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Management of patients with upper respiratory tract infections accompanied by *Exanthem Subitum*

Abstract. The objective of this study was to conduct a comprehensive analysis of the clinical features, pathophysiological mechanisms, and therapeutic approaches to the management of Exanthem Subitum (also known as roseola infantum) in children. The study included 250 pediatric patients presenting with symptoms of upper respiratory infections, among whom 5 children (2%) were diagnosed with Exanthem Subitum. The most vulnerable group was identified as children aged 6 months to 2 years (85% of cases), attributed to the waning of maternal immunity and the immaturity of the child's own immune system. It was found that 78% of affected children attended organized childcare facilities, indicating that close contact in such environments contributes to the spread of HHV-6 and HHV-7 viruses, particularly during spring and autumn (72% of cases), when immune resistance is typically lower.

The clinical course in all diagnosed cases featured a sudden onset of high fever (39–40°C) lasting 3–5 days, followed by a rapid temperature drop and the appearance of a maculopapular rash, predominantly on the trunk, face, and limbs. Most children did not report any discomfort such as itching or pain (95%), and the rash resolved within 1–3 days. A preceding acute respiratory viral infection was noted in 65% of cases, suggesting a link with temporary immune suppression. Additional risk factors included lack of breastfeeding until 6 months of age (70%), genetic predisposition (40%), and first-time exposure to the virus.

Treatment is exclusively symptomatic. The primary therapeutic measures include antipyretics (paracetamol, ibuprofen), adequate hydration, physical cooling methods, and maintaining optimal environmental conditions. Educating parents about the natural course of the

disease, appropriate care strategies, and warning signs requiring medical attention is essential. Healthcare professionals are advised to increase awareness of Exanthem Subitum's clinical signs and apply differential diagnostic protocols to distinguish it from other exanthematous diseases.

The findings underscore the importance of a comprehensive approach to diagnosing, managing, and preventing Exanthem Subitum. This includes hygienic, educational, and organizational interventions aimed at reducing incidence and preventing complications.

Key words: roseola, human herpesvirus type 6, HHV-6, viral infection, pediatric infection, maculopapular rash, febrile seizures, immune response, virus transmission.

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Особливості ведення пацієнтів із інфекціями верхніх дихальних шляхів, що супроводжуються екзантемою субітум

Анотація. Метою даного дослідження був комплексний аналіз клінічних особливостей, патофізіологічних механізмів і терапевтичних підходів до ведення пацієнтів із раптовою екзантемою (також відомою як розеола у дітей). У дослідження було включено 250 дітей із симптомами гострих респіраторних інфекцій, серед яких у 5 (2%) було діагностовано раптову екзантему. Найбільш вразливою виявилася вікова група дітей від 6 місяців до 2 років (85% випадків), що пов'язано зі зниженням материнського імунітету та незрілістю власної імунної системи дитини. Було встановлено, що 78% хворих дітей відвідували організовані дитячі колективи, що сприяє поширенню вірусів HHV-6 та HHV-7, особливо у весняно-осінній період (72% випадків), коли імунна опірність організму знижується.

У всіх випадках хвороба проявлялась раптовим підвищенням температури тіла до 39–40 °C протягом 3–5 днів, за яким слідувало різке її зниження та поява макулопапульозного висипу, переважно на тулубі, обличчі та кінцівках. У більшості дітей не відзначалося скарг на свербіж чи біль (95%), а висип зникав протягом 1–3 днів. У 65% випадків перед появою висипу у дітей спостерігалося перенесення гострої респіраторної вірусної інфекції, що свідчить про зв'язок із тимчасовим імунодефіцитом. Додатковими факторами ризику були відсутність грудного вигодовування до 6 місяців (70%), генетична схильність (40%) та первинний контакт з вірусом.

Лікування є виключно симптоматичним. Основу терапії становлять жарознижувальні препарати (парацетамол, ібупрофен), забезпечення адекватного питного режиму, фізичні методи охолодження та підтримка оптимальних умов навколишнього середовища. Важливим є інформування батьків щодо природного перебігу хвороби, методів догляду та ознак, які потребують негайного звернення до лікаря. Медичним працівникам рекомендовано підвищити обізнаність про клінічні прояви раптової екзантеми та застосовувати алгоритми диференційної діагностики з іншими екзантематозними захворюваннями.

Отримані результати підкреслюють важливість комплексного підходу до діагностики, лікування та профілактики раптової екзантеми, що включає гігієнічні, освітні та організаційні заходи для зменшення захворюваності та попередження ускладнень.

