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Herpes Simplex: Autoinoculation *versus* Dissemination

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SUMMARY Autoinoculation and dissemination (or Kaposi's varicelliform eruption (KVE) or eczema herpeticum) of herpetic lesions are two forms of viral spread, and it is essential to differentiate the two. Autoinoculation means true infection with retrograde transport of the virus to the dorsal root ganglia of the relevant dermatome that allows the virus to remain there in a latent state for a lifetime, with periodic reactivation. Autoinoculation is, in a manner of speaking, a kind of self-infection with a virus that exists in the host. In contrast, KVE involves a spread of the lesions to the skin areas affected by another skin disease, but there is no true inoculation, i.e. the nerve endings and ganglion are not affected, and so reactivation and recurrences of these lesions will not usually occur. Four cases of autoinoculation and two of KVE illustrate the differences between these two forms of viral spread.

KEY WORDS herpes simplex virus; autoinoculation, Kaposi varicelliform eruption

INTRODUCTION

In the era when most of the scientific literature on herpes is devoted to the detection, typing (1-4) and genetic analysis of the herpes simplex virus (HSV) protein domains (5-7) on the one hand, and the immune response of the host (8,9) as well as the development of vaccines (10-12) and improvement of antiviral chemotherapy (13-15) on the other hand, all of these involving highly sophisticated molecular biology methods, we would like to discuss a modest clinical matter. It is essential to differentiate between two forms of viral spread, autoinoculation and dissemination (or Kaposi's varicelliform eruption (KVE) or eczema herpeticum). We believe that the timing is right for a succinct update and clarification of each.

CASE REPORTS

Case 1

An 18-month-old boy was admitted to the pediatrics department with a 3-day history of swelling and purulent lesions on his right thumb, fever, and barking cough. Physical examination revealed body temperature of 38.3° C, pulse 150 beats/min, weight 8.200 kg (10th percentile), blood pressure 110/50, marked gingival hyperplasia, swelling and erythema with tense clouded vesicles on the distal phalanx of his right thumb (Fig. 1). Laboratory findings included hemoglobin level of 10.7 g/dl, white blood cell count of 10,840/μL (31.7% PMN, 51.9% lymph), and sedimentation rate of 55 mm/h. Urinalysis and biochemistry were within the reference range.

Acta Dermatovenerol Croat
2005;13(4):237-241

He was diagnosed as having herpetic gingivostomatitis and herpetic whitlow. The fever subsided within one day. His cutaneous lesions regressed in the next 10 days without therapy.

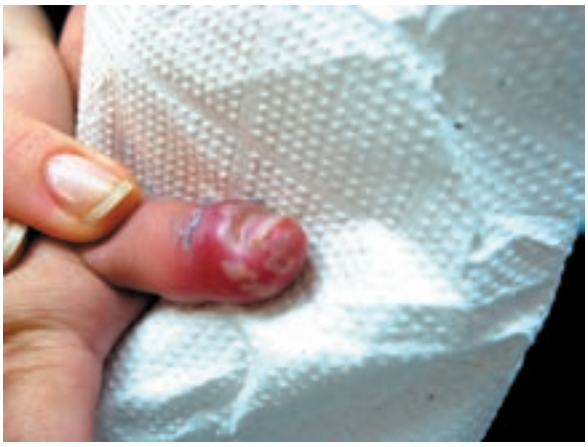

Figure 1. Tense clouded vesicles on the distal phalanx of patients right thumb.

Case 2

An 8-month-old otherwise healthy boy presented with herpetic gingivostomatitis that appeared 8 days prior to his admission. Painful lesions on the skin of his left thumb had appeared the day before he was admitted to the hospital. Physical examination revealed gingival hyperplasia and 1-mm erosions on an erythematous base on his lips and gingiva. There were grouped purulent vesicles on an erythematous base on his right thumb and thenar eminence (Fig. 2). The child's temperature was normal on admission as was his appetite. He was diagnosed as having herpetic whitlow of the digit, secondary to primary herpes gingivostomatitis. The lesions resolved without treatment other than a topical antibiotic cream to the thumb and reassurance of the parents.

