

Herpetic Whitlow of the Toe

Andrew Mohler, MD

Herpes simplex virus (HSV) is a common pathogen that can infect any cutaneous or mucocutaneous site. Although the most common types of primary infections are gingivostomatitis and genital herpes,¹ infection of the finger is also frequently reported. In 1909 Adamson published the first report of herpetic infections of the hand.² The term *herpetic whitlow* was first applied by Stern in his 1959 description of 54 neurosurgical unit nurses with infections of the finger.² Whitlow comes from the Scandinavian *whichflaw*, which means a crack in the sensitive area around the nail.³ Some authors have expanded the definition of whitlow to describe all digital herpetic infections, including the uncommonly reported herpetic infection of the toe. The following case report describes a case of herpetic whitlow of the toe with a previously unreported mode of infection.

Case Report

A previously healthy 13-month-old girl was admitted to Phoenix Children's Hospital with inflammation of her left fifth toe. Approximately 10 days earlier her mother had noted a blister on the lateral aspect of that digit. Oral antibiotics were prescribed for presumed bacterial cellulitis. The process worsened, however, with increased swelling and erythema of the toe. The mother brought the girl to her family physician, who noted an area of necrosis of the pad and sulcus of the toe surrounded by erythema and several small red papules scattered over the dorsal and plantar surfaces of the foot. The patient underwent debridement of the necrotic area and was admitted to the hospital. At admission the child was febrile (rectal 101.5°F) and agitated but consolable. An examination of her mouth showed several 2- to 3-mm white ulcers of the buccal mucosa and gingiva. The left fifth toe was erythematous and edematous, with evidence of surgical de-

bridement of the pad and sulcus. There were several small vesicles surrounding the toe in addition to the papules previously noted (Figure 1). No lymphadenopathy was observed. The patient's mother reported a history of cold sores in multiple family members, including the patient's mother, father, and 2-year-old and 4-year-old siblings. She also noted the patient's habit of putting her own toes in her mouth.

The base of an unroofed vesicle of the toe was swabbed for herpes simplex virus (HSV) culture. The patient was given intravenous acyclovir, as well as intravenous ampicillin-sulbactam for possible bacterial superinfection. Viral culture was positive for HSV-1. After 4 days of intravenous acyclovir, the toe had improved, and the patient's medications were changed to oral acyclovir. Acyclovir was discontinued after 5 additional days of continued improvement.

Discussion

There are few cases of herpetic whitlow of the toe in the literature. One report describes a 3-year-old girl with HSV-1 infection of the great toe thought to have been infected when her mother with herpes labialis trimmed her daughter's toenails using her teeth.⁴ In another case, a 28-year-old woman with genital herpes developed HSV-2 infection of her toe.⁵ The authors of the report propose neural transmission from the sacral ganglia to the toe or autoinoculation through toe-genital contact as possible modes of transmission. In the current case report, the most likely mode of transmission is autoinoculation through oral-pedal contact. No previous cases proposing this form of transmission were found by a literature review.

Because herpetic whitlow of the toe is so rarely reported, there is little information available about the epidemiology, clinical characteristics, natural history, or treatment of this disease. Fortunately, infection of the finger has been very well described. The anatomic and physiologic similarities of the finger and toe would suggest that most of the information known about finger infections would be applicable to infections of the toe. A brief review of

Submitted, revised, 9 June 1999.

From the Good Samaritan Family Practice Residency Program, Phoenix, Ariz. Address reprint requests to Andrew Mohler, MD, Good Samaritan Family Practice Residency Program, 1300 North 12th Street #605, Phoenix, AZ 85006.



Figure 1. Herpetic whitlow of the toe caused by herpes simplex virus type 1 in a 13-month-old girl.

herpetic whitlow of the finger, therefore, might be beneficial for properly diagnosing and treating whitlow of the toe.

The age distribution of herpetic infection of the finger is bimodal. The first peak, which occurs in young children, is primarily caused by autoinoculation from oral secretions containing HSV-1. The second peak, occurring from 20 to 40 years of age, is also typically caused by autoinoculation; however, the usual pathogen is HSV-2 from genital contact. Health care workers are at exceptional risk for contracting herpetic whitlow from the infected secretions of patients, accounting for about 9% of all cases.⁶

Herpetic infection of the finger often begins with a period of intense pain, pruritus, or both that can involve the entire arm or only the infected digit. The patient can also have systemic symptoms, such as malaise and fever.⁷ Following this prodrome, the distal finger becomes erythematous and edematous. Painful, deep vesicles typically appear on the distal segment of the digit. The vesicles can coalesce and result in damage to a large area of tissue.⁸ The lesions, which might appear to contain pus, almost always contain clear or serosanguineous fluid.⁹ Lymphangitis and axillary or epitrochlear lymphadenopathy can be present. Lesions are self-

limited, typically resolving within 10 to 14 days. Recurrences are common, occurring in about 30% to 50% of cases. In general, the initial infection is the most severe.^{7,8,10}

Because of its similarities to bacterial cellulitis or a paronychia, herpetic whitlow of the finger is often mistaken for a bacterial infection and treated ineffectively with antibiotics or even surgery. Similarly, in case reports of herpetic whitlow of the toe, including this one, the patients were initially thought to have bacterial cellulitis.^{4,5}

In making this diagnosis, it is important to note the histologic difference between the skin of the finger and the toe. In their description of 79 cases of herpetic infection of the hand, Gill et al⁶ found that in areas of highly keratinized skin, lesions seldom ulcerated. Based on this study, one might expect the appearance of lesions of the more highly keratinized toe to differ slightly from the well-described appearance of finger lesions.