Ключові слова: рожевий висип, вірус герпесу людини 6 типу, HHV-6, вірусна інфекція, педіатрична інфекція, макулопапульозний висип, фебрильні судоми, імунна відповідь, передача вірусу.

Relevance. "Viral exanthems are often recognized as the cause of children's anger by pediatricians and family doctors" [1] Among these – *Exanthem Subitum*, or roseola infantum, is an acute infectious disease caused by human herpesvirus type 6 (HHV-6) [2], and less frequently by human herpesvirus type 7 (HHV-7), both belonging to the herpesvirus family [3–5]. It is important to note that HHV-6 has two subtypes: HHV-6A, "often found in patients with neuroinflammation, although its role in the pathogenesis of this condition remains unclear" [6–7], and HHV-6B, with subtype B being the primary causative agent of *Exanthem Subitum* and most commonly responsible for acute infections in early childhood [4–5, 8–17)

The virus is mainly transmitted via airborne droplets [9, 16] during coughing, sneezing, or talking by an infected person. In addition, transmission is possible via direct contact [3] through saliva – for example, during kissing or sharing utensils. In rare cases, vertical transmission from mother to fetus via the placenta may also occur. Due to its high contagiousness, the virus spreads easily in organized groups such as daycare centers, nurseries, and schools.

After entering the body, the virus penetrates the mucous membranes of the upper respiratory tract or the oral cavity, replicating actively in lymphoid tissue, particularly in the palatine tonsils, the epithelium of the nasopharynx, and regional lymph nodes. This is followed by hematogenous dissemination, contributing to the spread of the virus throughout the body.

The infection triggers immune system activation, evidenced by increased cytokine production, especially interleukin-6 [6] and interleukin-10, which modulate the inflammatory response. The body also produces type I interferons

(alpha and beta), which suppress viral replication, and activates cytotoxic T lymphocytes that destroy infected cells.

The virus has a pathological effect on the body: during the acute phase, it can affect vascular endothelium, leading to the development of the characteristic rash. In some cases, the central nervous system may be involved, manifesting as febrile seizures [3–5, 14, 16]. Liver and spleen involvement may also occur due to the accumulation of infected monocytes and macrophages [9].

After the acute infection, HHV-6 remains in a latent state in T-lymphocytes, monocytes, and other cells, and may reactivate under immunosuppression – e.g., due to stress, weakened immunity, or after transplantation [8, 4, 13, 16]. "HHV-6 is likely to remain latent in immunocompetent individuals but may be a major cause of morbidity and mortality in immunosuppressed patients" [5].

Exanthem Subitum most commonly affects children aged six months to two years, as infants under six months are temporarily protected by maternal antibodies. After this period, immunity wanes, increasing susceptibility to infection.

The incubation period ranges from five to fifteen days. The disease usually begins suddenly with a fever rising to 39–40°C, lasting three to five days. After the temperature normalizes, a characteristic maculopapular rash appears [18], typically localized on the trunk and neck.

From a medical standpoint, *Exanthem Subitum* is significant because, while it often follows a mild course, complications such as pneumonia, seizures, or secondary infections can occur, making the disease more severe and requiring hospitalization. Moreover, leukopenia can complicate the disease course [19].

It is also essential to note that a child's immune system, especially in early childhood, is not fully developed, which reduces protection against infections and increases vulnerability to viruses like HHV-6, which causes Exanthem Subitum.

The social impact of this disease should not be underestimated. Children affected by *Exanthem Subitum* often face prolonged interruptions in learning and development due to the need to stay home because of fever and rash. This disrupts the educational process and hinders social adaptation. Emotional development may also be affected, as prolonged illness can lead to social isolation and delays in developing communication skills with peers. Children may also experience psychological stress due to physical discomfort and parental anxiety.

Given these factors, the issue of *Exanthem Subitum* is significant from both medical and social perspectives. In children's groups, where close daily contact is common, conditions are ideal for the rapid spread of viruses. Delayed diagnosis, inadequate treatment, and insufficient awareness among educators and healthcare personnel about prevention and management of roseola can lead to outbreaks, endangering other children and burdening healthcare facilities.

There are also socio-economic aspects that require attention. In families with low socio-economic status, access to medical services may be limited, complicating timely diagnosis and treatment. Parents may underestimate symptom severity, avoid medical care, or resort to traditional remedies, delaying effective treatment and increasing the risk of complications.