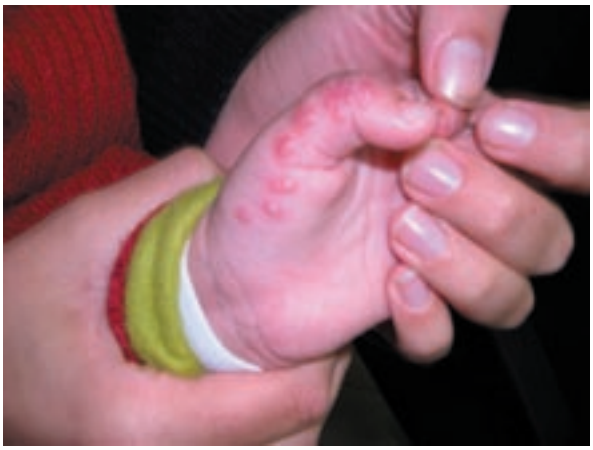

Figure 2. Grouped purulent vesicles on an erythematous base of patients right thumb and thenar eminence.

Case 3

A 25-month-old girl was referred for consultation to our outpatient clinic with a suspected diagnosis of impetigo of the left hand that did not respond to antibiotic treatment. On physical examination she appeared to be an otherwise healthy child with purulent blisters on an erythematous base involving the first and second digits of her left hand (Fig. 3). She had been treated with penicillin and clavulanic acid for 5 days prior to admission. Her mother reported that the child had suffered from painful ulcers in her mouth 10 days before. The lesions cleared within 4 days following treatment with oral acyclovir 50 mg/kg.

Figure 3. Purulent blisters on an erythematous base on the first and second digit of patients left hand.

Case 4

This 10-month-old boy was referred to our clinic for mild gingival hyperplasia and a purulent lesion on his thumb. His medical history included atopic dermatitis for the past 6 months. His father had also an atopic background. Physical examination revealed numerous blisters, some filled with purulent fluid, on an erythematous base on his right thumb and thenar eminence (Fig. 4). The rest of the examination was normal. The boy was being breastfed without difficulty. He was diagnosed as having herpetic infection of the digit and given oral acyclovir 50 mg/kg. His lesions resolved within 4 days.

Case 5

This 3.5-month-old child was admitted because of 24-h erosive oozing eruption, mainly on his right cheek. His medical history included hydronephrosis of the right kidney, undescended left testis, and facial dermatitis that had started one month before admission and had been diagnosed as atopic

Acta Dermatovenerol Croat
2005;13(4):237-241

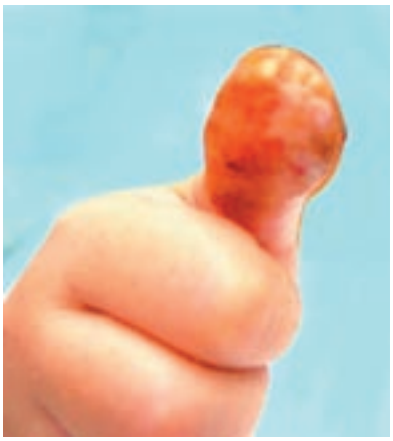

Figure 4. Purulent blisters on an erythematous base on patients right thumb and thenar eminence.

dermatitis. On admission, he was febrile (38.8° C), and appeared to be in pain. Dermatologic examination showed clustered vesicles on his right cheek with erosions and crust formation (Fig. 5). There were scattered umbilicated vesicles on an erythematous base on his forehead, chin and the upper part of his body. The rest of the clinical examination was unremarkable, except for the undescended left testis and muscle hypotonia that had been present since birth. His white blood count was 12,290/mm^3 (47% neutrophils, 40.7% lymphocytes), serum glucose, electrolytes, and liver and renal function were normal, as was his cerebrospinal fluid (CSF). Blood, urine and CSF cultures were negative. Serologic tests for herpes at admission were negative, and no viral culture could be done. He was diagnosed as having KVE and treatment with intravenous acyclovir 10 mg/kg every 8 hours was initiated with rapid improvement and clearing of the vesicular lesions within one week.

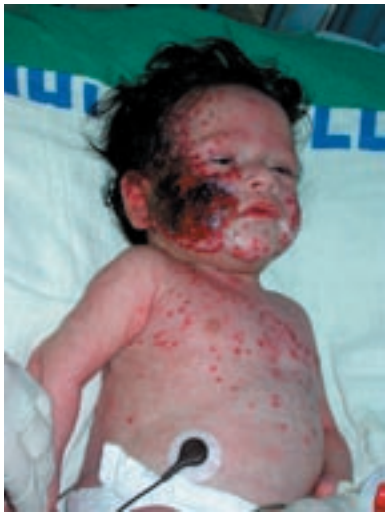

Figure 5. Clustered vesicles on the patients right cheek with erosions and crust formation.

