

Case reports



VARIABLE CLINICAL COURSE OF NEONATAL VARICELLA. TWO CASE REPORTS

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ABSTRACT

Purpose: To conduct a clinical and epidemiological analysis of neonatal varicella cases in the early neonatal period, to discuss clinical progression, complications, and formulate recommendations for practice.

Materials/ Methods: A prospective study was conducted from 2023 to 2025 at the Infectious Diseases Clinic in Plovdiv, Bulgaria, involving hospitalized neonates diagnosed with neonatal varicella. The study used epidemiological analysis methods, as well as laboratory, microbiological, and imaging investigations.

Results: This study describes two contrasting neonatal varicella cases with notably different clinical courses. The first case - a 13-day-old male, with severe presentation of the disease with systemic symptoms, including respiratory insufficiency and extensive rash, requiring intensive care and oxygen support. The second, a 12-day-old female, exhibited a milder course, uncomplicated progression with no systemic involvement. Both infants were exposed to maternal varicella infection during the peripartum period—a high-risk timeframe due to insufficient transfer to maternal antibodies through the placenta. Despite similar epidemiological factors, disease severity varied markedly.

Conclusions: Neonatal varicella represents a considerable health risk, particularly in the context of late maternal infection. The clinical variability observed underscores the unpredictable course of the disease. Preventative strategies are key in reducing the risk. Though vaccination is not recommended during pregnancy, postpartum immunization of seronegative women and also post-exposure prophylaxis are essential measures to reduce neonatal morbidity and mortality.

Keywords: neonatal varicella, maternal infection, varicella prophylaxis, vaccination

INTRODUCTION:

Varicella-zoster virus (VZV) is a highly contagious DNA virus belonging to the Herpesviridae family. Transmission occurs primarily via respiratory droplets, as well as through direct contact with vesicular fluid or indirectly via contaminated fomites, such as desquamated skin cells, hair, clothing, or bedding. Primary infection is typically characterized by fever, malaise and a pruritic exanthem that evolves in successive crops from maculopapular lesions to vesicles, which subsequently crust over and heal. The incubation period has historically been considered to be between 1 and 3 weeks (11-21 days). Infected individuals are contagious approximately 48 hours before the onset of the rash and remain an epidemiological risk until all vesicular lesions have crusted. While crusting of lesions typically begins within five days, complete resolution often requires a longer period. A more recent review suggests the transmission rarely occurs before the onset of the rash and can continue until all of the lesions have crusted over. [1, 2, 3, 4, 5]

Chickenpox, the primary infection with varicella-zoster virus (VZV; human herpesvirus 3) during pregnancy, may result in maternal mortality or serious morbidity. It may also cause fetal varicella syndrome (FVS) and varicella infection of the newborn, which includes congenital varicella syndrome (CVS) and neonatal varicella. If infection of the mother occurs during the days or weeks before delivery, the baby may be born with a condition called neonatal varicella. This form also occurs when infants acquire VZV infection in the first few weeks of life. Neonatal varicella can be life-threatening.

The risk of neonatal varicella increases after 36 gestational weeks. If maternal chickenpox infection occurs within the last four weeks of pregnancy, before delivery – about 1 in 4 neonates will develop varicella. However, maternal VZV-specific antibodies are transferred transplacentally, thus providing immunity protection and mitigating disease severity in the newborn. [1, 5] Moreover, 5 days before and 2 days after delivery, maternal VZV primary infection could result in neonatal fulminant varicella because a fetus does not have the maternal anti-VZV antibodies to overcome a high viral load. [6] Infection during this period is consequently associated with a significant rate of life-threatening disseminated disease in

neonates (up to 20%–50% of transmission with a fatality rate of 20%). [7] The aim of this survey is to conduct a clinical and epidemiological analysis of cases of neonatal varicella occurring in the early neonatal period, to describe the clinical course and potential complications, and to formulate recommendations for clinical practice.

MATERIALS AND METHODS:

Over a two-year period (2023–2025), a prospective study was conducted on cases of hospitalized neonates who developed neonatal varicella. The observed patients were admitted to the Infectious Diseases Clinic in Plovdiv, Bulgaria. The study employed clinical and epidemiological analysis methods, as well as laboratory, microbiological, and imaging investigations.

RESULTS:

Case 1

Our first clinical case involves a 13-day-old male neonate, P. A. He was born at full term, following a normal, uneventful pregnancy, through vaginal delivery. The infant presented on March 18, 2024, with a history of subfebrile temperature and a rash dating back 3 days. According to the mother, she developed symptoms of chickenpox one day after delivery. Prior to the examination, the infant had been treated in an outpatient setting with symptomatic treatment and topical antiseptics.