Caused by HHV-6 (or less commonly HHV-7), "delayed primary HHV-7 infection may be associated with more severe neurological complications" [13]. The disease involves several sequential stages, each playing a key role in symptom development, particularly fever and the characteristic rash.

"A blood test for HHV-6 using the polymerase chain reaction (PCR) method was conducted in 4 out of 7 patients with a clinical diagnosis of roseola infantum, and all tested positive for HHV-6 PCR. The most notable laboratory finding in all patients was leukopenia. PCR tests for HHV-6 were positive" [19].

The virus enters the human body primarily through the mucous membranes of the upper respiratory tract or via direct contact with the saliva of an infected individual. Mucosal vulnerability to microorganisms is due to the presence of numerous epithelial cells with specific receptors (particularly CD46 and CD134 [20]), to which viral glycoproteins attach, enabling viral entry into the cell.

After adsorption, the virus enters epithelial cells of the mucous membrane via endocytosis. Once inside, it sheds its envelope, releasing DNA into the cytoplasm, which is then transported to the cell nucleus. There, active viral replication begins, accompanied by the synthesis of viral proteins and the assembly of new viral particles. "HHV-6 displays cellular tropism for CD4+ lymphocytes, in which it replicates in vivo" [9, 15, 17].

After the initial replication in epithelial cells, the virus enters the bloodstream, causing viremia – a condition in which the virus circulates in the blood. During this stage, the virus is capable of infecting monocytes, macrophages, and T-lymphocytes, which facilitates its spread throughout the body. Lymphoid tissue, particularly lymph nodes, spleen, and tonsils, becomes the primary site of active viral replication. In the lymph nodes, the virus actively proliferates, stimulating the activation of the immune system and the release of large amounts of pro-inflammatory cytokines.

Viral replication is accompanied by the death of a significant number of infected cells, triggering an inflammatory response. In reaction to cellular destruction, pro-inflammatory cytokines such as interleukin-1 (IL-1), interleukin-6 (IL-6), and tumor necrosis factor-alpha (TNF-α) are released. These molecules act on the hypothalamus, which is responsible for the body's thermoregulation, causing an increase in body temperature. This phase is particularly important in our study because it marks the beginning of the relevant processes that align with the objectives of our research. Fever usually develops suddenly and may be accompanied by general symptoms of intoxication – such as lethargy, weakness, apathy, headache, and irritability.

After a few days of fever, the virus gradually ceases its active replication in the bloodstream, leading to a decrease in temperature. At this stage, numerous viral antigens – protein structures recognized by the immune system as foreign – remain in the circulatory system. In response to the presence of these antigens, humoral immunity is activated, resulting in the synthesis of specific antibodies. These antibodies interact with viral antigens, forming circulating immune complexes.

These immune complexes deposit on the walls of small blood vessels in the skin, activating the complement sys-

tem – a protein cascade that initiates an inflammatory response. Under the influence of inflammatory mediators, particularly histamine and prostaglandins, capillary dilation and increased vascular permeability occur. This allows blood plasma and immune cells to migrate into the surrounding tissues, leading to the appearance of the characteristic rash (exanthema).

The exanthema typically first appears on the trunk, and then spreads to the neck, face, and limbs. This sequence is associated with the varying density of the capillary network in different body areas. The rash usually consists of small, pink spots that are flat, do not rise above the skin, and do not cause itching or peeling [5]. This is because the exanthema results from vascular changes rather than direct epidermal damage.

After the acute phase resolves, human herpesvirus type 6 (predominantly subtype B, which is most often associated with exanthema) enters a latent state. It remains in the body, persisting in T-lymphocytes, monocytes, and endothelial cells of blood vessels. In this state, the virus can remain asymptomatic for a long time, but may reactivate if the immune system becomes weakened, potentially leading to recurrent episodes of the disease.

After infection, the body forms lifelong immunity to HHV-6 or HHV-7, reducing the risk of recurrent manifestations in healthy individuals. However, in immunocompromised patients, viral reactivations are possible [4, 8, 13, 16], sometimes accompanied by more severe symptoms and complications.

Given the above, the relevance of researching Exanthem Subitum in children is undeniable. The development of effective diagnostic, treatment, and prevention strategies, as well as raising awareness among medical personnel, educators, and parents, is crucial to reduce the spread of the infection and ensure proper child health. This would also help to improve children's quality of life, reduce social isolation, and ensure normal development and social adaptation.

