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Case Report Open Access

Recurrent Ophthalmic Eczema Herpeticum with Hyper Immunoglobulin E Syndrome in A 4 Years-Old Boy

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Abstract

Eczema herpeticum (EH) is a skin infection caused by the herpes simplex virus (HSV) that occurs in individuals with atopic dermatitis. It is characterized by the sudden appearance of vesicles and erosions with crusts over areas affected by eczema. EH can range from mild and self-limiting in healthy adults to life-threatening in children, infants, and immunocompromised patients. Early treatment with antiviral therapy is crucial in preventing complications and mortality. EH is primarily caused by a superinfection of HSV, usually HSV-1, in individuals with atopic dermatitis. Reactivation of HSV is more common than primary infection. Patients with atopic dermatitis are more susceptible to skin infections due to impaired skin barrier function and immune dysregulation. Disseminated cutaneous HSV infection can also occur in individuals with other forms of dermatitis, known as Kaposi varicelliform eruption (KVE). Several risk factors are associated with the development of EH, including severe atopic skin disease, decreased expression of filaggrin (a protein important for skin barrier function), and decreased production of antimicrobial peptides. EH patients often exhibit biomarkers associated with T-helper type 2 (Th2) cell responses, such as reduced interferon levels, elevated eosinophil count, and increased serum IgE levels. They are also more likely to have food and environmental allergies, asthma, early onset of atopic dermatitis, and a history of Staphylococcus aureus and molluscum contagiosum infections. The HLA-B7 allele has been linked to an increased risk of EH. Increased expression of interleukin-10 (IL-10) and local IL-25 is found in EH patients and may contribute to the development of the condition. The Th2 shift in the immune system in EH patients is associated with decreased antimicrobial peptides in the skin, making them more susceptible to cutaneous HSV infection. We present the case of a 4 years-old boy with initial bilateral eczema herpeticum of both eyes and high level of immunoglobulin E, 12 months later with recurrence of eczema of the left eye.

Keywords: Eczema herpeticum-child-ophthalmic-treatment

Introduction

Eczema herpeticum is a rare complication of atopic dermatitis that occurs in less than 3% of patients [1-18]. It is more common in infants and children than in adults [1-18]. Atopic dermatitis is a chronic inflammatory skin disease that affects 10 to 20% of children in developed countries and 7 to 10% of adults in the United States. The rarity of eczema herpeticum in atopic dermatitis patients suggests that there are many host factors involved in its development. Predictors of hospitalization in pediatric patients with eczema herpeticum include male sex, age less than one year, fever, and systemic symptoms [2,4,7]. The average age of hospitalized pediatric patients with eczema herpeticum is 3.26 years, and 41.8% of patients are female [3,7,9,14,18]. Asian pediatric patients have a higher prevalence, longer hospital stay, and higher cost of care. The epidemiology of eczema herpeticum in non-hospitalized and adult patients is not well defined [1-18].

Case Report

A previously healthy 4 years old boy was admitted to our emergency department because of an acute rash around both eyes. The patient had low-grade fever of around 38°C for two days. The history of infections in the surrounding area was unremarkable. All vaccinations had been performed according to the German vaccination schedule. Clinically, the boy presented in good general condition with a rash around both eyes with a bridging between both eyes (Figure1). O2 saturation was 100%. Many ruptured blisters and papules were noted around both eyes (Figure 1); otherwise, no other cutaneous abnormalities were apparent at this time. No neck stiffness was found. HSV 1 was positive. Later result of immunoglobulin E was pathologic and showed a level of 1560 kU/l. 12 months later he developed a similar rash on the left eye without fever and good physical condition. A recurrence of HSV 1 infection, now only of the left eye, was present (Figure 2).

Figure 1: Initial aspect of bilateral infection with a bridge between both eyes in 4 years-old boy

Figure 2: 12 months later, changing aspect of initial bilateral to unilateral lesions of the left eye (Figure 2)

Discussion

The main risk factor for EH was found to be extrinsic atopic dermatitis (AD) [1-18]. Extensive atopic dermatitis can be the result of despaired quality of life [3-5]. Early onset of AD was identified as a risk factor for recurrent EH [3,4,5,14,15]. Standard therapy for EH included pretreatment with topical steroids, systemic steroids, topical calcineurin inhibitors, or emollients. Skin without AD lesions was never affected by herpetic lesions. AD was associated with more severe disease and a known risk factor for EH. Patients with recurrent EH have a significantly younger age at AD onset compared to patients with a single episode of EH. This finding has not been assessed in larger studies before and suggests that early age of AD onset predisposes to both EH manifestation and recurrence. The correlation between atopic distortion of the patient and the disposition to EH occurrence. Patients with extrinsic AD tend to have a more severe, refractory type of AD compared to patients without signs of atopy. AD patients with a positive history of food allergies or asthma are more likely to develop EH, supporting this hypothesis.