Case 6

A 22-year-old man was admitted because of a vesicular impetiginized eruption on his right cheek and ear. His past medical history included atopic dermatitis from the age of one year. He had also had eczematous skin lesions before the acute vesicular eruption appeared. On examination, the patient was afebrile and appeared to be in good health. There were clustered vesicles with impetiginization on the right side of his face, ear and neck, and small, disseminated, less dense vesicles on the rest of his face (Fig. 6). Culture for herpes revealed HSV I. He was diagnosed as having KVE and treated with valacyclovir 1000 mg twice daily and cefaclor 750 mg twice daily. The eruption resolved completely after 10 days of treatment.

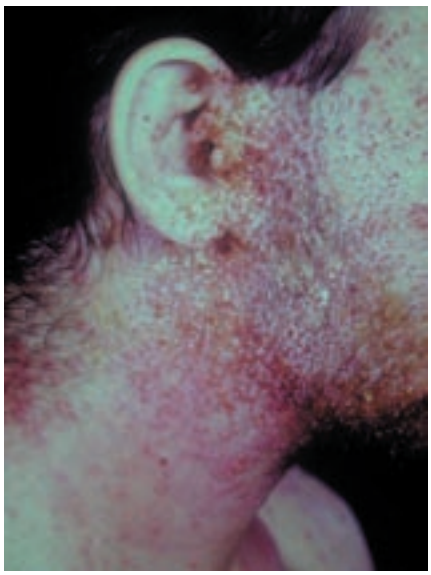

Figure 6. Clustered vesicles with impetiginisation on the right side of patients face.

DISCUSSION

The term “autoinoculation” has been overused to the point of abuse by including cases of dissemination (KVE), which is not a true inoculation. The differences between the two distinct forms of remote HSV spread are very clearcut. Autoinoculation means a true infection with involvement of peripheral nerve endings at the site of infection, with retrograde transport to the dorsal root ganglia of the relevant dermatome that allows the virus to remain there in a latent state for a lifetime, with periodic reactivation and with either typical expression of the disease or asymptomatic viral shedding. Autoinoculation is, in a manner of speaking, a kind of self-infection with a virus that exists in the host. In contrast, KVE involves a spread of the lesions to areas of the skin affected by another skin

disease (most often atopic dermatitis, but also Darier's disease, burns and after various rejuvenation procedures), but there is no true inoculation, i.e. the nerve endings and ganglion are not affected, and so reactivation and recurrences of these lesions will not usually occur.

Other subordinate differences between the two are: (a) KVE affects diseased or irritated skin with diminished barrier function, whereas autoinoculation affects apparently healthy skin (albeit with a port of entry), and as such, the extension of the eruption in KVE is influenced by the extension of the underlying disease/condition; and (b) the clinical pattern of autoinoculation is the same as that of a usual herpetic attack, i.e. mostly grouped vesicles, compared to KVE in which there is a spread of monomorphic vesicles or pustules distributed more or less evenly on the eczematous skin. The clinical picture might become more severe with systemic symptoms such as fever, malaise, and lymphadenopathy (16).

Finally, we would like to address an intriguing and important question: can one autoinoculate HSV from a recurrent herpetic attack (as opposed to primary herpes)? We believe that this is possible only in exceptional cases, which adds credence to our above approach to differentiating between the two. Considering the wide distribution of HSV worldwide and its very high prevalence among adolescents and adults, there are surprisingly few reported cases of autoinoculation from recurrent herpetic attacks (reviewed in 17, 18). Moreover, even in the few existing reports that suggest autoinoculation in association with recurrent herpetic attacks (oral or genital), one cannot exclude a concomitant exogenous inoculation of HSV in two distant areas (mouth or genitalia and finger), followed by recurrent attacks that no longer have to be simultaneous. In other words, herpetic whitlow lesions that appear in patients who had suffered from recurrent oral or genital herpetic attacks do not prove autoinoculation; they could well be a manifestation of an earlier HSV infection that had been dormant until the index eruption but had actually been acquired on the same occasion as the recurrent oral or genital herpetic attacks which were supposedly the source for the autoinoculation.

In conclusion, clinicians and healthcare personnel should be familiar with the various forms of remote HSV infections, their clinical appearance as well as the ways of their acquisition. We hope that this brief analysis has been helpful.

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Acta Dermatovenerol Croat
2005;13(4):237-241

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