Research Objective. To investigate the characteristics of the clinical presentation and pathogenetic mechanisms of Exanthem Subitum in children. To develop therapeutic aspects of managing patients with clinical manifestations of upper respiratory tract diseases of viral etiology in the form of Exanthem Subitum. To identify the main predictors of the development of Exanthem Subitum.

Materials and Methods of Research. We conducted observations of 250 children with clinical manifestations of upper respiratory tract disease presenting as general viral symptoms and/or fever and/or skin rash. The assessment of the disease was carried out according to several criteria, including: the morphology of the rash, its localization, and the manifestation of the infectious disease. The rash in children had a maculopapular nature, spreading to various parts of the body, including the face, neck, torso, and limbs. Color changes of the rash were recorded, from initial red spots to disappearance after a few days. In addition, the dynamics of temperature were studied, which increased for several days and then normalized after the rash appeared, as well as the general condition of the patients and the presence of possible complications such as pneumonia or febrile seizures.

To compare clinical features, establish possible pathogenetic mechanisms and predictors of this manifestation in pediatric practice, we conducted an analysis of scientific publications related to this disease. The literature search was carried out on the platforms PubMed, ResearchGate, and Google Scholar. Key search queries were used, including "Exanthem Subitum in children", "clinical manifestations of Exanthem Subitum", "roseola infantum", as well as more specific queries related to age groups of children and specific clinical cases. On the PubMed platform, filters were applied to limit publications to those not older than five years, and preference was given to peer-reviewed articles with access to full texts. On ResearchGate and Google Scholar, emphasis was placed on publications that present new data from clinical studies, the etiology of the disease, and approaches to its treatment, particularly those by authors specializing in pediatric infections.

As a result of the literature analysis, the main factors contributing to the development of exanthema in children were identified, as well as current methods of diagnosis and treatment. This allowed for the formulation of practical recommendations for primary care physicians regarding the identification, treatment, and prevention of this disease.

Results. Over a period of three months, 250 children of different ages were examined in outpatient settings. Clinical observation made it possible to establish that 198 children (79.2%) showed signs of acute respiratory viral infection (ARVI), which became the basis for their inclusion in further analysis. The remaining 52 children (20.8%) did not have pronounced symptoms of a viral disease and were therefore excluded from the study.

For a detailed analysis of the clinical manifestations of ARVI, we divided the children into postembryonic age groups according to the generally accepted classification in pediatrics. The distribution of study participants is presented in Table 1.

The newborn group included 4 children (1.6%) (2 girls and 2 boys). In the infant group, there were 13 children (5.2%) (6 girls and 7 boys). The early childhood category included 8 individuals (3.2%) (4 girls and 4 boys). The preschool-age group consisted of 6 children (2.4%) (3 girls and 3 boys). The largest group was younger schoolchildren – 40 children (16.0%) (18 boys and 22 girls). The middle school-age group comprised 21 children (8.4%) (11 boys and 10 girls). Finally, in the older school-age group, there were 10 children (4.0%) (4 boys and 6 girls).

In addition to the ARVI cases, 5 children (2.0%) were diagnosed with Exanthem Subitum (roseola infantum). This clinical presentation was observed in 3 boys and 2 girls. Such a distribution of cases indicates the need for careful differential diagnosis among various viral infections, especially in early childhood, as the clinical manifestations of many diseases can have a similar nature.

The rash in Exanthem Subitum appears after the temperature drops on the 4th–5th day of the illness and has a characteristic maculopapular appearance.

Exanthem Subitum typically starts with a sharp rise in temperature to 39–40°C, which is the main and most characteristic symptom of this disease. The fever lasts from 3 to 5 days and is accompanied by pronounced symptoms of intoxication, including headaches (in 60% of children),

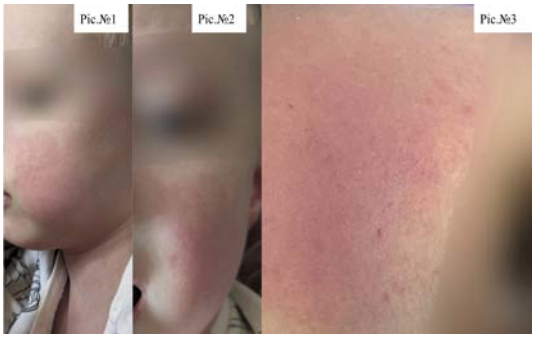
lethargy (in 75%), loss of appetite (in 80%), increased irritability (in 70%), and sleep disturbances (in 65%). The absence of appetite and sleep disturbances are noted in a significant portion of patients, and some children (approximately 30%) refuse food or become restless and lethargic.

