate is at least 70%, according to most research studies.

Immunotherapy may be used to treat warts. This involves the injection of a substance into the wart and surrounding tissues. The immune system is then stimulated and attacks the wart. One treatment option for recalcitrant warts is immunotherapy using intralesional injections of *Candida albicans* and/or the measles, mumps, rubella antigen into the wart.

consider this

Case study #1

An 85-year-old male patient in a long-term-care facility has diabetes and is confined to a wheelchair. He has chronic ulcers on his lower legs that won't heal. He also has warts on his fingers and toes. He states, "One of the warts on my foot is underneath my big toe and hurts when I move around in my wheelchair." The patient's healthcare provider won't excise the wart from his toe because it may lead to infection. Therefore, the patient must undergo cryotherapy every month on his big toe and fingers. The patient states, "My doctor said my immune system is operating poorly because of my age and diabetes." He tells you, "The freezing hurts and I get tired of it, but it does keep the warts under control."

Case study #2

A 57-year-old female patient has medium-size warts on her middle and index fingers on one hand. She's healthy and without preexisting chronic conditions. The patient states, "Those warts are so ugly! I tried everything over the counter from vitamin A to garlic and it didn't work for me. I went to the dermatologist who froze the warts off. It took three treatments over 12 weeks to get rid of them, but they're gone now and I haven't had any other problems with them."

Case study #3

A 17-year-old male patient is a high school swimmer. He's healthy and without preexisting chronic conditions. The patient states, "I thought I had corns on the bottom of my feet, but then my mom told me I had warts. I went to the doctor who froze the warts several times over a few months, but it didn't get rid of them. He had to cut them out. That was a major problem!" The patient then stated, "After the doctor cut the warts out, it took a few months for my feet to heal. I'm going to wear foot protection when I'm at the gym so I don't get them again."

Case study #4

A 45-year-old male patient with cardiomyopathy has a heart transplant. The patient is placed on anti-rejection medication, which causes severe immunosuppression. The patient states, "My new heart is great and I'm thankful. But I now have frequent sinus infections and warts on my feet and hands. My doctor says my immunoglobulins, especially my IgG, are low. I'm prone to bacterial and viral infections. I go to the dermatologist every month for cryotherapy, which keeps the warts under control. On occasion, I'm surprised when a wart goes away for good. I've had some other treatments over the years, including cantharidin and imiquimod, but they didn't work for me."

Case study #5

A 35-year-old female patient is screened for cervical cancer. The patient states, "I didn't realize that I had HPV lesions on my cervix when the doctor took a biopsy. Fortunately, they weren't malignant. My doctor asked me to have my husband checked for HPV infection also."

Topical immunotherapy includes the use of imiquimod 5% cream and 5-fluorouracil 5% cream. Application of squaric acid dibutylester may also be used as immunotherapy. In some patients with warts not responsive to other treatments, the histamine H2 antagonist cimetidine resulted in a dramatic improvement in 35% of cases in one study, with 25% showing some improvement. The success rate of immunotherapy is 50% to 90%, according to various research studies. If your patient undergoes immunotherapy for warts, monitor the injection and/or application sites for excessive erythema or edema.

Contact sensitizers, such as dinitrochlorobenzene (DNCB), can be used on resistant warts. DNCB may stimulate a response so that the immune system sees the wart as foreign to the body. The wart then goes away over time. The healthcare provider spreads a small patch of DNCB solution on the patient's body, usually on the upper inner arm where lymph tissue is abundant. The purpose of this application is to develop a sensitization. If sensitization doesn't occur as indicated by a red, itching rash, then DNCB is applied again. Once sensitization occurs, DNCB is applied to the wart at periodic intervals until it resolves. Sensitization may be difficult to achieve in immunocompromised patients.

