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Herpetic Whitlow

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Herpetic whitlow is a painful cutaneous infection that most commonly affects the distal phalanx of the fingers and occasionally the toes. It is caused by herpes simplex virus (HSV) types 1 or 2. Herpetic whitlow has been known mainly for infecting healthcare workers in contact with infected secretions or mucous membranes, but the implementation of universal precautions has resulted in a decrease in the incidence of occupation-related cases. Herpetic whitlow occurs mainly in adults aged 20 to 30 years and children. In children, most cases can be attributed to autoinoculation of HSV-1, while in adolescents and adults, herpetic whitlow tends to be caused by autoinoculation of HSV-2. Herpetic whitlow may have a prodrome of burning, pruritus, and/or tingling of the affected finger or the entire limb, followed by erythema, pain, and vesicle formation.

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Herpes simplex virus (HSV) types 1 and 2 are best known for causing infections in the orolabial and genital regions; however, these viruses also are responsible for a number of other infections, including neonatal infection, eczema herpeticum, HSV-associated erythema multiforme, and herpetic whitlow. Herpetic whitlow, first reported in 1909, is a painful cutaneous infection of the fingers or toes caused by HSV-1 or HSV-2.¹ The term is derived from the Scandinavian word *whichflaw* (*which* refers to the sensitive area around the nail, *flaw* means crack).²

Epidemiology

Herpetic whitlow perhaps is most known for affecting healthcare workers in contact with infected

secretions or mucous membranes; however, since the implementation of universal precautions, the incidence has decreased and occupation-related cases no longer represent the majority of occurrences.^{3,4} Herpetic whitlow mainly occurs in individuals aged 20 to 30 years, with lesions usually autoinoculated from HSV-2 genital lesions.³ Children younger than 10 years comprise the next most affected group, with autoinoculated lesions from HSV-1 gingivostomatitis.³ The peak age of occurrence in the pediatric population is within the first 2 years of life.⁵ In immunocompetent individuals, herpetic whitlow is not common; when it does occur, it is a self-limited process.⁶ As is typical of HSV-1 and HSV-2, however, herpetic whitlow may recur. Herpetic whitlow recurrences in pediatric cases occur at a similar rate as adults, with a comparable rate for HSV-1 and HSV-2 cases.⁵

Clinical Manifestations

Herpetic whitlow occurs most commonly on the pulp of the finger; however, the sides and paronychia regions of the finger also can be involved. Cases affecting the toes also have been reported.^{2,7,8} Primary infection might involve a prodrome of burning, pruritus, and/or tingling of the affected finger or the entire limb. The prodrome is followed by edema, erythema, and pain and tenderness in the affected digit.⁹⁻¹² Fever, regional lymphadenopathy, and lymphadenitis also can occur.^{9,10,13,14} Herpetic whitlow initially is seen as painful deep vesicles filled with clear or serosanguineous fluid (Figure).^{9,10,12} Eventually, the vesicles can coalesce,^{9,10} at which point the infection mimics a pyogenic bacterial infection and can be easily misdiagnosed. Vesicles crust after about 10 days. The affected area sometimes undergoes necrosis and sloughs off about one week later.^{10,12} If a superimposing bacterial infection develops, the vesicles can become purulent.

Immunocompromised individuals are at risk of developing atypical or severe infections.^{15,16} They are more likely to develop prolonged and invasive infections. If left untreated, the infection can lead to rapid destruction of the nail.¹⁵ One immunocompromised

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Painful coalesced vesicles with surrounding erythema on the finger.

adult developed gangrenous herpetic whitlow with partial destruction of the nails and deep skin ulceration.¹⁷ Herpetic whitlow also can be the first sign of an immunocompromised state. In a 10-year-old girl, herpetic whitlow was the first manifestation of human immunodeficiency virus infection.⁶

In an immunocompetent individual, the infection usually is self-limited, with lesions resolving within 14 to 21 days.⁹ Recurrence occurs in 20% of cases, usually at the same site.^{5,10} Recognized complications of herpetic whitlow include superinfection with *Staphylococcus aureus* and other bacteria, nail dystrophy, and permanent nail loss.⁵ There also have been reports of local hypoesthesia, secondary ocular involvement, and systemic viremia.^{18,19}

Pathophysiology

Herpetic whitlow is caused by HSV-1 and HSV-2. Though they are serologically distinct, both HSV-1 and HSV-2 are part of the Alphaherpesvirinae family. They share genetic similarities and produce similar primary and recurrent infections.²⁰ In herpetic whitlow, the virus finds its way from an active lesion or infected secretions to an area of broken skin, such as an abrasion or a torn cuticle on the finger or toe. After infecting epithelial cells, the virus replicates and produces symptomatic infection in the form of vesicles. The virus also travels along the nerves until it reaches the dorsal root ganglion that innervates the primary site of viral replication. It lies latent there until the reactivation stage, when the virus replicates again and produces recurrent infection that can be either symptomatic or asymptomatic. Recurrent infections tend to occur in the same site as the primary infection.¹¹ In immunocompetent individuals, primary infections tend to be more severe than recurrent infections.^{10,21}