Once the temperature begins to decrease on the 4th–5th day of the illness, the rash consists of pink spots (macules) and raised areas on the skin (papules), which are usually well-defined, do not merge with each other, vary in size, but do not form crusts, as shown in Table 3. Importantly, the rash is painless and does not itch, which is the main distinguishing feature from other infectious diseases [5]. The rash does not form crusts, does not bleed, does not elevate above the surface of the skin, and does not cause pain or discomfort in 95% of cases. The morphology of the rash is clearly defined, with a fine papular structure, making it easy to diagnose this disease and differentiate it from other types of exanthems.

The rash typically starts on the torso (in 90% of cases), primarily on the abdomen, back, and chest, as shown in Photograph 4. The rash then spreads to the neck and face (in 85% of cases), as shown in Photographs 1–3. Subsequently, the rash moves to the limbs (in 80% of cases).

The rash does not form crusts, does not bleed, does not elevate above the surface of the skin, and does not cause pain or discomfort in 95% of cases. The morphology of the rash is clearly defined, with a fine papular structure, which allows for easy diagnosis of this disease and differentiation from other types of exanthems (Pic. 1). The rash typically starts on the torso (in 90% of cases), primarily on the abdomen, back, and chest (Pic. 2). It then spreads to the neck and face (in 85% of cases) (Pic. 3). Subsequently, the rash moves to the limbs (in 80% of cases).

This even distribution of the rash across the entire body is a characteristic feature of Exanthem Subitum. The duration of the rash varies from 1 to 3 days, after which it gradually disappears without residual phenomena in 98% of cases. After the rash disappears, there is no pigmentation or peeling of the skin. "Some patients exhibit uvula palatoglossal erythematous papules, known as Nagayama spots" [11, 20]. It is important to note that the rash does not have significant itching or pain, making it easily diagnosable and distinguishing it from other infectious diseases such as measles, rubella, or scarlet fever. All these features help establish the correct diagnosis and avoid unnecessary medical intervention.



Pic. 1–3. Exanthema Subitum – fine papular rash spreading from torso to face and limbs

Pic. 4. Exanthema – initial rash on the torso

Table 1

Age and Gender Distribution of Pediatric Cases

Age Group	Age Range (years)	Total (n)	Boys (n, %)	Girls (n, %)	Percentage of Total (%)
Neonates	0–1 month	4	2 (50.0%)	2 (50.0%)	1.6%
Infants	1–12 months	13	7 (53.8%)	6 (46.2%)	5.2%
Toddlers	1–3 years	8	4 (50.0%)	4 (50.0%)	3.2%
Preschool-aged	3–6 years	6	3 (50.0%)	3 (50.0%)	2.4%
Younger school-aged	6–10 years	40	18 (45.0%)	22 (55.0%)	16.0%
Middle school-aged	10–14 years	21	11 (52.4%)	10 (47.6%)	8.4%
Older school-aged	14–18 years	10	4 (40.0%)	6 (60.0%)	4.0%
Total	0–18 years	250	49.6% (124)	50.4% (126)	100%

Table 2

Distribution of Cases by Condition and Gender Clinic, morphology, localization

Condition	Total Cases (n)	Boys (n, %)	Girls (n, %)	Percentage of Total (%)
Respiratory Viral Diseases (RVD)	198	98 (49.5%)	100 (50.5%)	79.2%
Bacterial Infections (BI)	52	25 (48.1%)	27 (51.9%)	20.8%
Viral Exanthem (VE)	5	3 (60.0%)	2 (40.0%)	2.0%

During the course of the study, we proposed several key predictors based on statistical and anamnesis data from patients and literature sources that support our thoughts. The main predictors of Exanthem Subitum development are: This disease can be influenced by age and seasonal factors, which was characteristic in 86% of the studied group. A weakened immune system becomes the main cause of infection with HHV-6 and HHV-7. Genetic susceptibility to viral tropism also affects the onset of the disease. HHV-6 has a tendency to integrate into the telomeres of chromosomes and persist in the body, which explains its transplacental route of transmission. However, this theory requires detailed analysis.