On initial examination, the neonate is found to be in a severe general condition, intoxicated and exhibiting signs of dehydration. A profuse, generalized maculopapulo-vesicular rash is observed, with isolated pustular eruptions, affecting all regions of the body, including the palms and soles. The oropharynx is hyperemic, with enanthem present on both the soft and hard palate. Auscultation reveals bilaterally accentuated vesicular breath sounds, with a respiratory rate of 32 breaths per minute and no clinical signs of respiratory insufficiency.

Emergency admission to the intensive care unit of the Infectious Diseases Clinic follows. Initial management includes intravenous infusion therapy with electrolyte and glucose solutions, antiviral treatment with Aciclovir 30 mg/kg IV divided into three daily administrations, as well as empirical antibacterial therapy with Cefotaxime 50 mg/kg IV, also administered in three doses. Supportive treatment includes vitamin C and a probiotic. Initial laboratory findings reveal monocytosis with lymphocytosis, neutropenia, normal C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR), elevated D-dimer levels. Microbiological samples obtained from a throat swab and pustular lesion are negative for pathogenic organisms.

On the second day of hospitalization, the patient demonstrates an oxygen saturation (SpO₂) of 79% on room air, despite the absence of overt clinical signs of respiratory distress. A pediatric consultation is obtained, and oxygen supplementation is initiated at a flow rate of 4 L/min, as recommended. Oxygen therapy is discontinued the following day due to clinical improvement. However, on the afternoon of the third day, the patient's general condition deteriorated, with observed intercostal retractions and in-

creased respiratory rate. Arterial blood gas analysis (ABG) reveals hypoxemia with an oxygen saturation of 81%, a partial pressure of oxygen (PaO₂) of 47.0 mmHg, and hypercapnia with a carbon dioxide (PaCO₂) level of 52.0 mmHg. Oxygen supplementation is resumed. Chest X-ray shows no evidence of active infiltrative pulmonary disease. The patient maintains high values of body temperature until the 4th day of hospitalization and the onset of the treatment, after which he remains consistently afebrile until the day of discharge.

During the course of hospitalization, all described symptoms and clinical syndromes gradually resolve. The patient is discharged on the ninth day of admission, afebrile, with resolved respiratory insufficiency and no further need for oxygen supplementation. At the time of discharge, the cutaneous lesions are entirely in the crusted stage.

Case 2

The second clinical case of neonatal varicella involves a 12-day-old female neonate, D.A. She presents with a rash that began three days prior to the initial examination. According to the medical history, the mother had a rash at the time of delivery, and no therapeutic or preventive antiviral treatment was administered.

On initial physical examination, the infant is in a moderately severe general condition. She is afebrile, with no signs of dehydration, and a generalized maculopapular rash is observed. Oropharyngeal findings include pharyngeal hyperemia and a coated tongue. Examination of the respiratory system reveals no pathological findings.

The infant is admitted to the Infectious Diseases Clinic for isolation and active monitoring. Etiological therapy is initiated with aciclovir at a dose of 30 mg/kg IV, divided into three daily doses. Laboratory results reveal lymphocytosis and monocytosis, neutropenia, and CRP and ESR values within the reference range. Microbiological studies do not isolate any pathogenic microorganisms from a throat swab or pustular lesion sample.

No elevated body temperature is recorded during the hospitalization. The patient is discharged on the sixth day of admission in improved condition, with the rash in the crusted stage.

DISCUSSION:

Neonatal varicella is a rare, but potentially life-threatening condition in newborns, that arises from transplacental transmission of VZV, typically when the mother is diseased within the last three weeks of pregnancy or in the early postpartum period. It may present with a spectrum of clinical severity, ranging from mild to life-threatening forms, including pneumonia, hepatitis and meningoencephalitis; however, severe manifestations are more frequently observed. Both clinical cases presented had markedly different clinical presentations, despite similar epidemiological backgrounds. In both cases, maternal infection occurred in the immediate peripartum period — a well-established risk factor for neonatal transmission and severe disease due to the absence of transplacental transfer of protective maternal antibodies. [8] Despite this shared

risk factor, the first case demonstrated a severe clinical course characterized by respiratory insufficiency, extensive vesicular rash, and a pronounced toxic-infectious syndrome. In contrast, the second case followed a mild, self-limiting course, with no systemic complications registered. This heterogeneity in clinical presentation underscores the unpredictable nature of neonatal varicella, even in the presence of similar risk factors.

These contrasting outcomes highlight the critical importance of preventive strategies, particularly maternal varicella vaccination, in mitigating neonatal risk. [8] The varicella vaccine contains a live attenuated virus derived from the Oka strain of VZV [9, 10] and has been licensed for use in the United States since March 1995. [11]. Following its introduction, the incidence of primary infection (varicella) in the general population has declined by more than 80%, and varicella-related mortality has decreased by two-thirds [12]. Vaccine-induced immunity has been shown to persist for up to 20 years. [13, 14].