In order for HSV-1 and HSV-2 infections to spread, there must be direct contact of an open

skin area with active lesions or infected secretions, often from the saliva, semen, or cervix secretions of an asymptomatic individual. Hence, many cases of herpetic whitlow occur as a sequela of primary or recurrent HSV-1 or HSV-2 infection in the orolabial or genital areas. Pediatric herpetic whitlow, especially in children younger than 2 years, is primarily attributed to HSV-1. HSV-1 infection usually is acquired before the age of 5 years, and up to 40% of children demonstrate antibodies for HSV-1.²¹

For primary herpetic whitlow in a child, there are several proposed mechanisms of spread. The primary mechanism is autoinoculation.^{2,5} Infection with HSV-1 in the orolabial region can occur when the child sucks his/her thumb or bites his/her fingernails.¹³ Another mechanism of spread is exogenous sources, such as when an infected individual kisses a child's fingers,²¹ when a mother sucks her infant's toe,⁵ or when an infant explores the mouth of an infected adult.⁴ One child developed herpetic whitlow 3 days after swinging on monkey bars.²² There have been several cases of unknown etiology.^{4,10}

Diagnosis

The diagnosis of herpetic whitlow usually is based on the clinical morphology of extremely painful vesicles on the fingers or toes.⁵ If the infection is primary, there often is a history of recent HSV infection in either the patient or close contacts. If the infection is a recurrence, there will be a history of previous herpetic whitlow infection in that area. Confirmation of the diagnosis requires definitive proof of HSV infection in the affected area, which can be achieved using the Tzanck test, viral culture, or DNA amplification techniques.⁹ The Tzanck test is done by unroofing the vesicle and scraping the base of the lesion.⁴ A positive Tzanck test shows multinucleated giant cells specific for HSV-1, HSV-2, and Varicellovirus.¹⁰ Viral culture and DNA amplification techniques are conducted using fluid obtained from the vesicle via needle puncture.^{4,5} Serologic studies are not helpful in diagnosing herpetic whitlow.^{10,23}

Differential Diagnosis—Although herpetic whitlow is not commonly seen in children, it should always be considered in the differential diagnosis of an infection of the finger because misdiagnosis can lead to the wrong treatment. Herpetic whitlow often is misdiagnosed because it mimics paronychia, bacterial felon, and cellulitis.^{8,10,15} Antibiotics have been started in 65% of documented cases of herpetic whitlow because of misdiagnosing herpetic whitlow as a bacterial infection.⁵ Though the correct diagnosis eventually was reached with further tests, it is ideal to avoid unnecessary antibiotic therapy or surgery.

There are a few characteristics that can help distinguish herpetic whitlow from other conditions. First, a history of trauma to the nail cuticle or skin of the finger (eg, nail biting) might indicate herpetic whitlow because the trauma provides a mode of entry for the virus.²⁴ In addition, because autoinoculation is a common mechanism of spread, a recent history of orolabial or genital herpetic lesions in the individual or any close contact suggests herpetic whitlow. Recurrence of similar symptoms at the same site also should alert the diagnostician to possible HSV infection.² Finally, herpes whitlow characteristically has nonpurulent vesicular fluid.¹⁰ The fluid in the vesicle initially is clear or serosanguineous and can become cloudy secondary to bacterial superinfection, unlike bacterial paronychia, in which the lesions are filled with cloudy fluid from the start due to the presence of pus.¹⁰

Comment

Herpetic whitlow in immunocompetent individuals usually is self-limited; therefore, treatment often is symptomatic.^{10,12} Symptoms last a few weeks, after which healing usually is complete.²⁴ Treatment includes halting viral replication with acyclovir, valacyclovir, or famciclovir; symptomatic pain relief with analgesics; and treatment of bacterial superinfection with antibiotics.²⁴ It is important to keep the lesion covered with a dry dressing because viral shedding occurs until the lesion heals.^{9,10} Incision and drainage should be avoided because it can worsen symptoms and even lead to viremia or bacterial infection.^{5,10}

Although it would seem logical to prescribe antiviral medication to treat herpetic whitlow, there are limited studies proving the efficacy of this course of action. One double-blinded, placebo-controlled, crossover study showed that oral acyclovir administered during the prodromal stage of recurrent HSV-2 herpetic whitlow helped reduce symptom duration from 10.1 to 3.7 days and positive viral cultures from 5.3 to 0.6 days.²⁵ In treating recurrent herpetic whitlow, recurrence can decrease with daily use of oral acyclovir.²⁶ Topical acyclovir does not provide a clear benefit in the treatment of herpetic whitlow.⁵

Systemic acyclovir is indicated in immunocompromised individuals with any form of herpes infection, whether it is localized or disseminated. It is the therapy of choice not only for the treatment of HSV infections but also to prevent recurrent infections in immunocompromised individuals.¹⁵ Perhaps a vaccine is the best way to protect immunocompromised individuals from such a potentially dangerous infection. Research is being conducted to develop vaccines for the prevention and/or

treatment of HSVs, particularly HSV-2. It is possible that these vaccines also might be effective against herpetic whitlow.^{8,27}

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