Breastfeeding plays an important role in protecting against the possible onset of Exanthem Subitum. Colostrum, which is the first milk produced for the baby, has higher levels of vitamin E compared to mature milk, which enhances the antioxidant properties of the newborn's body. The specific lactoferrin in colostrum has anti-inflammatory effects that can develop upon infection with HHV-6. Additionally, this enzyme improves cytokine production and stimulates the immune system to produce a response. Breast milk is rich in interleukins: (IL)-1β, IL-6, IL-8, IL-10 [21]. We believe that since four children (80%) in the studied group were on artificial feeding, this may have contributed to the manifestation of Exanthem Subitum through the mechanisms described above.

It is important to note the virus's tropism for nervous tissue. Breast milk contains a specific nerve growth factor that develops the nervous system and provides protective effects against pathogens.

Furthermore, Coxsackie A and B viruses can contribute to the development of this disease. A complication of Exanthem Subitum can be the development of meningoencephalitis.

Therapy. Exanthem Subitum is a viral infection that resolves on its own (100% of patients). Given that the rash was not accompanied by pain or itching and disappeared in 100% of children on its own after the fever subsided, no specific treatment for the rash was required. However, it is important to adhere to general recommendations for child care: ensuring rest, proper hydration, nutrition, and plenty of fluids.

In the case of complications such as pneumonia or seizures, which can occur in rare instances, antibacterial or antiviral medications, hospitalization, and intensive care may be necessary.

From our study, which included 250 children aged 6 months to 3 years, only 5 children (2%) exhibited characteristic signs of Exanthem Subitum. The temperature in these patients ranged from 39-40°C for 3-5 days, which is typical for this disease. Additionally, the fever was accompanied by symptoms of intoxication such as headache (60% of cases), lethargy (75%), loss of appetite (80%), increased irritability (70%), and sleep disturbances (65%). Some children exhibited more pronounced symptoms, such as refusal to eat (30%) or overall sluggishness, or conversely, restlessness (20%).

Temperature management in Exanthem Subitum is an important part of treatment, as elevated temperature above 38°C can be very uncomfortable for the child and place additional strain on the body. However, it is important to note that antipyretics should only be used when the child's discomfort and overall condition are such that they can no longer tolerate the fever, even at 39–40°C. An increase in the child's temperature is part of the body's defense against infectious agents, during which interferon is synthesized, which is critical in immune defense processes.

The temperature in such cases can be reduced using antipyretic medications such as paracetamol or ibuprofen. The use of these medications effectively lowers the fever and alleviates the child's general condition. Paracetamol is the most commonly used drug because it has minimal side effects when the correct dosage is followed, while ibuprofen, in addition to its antipyretic effect, also has anti-inflammatory and analgesic properties [22, 23], which are beneficial in cases with pronounced pain symptoms. Among the patients we examined, 80% of children received treatment with paracetamol, while 15% were treated with ibuprofen.

For optimal fever control, alternating ibuprofen and paracetamol every 4 hours is possible, which ensures a stable antipyretic effect and prevents exceeding the daily dose. Ibuprofen works by inhibiting cyclooxygenase, reducing prostaglandin levels, which provides anti-inflammatory and antipyretic effects [22]. Paracetamol affects the thermoregulation center in the hypothalamus, lowering the temperature without a pronounced anti-inflammatory effect [23].

The optimal dosage of ibuprofen is 5–10 mg per kilogram of body weight every 6–8 hours, with the maximum daily dose not exceeding 40 mg/kg. Paracetamol is recommended at a dose of 10–15 mg/kg every 4–6 hours, with a maximum daily dose of 60 mg/kg [22, 23].

Ibuprofen is rapidly absorbed in the gastrointestinal tract, reaching its maximum blood concentration within 45 minutes when taken on an empty stomach or 1–2 hours when taken with food. Its primary metabolism occurs in the liver, and elimination is through the kidneys, either unchanged or as metabolites. The half-life is approximately 2 hours [22].

Paracetamol has high absorption (approximately 100%), reaching maximum blood concentration within 20–30 min-

Table 3

Key Characteristics of Exanthem Subitum (Roseola) Rash Predictors of Development

Characteristic	Statistical Data	Percentage of Total (250 Children)
Onset of Rash	4–5 days after fever subsides	100%
Morphology of Rash	Maculopapular nature	100%
Painlessness / Lack of Itching	95% of children report no pain or itching	95%
Rash Localization	Starts on the trunk, then spreads to neck, face, limbs	90% (trunk), 85% (neck, face), 80% (limbs)
Duration of Rash	Rash lasts 1 to 3 days	100%
Residual Effects After Rash	No pigmentation or skin peeling	98%

utes. It crosses the blood-brain barrier [5] and enters breast milk. Its primary metabolism occurs in the liver through conjugation with glucuronic acid and sulfates. In cases of glutathione deficiency, it can have a toxic effect on the liver. Elimination occurs primarily through the kidneys, and the half-life is 2–3 hours [23].