We found high levels of IgE in the blood of the patient as a form of Hyper IgE-syndrome. High IgE levels have been associated with EH previously, but researchers did not find a correlation between high IgE levels and EH recurrence. Extrinsic and intrinsic AD patients show different cytokine activation patterns, with TH2 cells playing a role in EH development. An elevated type 2 cell response to HSV was found in AD patients [15]. Patients with moderate-to-severe AD are more likely to develop EH, but there was no significant difference in disease severity between patients with one episode of EH and those with recurrent EH. Long-term follow-ups of EH patients would be needed to further evaluate the role of disease severity in recurrence. The use of topical steroids or calcineurin inhibitors does not seem to correlate with EH occurrence. In fact, these treatments may be used to treat the underlying AD in patients with EH. Discontinuation of topical corticosteroids may contribute to the outbreak of EH. Gender is most likely not a risk factor for EH, as studies have shown inconsistent results regarding gender predominance. The average time until diagnosis of EH is 4 days, which is considered a long delay considering the high mortality of untreated disseminated HSV infections. Immediate diagnosis and treatment initiation are crucial for EH patients. EH lesions only affect lesional AD skin and spare areas of the skin without eczema [3,4,6,7,9,11,12]. This information can help differentiate EH from other skin conditions and lead to a faster diagnosis of affected patients. EH is a skin infection caused by HSV that can lead to serious complications including ocular and systemic infections. Accurate diagnosis is crucial for determining appropriate treatments. Acyclovir is typically initiated based on clinical impression, as test results are not immediately available. Large studies on EH in children are uncommon. Previous findings that lymphopenia are more pronounced in patients with EH. This may be a result of HSV infection, as another study on the effects of HSV infection found lower lymphocyte counts in individuals with HSV. Leukopenia or lymphopenia, along with clinical suspicion of EH, can assist clinicians in making treatment decisions.

It has been observed that these children have weakened innate and adaptive immune responses. The administration of interferon-gamma (IFN-γ), a protein that helps ameliorating immune responses, did not show significant improvement in either subset of children with eczema herpeticum. However, further investigation into the production, function, or receptor defects of IFN-γ may help predict the response to treatment in these children.

Clinical diagnosis can be confirmed by polymerase chain reaction, viral culture, electron microscopic direct detection of virus in negative contrast, Tzanck test, immunofluorescence studies, or serologic studies. Several therapeutic alternatives to the standard therapy of eczema herpeticatum, intravenous antiviral chemotherapy with aciclovir, have been developed in recent years. Kaposi like varicelliform eruptions do occur in a few cases [12].

Eight genes were identified when comparing recurrent ADEH+ to ADEH- and NA subjects. SIDT2, CLEC7A, GSTZ1, TPSG1, SP110, RBBP8NL, TRIM15 and FRMD3 were described [19]. Silencing of SIDT2 and RBBP8NL in normal human primary keratinocytes (NHPKs) resulted in significantly increased HSV-1 replication [19]. SIDT2-silenced NHPKs had decreased gene expression of IFNk and IL1b in response to HSV-1 infection [19]. RBBP8NL-silenced NHPKs had decreased gene expression of IFNk, but increased IL1b. In addition, silencing of SIDT2 and RBBP8NL also inhibited gene expression of the keratinocyte differentiation markers keratin 10 (KRT10) and loricrin (LOR) [19].

EH can be associated with DOCK8-Deficiency Hyper Ig-E syndrome [8], Hailey-Hailey Disease [17] and Darier disease [18] and nevertheless, atopic dermatitis as stated above [3,4,5,14,15]. Novel genetic mutations have been found in EH [9]. In conclusion and concerning our case, the herpes infection was primarily found on both eyes with an untypical bridge between both eyes (Figure 1). The appearance changed 12 months later to an unilateral aspect of the left eye, which is very unusual and interesting to publish (Figure 1 and 2).

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