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## A clinical case of erythema multiforme associated with HSV 1/2 in a child

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**Abstract:** *this research examines a clinical case of erythema multiforme in a 5-year-old child, which was triggered by HSV-1. Clinically, the child presented with a fever of 37.5–38.0°C, itching, and a papular-vesicular rash with ring-shaped hyperemia around the vesicles on the face, trunk, limbs, and edema. Instrumental and laboratory investigations did not reveal any abnormalities. The blood serum analysis detected positive Ab IgG HSV1/2 (qualitative method) with a value of 24.7 S/CO and a dubious result for Ab IgM HSV 1/2, indicating the presence of a herpes infection. Considering the clinical, laboratory, and instrumental findings, a differential diagnosis was required to distinguish between erythema multiforme triggered by HSV-1 and chickenpox in order to prescribe the appropriate treatment and prevent complications.*

**Keywords:** [chickenpox](#), [differential diagnosis](#), [erythema multiforme](#), [herpesvirus infection](#), [rash](#).

### Introduction

Erythema Multiforme is an acute condition characterized by vesicular, bullous, erythematous, and urticarial eruptions on the skin and mucous membranes. The causes of this condition are diverse, and the generally accepted hypothesis regarding its pathogenesis is a hypersensitivity reaction of an immediate type, which can be induced by infectious agents, medications, and other allergens (Chernyshova L.I., Volokha A.P., Bondarenko A.V. et al., 2021, p.1072). HSV-1 and HSV-2 hold one of the leading positions among potential infectious agents of erythema multiforme. Erythema Multiforme may be one of the rare forms of simple herpes.

### Aim

To analyze a clinical case of erythema multiforme associated with HSV-1/2 in a 5-year-

old child and to perform a differential diagnosis between the rash associated with erythema multiforme triggered by HSV-1 and the rash associated with chickenpox.

### Clinical case description

On October 4, 2022, a 5-year-old child was admitted to the infectious disease department with complaints of fever, swelling of the face, lower limbs, and genitals, and a rash all over the body. The child's medical history includes previous episodes of herpes labialis in both the child and the mother, while the allergological history is unremarkable. The disease started with an increase in body temperature to 37.5–38.0°C, followed by the onset of skin itching after 2 days. Within a few days, a papular-vesicular rash with areas of ring-shaped hyperemia around the vesicles appeared on the face, trunk, and limbs. Swelling worsened in

parallel with the development of the rash. Due to the progression of clinical symptoms, the patient was hospitalized on the 10th day of the illness. The child was treated symptomatically before admission to the hospital. Upon admission, the body temperature was 37.4°C, the heart rate was 90 beats per minute, and the respiratory rate was 20 breaths per minute. Swelling was observed on the face, lower limbs, and genital areas. At the time of examination, the papulovesicular rash with polymorphism and circular erythema around the vesicles had already transformed into a rash all over the body with crusts and areas of clearing, bordered by circular hyperemia (Fig.1).

Small lymph nodes were palpable in the cervical, submandibular, and occipital regions. No abnormalities were detected during internal organ examinations. Laboratory test results show neutrophilia, while the results of biochemical blood analysis and urinalysis are normal. The blood serum



**Fig. 1.** Photo of the rash at the time of the child's hospitalization

test detected positive Ab IgG HSV1/2 (qualitative method) with a value of 24.7 S/CO (negative when < 0.9, dubious when 0.9-1.1, and positive when > 1.1), and a dubious result for Ab IgM HSV 1/2 and a negative result for Ab IgM VZV and Ab IgG VZV. The Polymerase Chain Reaction (PCR) tests for VZV DNA and HSV-1/2 DNA in the blood also yielded negative results. These results indicate the presence of a herpes infection in the patient caused by HSV-1/2. Ultrasound examination results reveal hepatomegaly, heterogeneity of the hepatic parenchyma, and an increased vascular pattern. Before the laboratory test results were available, considering the patient's complaints of elevated body temperature, swelling, rash all over the body with itching, as well as objective signs of general intoxication syndrome, swelling of the face, lower limbs, and genitals, and a pronounced papular-vesicular rash with areas of ring-shaped hyperemia on the skin of the face, trunk, and limbs, a preliminary diagnosis of chickenpox, erythema multiforme? was made.

After conducting laboratory and instrumental investigations and based on a differential diagnosis, the diagnosis of erythema multiforme associated with HSV-1/2 was established. The treatment plan involved symptomatic management following the protocol used for varicella-zoster virus (VZV) infection, which included antipyretics for temperatures above 38.0°C, skincare, and detoxification therapy. After establishing the final diagnosis, loratadine and dexamethasone were prescribed at a dose of 1.5 mg/kg based on prednisolone for a course of 5 days, taking into account the patient's complaints and condition (severe skin itching and edema in various locations). Antiviral therapy was not prescribed due to the absence of HSV-1 replication at the time of hospitalization (negative results of PCR testing for HSV-1/2 DNA in the blood). During the course of treatment, the patient's overall condition improved, with the body temperature decreasing to 36.6°C and a reduction in skin symptoms. The rash progressed to the formation of crusts, which, after falling off, left behind hyperemic irregularly shaped patches with central clearing. No new rash elements appeared. Swelling on the face, limbs, and genital organs reduced and eventually disappeared. The child was discharged on October 11, 2022.