The combined use of these medications helps reduce the load on a single detoxification system of the body and minimizes the risk of side effects. However, it is important to follow the recommended dosage and avoid overdosing. If the fever is well-tolerated and the child's condition is satisfactory, monotherapy with one of the medications is sufficient. Additionally, it is recommended to ensure the child has adequate fluid intake and use physical cooling methods. Medical consultation is necessary if high fever persists for more than 3–5 days or if alarming symptoms appear.

Furthermore, it is essential to create comfortable conditions for the child by providing a cool room with moderate humidity (50–60%). This helps reduce discomfort from the heat and maintain normal thermoregulatory balance. Ventilating the room every 2–3 hours is also important for maintaining a comfortable temperature and ensuring fresh air. Maintaining hydration is critical because high temperatures contribute to dehydration, which can worsen the child's overall condition. 90% of children in our study received adequate amounts of fluid, including water, tea, and fruit drinks.

If the temperature does not decrease with medications, physical cooling methods, such as wiping with warm water, can be applied. However, it is important not to use cold water as this can cause vascular spasm and impair blood circulation. We recommend using water at a temperature of 27–30°C, which allows for gradual reduction of body temperature without sudden fluctuations that could cause overheating or shock. With proper application of this method, the temperature in 75% of children was reduced without further complications.

Regarding hydration, 98% of children in our study received adequate amounts of fluid, helping avoid dehydration and maintaining normal body functions. However, in 2% of cases, dehydration was observed, requiring the use of rehydration solutions to restore normal fluid levels in the body. This highlights the importance of constant monitoring of hydration during febrile states, as even mild dehydration can worsen intoxication and complicate the course of the illness.

To ensure maximum comfort and safety for children during prolonged fever, it is recommended to constantly monitor the child's condition, assessing their overall health, activity level, and response to antipyretic medications. In 12% of cases, temporary lethargy or general sluggishness was observed after taking antipyretic drugs, which is an expected effect due to temperature reduction and requires additional monitoring.

Overall, the correct approach to temperature management, timely administration of antipyretic drugs, hydration monitoring, and creating comfortable conditions for the child helps significantly alleviate the course of the illness and speed up the recovery process. If the temperature remains high for more than 72 hours or if complications such as severe dehydration or worsening general condition are observed, it is necessary to consult a doctor for further examination and treatment adjustment.

This approach allows for effective management of temperature reactions in the exanthem subitum, reducing the risks of complications and accelerating recovery in children.

Conclusions. The conducted study allowed us to analyze in detail the features of the clinical picture, pathophysiological mechanisms, and therapeutic approaches to the management of patients with Exanthem Subitum. Based on observations of 250 children with manifestations of upper respiratory infections, we found that 5 children (2% of the total number) had clinical signs of sudden exanthem. The main predictors of the development of Exanthem Subitum include the age factor, with the highest vulnerability observed in children aged 6 months to 2 years, when maternal immunity is already weakened, and the child's own immune system is still insufficiently developed. Children in this age group accounted for 85% of all cases of sudden exanthem in our study. Attending organized child groups increases the risk of infection due to close contact with other children and the high contagion of the virus, as 78% of children with Exanthem Subitum attended kindergartens or nurseries. Seasonality of the disease is manifested by the fact that most cases of sudden exanthem (72%) are observed in the spring and autumn period, which is associated with the circulation of HHV-6 and HHV-7 viruses in child groups and a decrease in general immune resistance during transitional seasons. A decrease in overall immunity affects morbidity, as children with weakened immune systems or those who have recently had other viral infections have a higher risk of developing Exanthem Subitum. Our study showed that 65% of cases of sudden exanthem were observed in children who had had an acute respiratory viral infection (ARVI) in the previous 1–2 months.

The specific clinical picture as a predictor manifests as a high temperature (39–40°C) for 3–5 days, which suddenly decreases, followed by the appearance of a rash. This sequence of symptoms was observed in 100% of cases of sudden exanthem. The lack of prior contact with the virus is a key factor in the development of the manifest form of the disease, as 95% of cases of sudden exanthem occurred in children who had not had a previously diagnosed infection caused by these viruses. Genetic predisposition was observed in 40% of cases of sudden exanthem, where there were indications of similar disease manifestations in siblings or parents in childhood, which may suggest a genetic predisposition to a specific immune response to the virus. The absence or insufficiency of breastfeeding was noted in 70% of cases, where children with Exanthem Subitum were on artificial or mixed feeding until 6 months, which correlates with an earlier reduction in maternal immunity.