The cancer medication bleomycin can be used to inactivate the HPV that caused the wart. It's injected directly into the wart and very little, if any, of the medication is absorbed into the systemic circulation. Injection of the medication is uncomfortable to painful, but is tolerable for most people. After the injection, erythema and some swelling may occur. This is followed by the wart turning black, which indicates that it's dying. Although the treatment is effective in 80% to 90% of cases, teach your patients that the virus may still be in surrounding tissues. Instruct patients to observe for any new warts.

Other therapies may be effective, including laser therapy to target the wart's tiny blood vessels or curettage to scoop out or scrape off warts. Surgical removal of warts is sometimes necessary, especially if they're numerous, large, or causing pain. However, removing warts may cause viral shedding, creating more warts.

There are a variety of complementary or alternative wart treatments that may be effective in some patients. These treatments include the application of aloe, dandelion sap, garlic, milkweed, apple cider vinegar, vitamin C, and banana to the wart. Frequently soaking a wart in very warm water is cited in the literature as a treatment. Additional research studies need to be conducted to evaluate the consistency of these approaches in treating and resolving warts.

Teach your patients the importance of body hygiene, including frequent and thorough hand washing, and encourage them to be aware of their environment.

Patient teaching tips

In addition to wart therapies, lifestyle modification is important. Teach your patients the importance of body hygiene, including frequent and thorough hand washing, and encourage them to be aware of their environment. Consider these patient teaching tips:

- Warts easily spread to surrounding healthy tissue. Don't scratch, scrape, or cut warts with sharp objects because this causes bleeding, which allows warts to spread. Thoroughly wash your hands after touching a wart.
- Don't use towels, shoes, or other personal items of a person who has a wart.
- Wear sandals or other footwear in public places, such as gyms, swimming pools, and public showers, and sit on a clean towel when using a public sauna.
- Make sure to thoroughly wash your hands when using public restrooms.
- Clean bathtubs with over-the-counter antiseptic agents after each person bathes in the home environment.
- Don't brush, shave, or clip areas that have warts to prevent further contamination.

• Don't bite your nails. This can cause bleeding, which creates an avenue for warts to spread.
• Warts like warm, moist environments to grow. Dry your feet and hands properly. Consider over-the-counter preparations to promote dryness of the feet. Wear socks that absorb moisture. Don't wear tight-fitting shoes because they make the feet sweat.
• Lesions need to be examined by a healthcare provider. A lesion may look like a wart, when it may be actinic keratosis, squamous cell carcinoma, or basal cell carcinoma. These lesions have unique characteristics when biopsied and viewed under a microscope.

When teaching patients about genital warts, it's important to understand the modes of HPV infection transmission regardless of a patient's sexual orientation or gender identity. The focus is on behavior, not sexual orientation. To prevent genital warts, teach your patients the following:
• The best way to prevent genital warts is through abstinence.
• Condoms can be used to reduce the risk of genital warts. However, there's always a chance that there will still be skin-to-skin contact that can easily spread the infection.
• The HPV types that cause genital warts can be spread through oral sex. For example, a person may have the virus in the mouth and/or throat and this can be transmitted if the individual performs oral sex on another person.
• Treatment of genital warts is important to prevent a cycle of reinfection with sexual partners.
• Vaccination against HPV is now available and should be explored by parents for their children before they become sexually active. The main benefit of vaccination is to prevent serious complications such as cervical cancer. Research evidence indicates that HPV vaccination may reduce the severity of warts even after an individual has been infected.

Examining your patient from head-to-toe and taking a thorough health history are important when assessing him or her for HPV infection. The incidence of HPV infection can be reduced through patient teaching about modes of transmission and the inclusion of lifestyle modifications. And don't forget the impact of warts on a person's perception of physical attractiveness, self-image, and overall comfort level. Your patient may be experiencing body image disturbances, so words of encouragement and offering support are helpful.

Summing it up

Most warts spontaneously resolve and don't require treatment, especially when a person has a normally functioning immune system. Persistent warts may need aggressive therapy. Special populations, such as older adults and immunocompromised patients, may present challenges. Help your patients prevent warts or keep them under control through lifestyle modifications and a variety of treatment strategies. ■

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