**Tab. 1.** Differential diagnosis between erythema multiforme associated with HSV-1 and chickenpox

Feature		Chickenpox	Erythema multiforme associated with HSV-1
Etiology		Varicella-zoster virus	Viruses (HSV ½ usually), bacteria, medications
Rash	dates of appearance	from the first day of the disease	gradually after a few days from the disease's beginning
	an increase in temperature correlates with the appearance of new elements of the rash	yes	no
	duration	5-7 days	10-14 days
	character	spotted-papular-vesicular, fake polymorphism	papular-vesicular rash with areas of annular hyperemia around the vesicles in the form of spots of irregular shape
	itching	Not always present	Characteristic symptom
	swelling of specific body part	Not always present	Characteristic symptom
	localization	face, trunk, limbs, mucose	face, trunk, limbs, palms
	crusts	3-5 days	10-12 days
Special markers		Ab IgM VZV Ab IgG VZV	Ab IgM HSV-1/2 Ab IgG HSV-1/2

**Discussion**

Erythema multiforme is a clinical condition characterized by a wide range of morphological lesions. In this clinical case, the preliminary clinical diagnosis was chickenpox (varicella), erythema multiforme? The characteristic features supporting both diagnoses included a general intoxication syndrome, fever elevation, and papulovesicular rash. The patient was admitted to the infectious diseases department on the 10th day of the illness due to worsening of the condition. Nonsteroidal anti-inflammatory drugs (NSAIDs) therapy was administered during the pre-hospital stage. On the 10th day of illness, the patient was admitted to the infectious diseases department, where the objective examination revealed edema on the face, lower extremities, and genitalia. Upon studying the nature of the rash, crusts were found with areas of clearing surrounded by a circular erythema. Since the rash exhibited true polymorphism and showed incomplete resemblance to the classic manifestations of chickenpox (Fig. 2), there arose a need for differential diagnosis.



**Fig. 2.** Photo of the polymorphic rash on the child's hand skin upon admission

Table 1 presents the differential diagnosis of the rash in erythema multiforme associated with HSV-1/2 and the rash in chickenpox. According to the data in the table, it is crucial to focus on the onset of the rash. Chickenpox is characterized by dermal symptoms appearing from the first day of illness, while in erythema multiforme associated with HSV-1/2, the rash gradually appears over several days from the onset of the disease. Additionally, attention should be given to the duration of the rash. Chickenpox rash lasts for 5-7 days, while the rash in erythema multiforme associated with HSV-1/2 can persist for 10-14 days. Furthermore, the correlation between the fever spike and the appearance of new rash elements is a diagnostic criterion for chickenpox, which is not characteristic of erythema multiforme associated with HSV-1/2. Another important criterion for differential diagnosis is the character and localization of the rash. In chickenpox, the rash is localized on the trunk, face, mucous membranes, and limbs, presenting as a maculopapulovesicular rash with pseudo-polymorphism. In erythema multiforme associated with HSV-1/2, the rash is localized on the face, trunk, limbs, and palms, presenting as a papulovesicular rash with areas of circular erythema around the vesicles in the form of irregularly shaped spots. Additionally, the rash is accompanied by edema and itching, which are not characteristic of chickenpox. To confirm the diagnosis of erythema multiforme associated with HSV-1, laboratory investigations for VZV and HSV 1/2 markers were conducted. The presence of IgG antibodies and doubtful results for IgM antibodies to HSV 1/2, along with the absence of IgM and IgG antibodies to VZV, allowed for the exclusion of the diagnosis of chickenpox in the patient. Based on this clinical case, we conducted a differential diagnosis between chickenpox and

erythema multiforme associated with HSV-1/2. According to the studies (Rahi, I., 2017), there is molecular and immunological evidence suggesting that HSV can cause erythema multiforme through hypersensitivity, involving vasculitis and immune complex formation. Therefore, the analysis of specific HSV-1/2 and VZV markers is an important aspect of the differential diagnosis between chickenpox and erythema multiforme associated with herpes simplex virus.

### Conclusion

The rarity of the pathology and the similarity of symptoms with chickenpox complicate the diagnosis of erythema multiforme. The awareness of physicians about the etiology, pathogenesis, and clinical characteristics of chickenpox and erythema multiforme associated with HSV-1/2 facilitates the differentiation between these two conditions.

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### Conflict of interest

The authors declare that they have no competing interests. Consent for the publication of this work was obtained from the legal representatives of the patient.

### Consent to publication

Written informed consent was obtained from patient's parents for the use of research data and publication of this work.

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## Клінічний випадок мультиформної еритеми асоційованої з HSV 1/2 у дитини

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*Анотація:* це дослідження присвячене клінічному випадку мультиформної еритеми викликаній HSV-1 у дитини 5 років. Клінічно у дитини спостерігали підвищення температури тіла до 37.5–38.0 С, свербіж, папульозно-везикульозний висип з ділянками кільцевидної гіперемії навколо везикул на шкірі обличчя, тулуба та кінцівок, набряки. Дані інструментальних та лабораторних досліджень не виявили відхилень від норми. У сироватці крові пацієнта виявлено позитивний результат для антитіл IgG HSV1/2 (якісний метод) зі значенням 24,7 S/CO, а також сумнівний результат для антитіл IgM HSV 1/2, що свідчить про наявність герпесвірусної інфекції. Враховуючи клінічні, лабораторні та інструментальні дані постала необхідність в диференційній діагностиці мультиформної еритеми, викликаній HSV-1 та вітряної віспи для правильного лікування захворювання та попередження розвитку ускладнень.

**Ключові слова:** висип, вітряна віспа, герпесвірусна інфекція, диференційний діагноз, мультиформна еритема.



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