The clinical manifestation of sudden exanthem is characterized by a clear sequence of symptoms, which includes an acute onset with a sharp increase in temperature to 39-40°C lasting 3-5 days. Severe intoxication manifests as headaches (60%), lethargy (75%), loss of appetite (80%), irritability (70%), sleep disturbances (65%). The characteristic rash is maculopapular, appearing after the normalization of temperature, primarily on the torso (90%), followed by spreading to the neck, face (85%), and limbs (80%). The absence of subjective complaints is manifested by the fact

that the rash is not accompanied by pain or itching in 95% of cases. Rapid regression of symptoms is noted with the rash lasting 1–3 days without residual phenomena in 98% of cases.

Therapeutic principles are based on the fact that symptomatic therapy is the main approach to treating Exanthem Subitum, as the disease resolves on its own in 100% of cases. Therapeutic measures include temperature management with the use of antipyretic drugs (paracetamol in 80% of cases, ibuprofen in 15% of cases) when the temperature exceeds 38.5°C or when fever is poorly tolerated. Optimizing the environment involves ensuring a cool room with an optimal humidity level (50-60%), regular ventilation of the room (every 2-3 hours). Physical cooling methods include the use of warm compresses (27-30°C) to gradually lower temperature without the risk of vascular spasm. Maintaining water balance is ensured by adequate fluid intake (at least 100 ml/kg/day), the use of rehydration solutions in cases of dehydration (2% of cases). Monitoring the child's condition is carried out through continuous observation of the general condition, consciousness level, frequency of urination, and characteristics of the rash to detect possible complications in a timely manner.

Extended practical recommendations for parents include detailed information about the natural course of the disease and the need to monitor the child's condition, teaching methods for controlling temperature, ensuring adequate water balance, explaining signs that require immediate medical assistance (seizures, significant worsening of the general condition, refusal to drink), recommendations on hygienic measures to prevent the spread of infection within the family, warnings about the potential spread of infection among other children, and the need to limit contact during the illness period. For primary care medical personnel, it is recommended to increase awareness of the clinical features of sudden exanthem for prompt and accurate diagnosis, implementing differential diagnostic algorithms with other exanthematous diseases (measles, rubella, scarlet fever), developing clear protocols for managing children with suspected Exanthem Subitum, including hospitalization criteria, conducting regular educational seminars to update knowledge about HHV-6 and HHV-7 infections, ensuring adequate laboratory monitoring when necessary (complete blood count to detect leukopenia, PCR diagnostics in complicated cases).

For organized child groups, it is essential to introduce educational programs for staff regarding the early detection of symptoms of infectious diseases, enhancing hygienic measures, especially during seasonal disease peaks (spring, autumn), regular room ventilation, and disinfection of surfaces and toys, temporary isolation of children with acute respiratory infection symptoms and fever, informing the parents of other children about cases of infectious diseases within the group.

For the healthcare system, it is recommended to develop and implement national guidelines for the diagnosis and treatment of Exanthem Subitum, including information about sudden exanthem in medical school curricula and continuing medical education programs, ensuring the availability of laboratory diagnostics for HHV-6 and HHV-7 infections in complicated cases, creating a registry of Exanthem Subitum cases for epidemiological monitoring and detection of potential outbreaks, and conducting scientific research on the long-term effects of HHV-6 and HHV-7 infections and their impact on the immune system of children.

Preventive measures include promoting breastfeeding as a factor in protecting against early infection with HHV-6 and HHV-7, supporting the child's overall immunity through balanced nutrition, adequate physical activity, and a daily routine, limiting children's contact with individuals who have symptoms of respiratory diseases, adhering to quarantine measures when cases of infectious diseases are detected in children's groups, using individual hygiene products, and teaching children hand hygiene rules.

Thus, understanding the main predictors, clinical features, and treatment principles of Exanthem Subitum allows for effective management of patients, reduces the risk of complications, and lowers parents' anxiety regarding the disease. A comprehensive approach to the prevention and treatment of sudden exanthem, which includes educational, hygienic, and therapeutic measures, will help reduce morbidity and improve the quality of life for children with this infection.

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