There have been no formal studies to assess the efficacy of antiviral medications for suppression of recurrent herpetic whitlow. A limited number of case reports of finger infections, however, suggest that acyclovir might be beneficial. One report showed a decreased recurrence rate in a patient taking daily oral acyclovir.¹¹ Another case report showed that twice-daily oral acyclovir for 5 days initiated at the onset of the prodromal phase markedly decreased the likelihood of lesion appearance.¹² Although the literature regarding suppressive therapy for herpetic whitlow is limited, the prevention of recurrent genital herpes infections has been much more widely studied. Daily dosing of acyclovir in patients who have more than six episodes of genital lesions per year reduces the recurrence rate by approximately 75%.¹³ When treatment is instituted during the prodromal period or within the first 2 days of the development of genital lesions, the severity of the infection is noticeably reduced. Whether suppressive therapy is as effective for herpetic whitlow remains to be shown in a large-scale study.

Cases of apparently successful treatment of existing whitlow lesions with acyclovir have also been reported.¹⁴ As in the case of suppressive therapy for recurrent whitlow, however, large-scale studies on the treatment of existing lesions have not been published. One author recommends using intravenous acyclovir for initial episodes of whitlow of the finger, for infection in immunocompromised pa-

tients, and for severe infections associated with constitutional symptoms.¹ Until further studies are available, it would seem reasonable to apply similar treatment guidelines to the treatment of herpetic whitlow of the toe. Surgical debridement is generally discouraged because of the theoretical risk of serious consequences, such as secondary bacterial infection or viral encephalitis.¹² Even so, at least one group favors excising or perforating the overlying nail for pain relief in the case of an infected nailbed.¹⁵

Although preventing the transmission of HSV is preferable to either suppressing recurrent infections or treating existing lesions, there are no currently established methods for the primary prevention of nongenital HSV infections. Transmission frequently occurs through asymptomatic viral shedding, which complicates prevention. Strategies aimed at chemoprophylaxis or isolation of uninfected contacts during periods of active lesions are not effective. Studies are currently underway for the development of vaccines for HSV.¹⁶ Although the major studies are focusing only on vaccines for genital HSV, the research could potentially be applied to the development of vaccines for nongenital HSV. Patients who are exposed to infected household contacts and thus are at high risk of becoming infected, such as the patient in this case report, would be ideal candidates for vaccination.

Conclusion

Herpetic whitlow of the toe is an uncommon form of HSV infection with several proposed modes of transmission. The clinical characteristics are similar to those of herpetic whitlow of the finger. As is herpetic infection of the finger, infection of the toe is probably often mistaken for a bacterial process. Including whitlow in the differential diagnosis for all toe infections can improve diagnostic accuracy, thereby preventing potentially harmful surgical procedures and the delay of antiviral therapy in serious infections.

The author thanks Drs. Vicki Copeland and Cookie Schaffranek for their photography and the Good Samaritan Family Practice Residency faculty for their review of this manuscript.

References

1. Arbesfeld DM, Thomas I. Cutaneous herpes simplex virus infections. *Am Fam Physician* 1991;43:1655-64.
2. Gill MJ, Arlette J, Buchan KA. Herpes simplex virus infection of the hand. *J Am Acad Dermatol* 1990;22:111-6.
3. Feder HM Jr. Herpetic whitlow in an infant without defined risks. *Arch Dermatol* 1995;131:743-4.
4. Feder HM Jr, Geller RW. Herpetic whitlow of the great toe. *N Engl J Med* 1992;326:1295-6.
5. Egan LJ, Bylander JM, Agerter DC, Edson RS. Herpetic whitlow of the toe: an unusual manifestation of infection with herpes simplex virus type 2. *Clin Infect Dis* 1998;26:196-7.
6. Gill MJ, Arlette J, Tyrrell L, Buchan KA. Herpes simplex virus infection of the hand. Clinical features and management. *Am J Med* 1988;85(Suppl 2A):53-6.
7. Weisman E, Troncale JA. Herpetic whitlow: a case report. *J Fam Pract* 1991;33:516, 520.
8. Schwandt NW, Mjos DP, Lubow RM. Acyclovir and the treatment of herpetic whitlow. *Oral Surg Oral Med Oral Pathol* 1987;64:255-8.
9. Feder HM Jr, Long SS. Herpetic whitlow. Epidemiology, clinical characteristics, diagnosis, and treatment. *Am J Dis Child* 1983;137:861-3.
10. Jarris RF Jr, Kirkwood CR. Herpetic whitlow in family practice. *J Fam Pract* 1984;19:797, 800-1.
11. Laskin OL. Acyclovir and suppression of frequently recurring herpetic whitlow. *Ann Intern Med* 1985;102:494-5.
12. Gill MJ, Arlette J, Buchan K, Tyrrell DL. Therapy for recurrent herpetic whitlow. *Ann Intern Med* 1986;105:631.
13. Fitzpatrick TB, Johnson RA, Wolff K, Polano MK, Suurmond D. Color atlas and synopsis of clinical dermatology: common and serious diseases. 3rd ed. New York: McGraw-Hill, 1997.
14. Whitley RJ, Gnann JW Jr. Acyclovir: a decade later. *N Engl J Med* 1992;327:782-9.
15. Polayes IM, Arons MS. The treatment of herpetic whitlow—a new surgical concept. *Plast Reconstr Surg* 1980;65:811-7.
16. Stanberry LR. Herpes. Vaccines for HSV. *Dermatol Clin* 1998;16:811-6.