According to CDC recommendations, varicella vaccination is indicated for seronegative women of reproductive age. Still, it is contraindicated during pregnancy due to a theoretical risk of fetal infection, although no such cases have been documented to date. Seronegative women can be safely vaccinated in the postpartum period, even while breastfeeding. However, pregnancy should be avoided for at least one month following each dose of the vaccine. In cases where a rash develops after vaccination, contact with other susceptible individuals should be avoided. Although the vaccine contains a live attenuated virus, transmission of the vaccine strain is rare. Small studies have not detected varicella vaccine virus in the breast milk of women vaccinated postpartum. [11, 12].

Given the high contagion index of the varicella-zoster virus, varicella vaccination prior to pregnancy or in the postpartum period should be considered for women who are found to be seronegative for VZV IgG. For women identified as seronegative during pregnancy, vaccination can be safely offered after delivery. The varicella immune status of women planning pregnancy or undergoing fertility treatment may be assessed through a clinical history of prior infection and, in those with no or uncertain history, by serologic testing for varicella-specific antibodies. [15, 16] VZV infection during pregnancy poses significant risks not only to the fetus but also to the mother. Although varicella is far less common in adults than in children—owing to its extremely high contagion index, which ranges between 61% and 100% among susceptible children [14]—infection in pregnancy can lead to serious maternal complications. In a prospective series of 347 pregnant women with varicella, approximately 5% developed varicella pneumonia, a potentially life-threatening condition. [15] Although rare, maternal varicella can result in severe morbidity and, in some cases, mortality.

In cases where a pregnant woman has had significant epidemiological exposure to an individual with varicella or herpes zoster, current expert recommendations emphasize assessing her immunity to VZV. If she is found to be non-immune, post-exposure prophylaxis (PEP) should

be promptly initiated. The UK Health Security Agency (UKHSA) recommends oral antiviral therapy—such as aciclovir or valaciclovir—as the first-line option for PEP, administered between days 7 and 14 following exposure. In situations where antivirals are contraindicated or poorly tolerated, varicella-zoster immunoglobulin (VZIG) may be considered as an alternative PEP. VZIG is most effective when given within 10 days of exposure; for ongoing exposure, this is defined as 10 days from the onset of rash in the index case. Non-immune pregnant women who have been exposed should be considered potentially infectious from days 8 to 28 post-exposure if treated with VZIG, and from days 8 to 21 if no immunoprophylaxis is administered. [18, 19]

Management of varicella exposure in pregnancy requires not only timely post-exposure prophylaxis but also careful infection control. A pregnant woman who develops a varicella rash should be isolated from other pregnant women when presenting to a general practice or hospital setting to minimize the risk of nosocomial transmission. In cases of repeated exposure, if seroconversion has not occurred, a second course of antiviral therapy may be administered, starting seven days after the subsequent exposure. Similarly, if varicella-zoster immunoglobulin (VZIG) was used initially for PEP, a repeat dose may be considered if re-exposure occurs three weeks or more after the last administration. [5, 17, 18]

Varicella vaccination in Bulgaria is currently recommended but not mandatory, although it is anticipated that it will soon be incorporated into the National Immunization Schedule. The licensed vaccine available in Bulgaria, Varivax, is a live attenuated vaccine administered in two doses. [20] For children aged 12 months to 12 years, the minimum interval between doses is one month; for older children and adults, the recommended interval is 1–2 months. According to the updates to Regulation no. 15 of May 12, 2005, on immunizations in the Republic of Bulgaria, vaccination against chickenpox in Bulgaria is provided for in certain age groups: vaccination at 12–15 months of age and revaccination at 4 years of age. The same regulation on amendments and supplements to the Immunization Calendar includes mandatory immunization against chickenpox from 01.07.2026 for those born in 2025 and after. [21] The varicella vaccine can also be administered as post-exposure prophylaxis, provided it is given within 72 hours of contact with a confirmed case. [6] The National Health Information System publishes data on the number of chickenpox vaccinations: in 2024, approximately 8,010 vaccinations were registered; in 2025, approximately 10,060; and in 2026 (until February 16), about 1,230. [22]

CONCLUSION:

Neonatal varicella, though rare, poses a considerable clinical challenge, particularly when maternal infection occurs in the peripartum period. The two cases discussed highlight the variability in disease manifestation and underscore the need for heightened clinical attention. Timely diagnosis, prompt initiation of antiviral therapy, and sup-

portive care are crucial to improving outcomes.

Equally important are preventive strategies, including routine assessment of maternal varicella immunity and postpartum vaccination for seronegative women. Incorporating varicella vaccination into national immunization schedules, as well as ensuring timely post-exposure prophylaxis, may substantially reduce the incidence and severity

of neonatal varicella. These interventions are fundamental to promoting safer outcomes for both mothers and infants.

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