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Neonatal Chikungunya Infection Mimicking Bacterial Meningitis: A Case Report

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Abstract

increasingly recognized cause of sepsis-like illness in endemic regions, often masquerading as bacterial meningitis due to overlapping clinical and laboratory features. We report a 23-day-old female infant who presented with prolonged fever, irritability, poor feeding, and a generalized hyperpigmented rash. She had been previously hospitalized elsewhere with suspected bacterial meningitis and treated with multiple antibiotics without clinical improvement. Laboratory evaluation revealed resolving thrombocytopenia, cerebrospinal fluid pleocytosis with sterile cultures, and negative blood cultures. The diagnosis of neonatal chikungunya fever was established by serological detection of CHIKV IgM. The infant recovered with supportive care. This case highlights the importance of considering vertical arboviral transmission in neonates presenting with sepsis-like illness, fever, thrombocytopenia, and characteristic dermatological manifestations, particularly in endemic areas. Early recognition can prevent unnecessary antibiotic exposure and guide appropriate supportive management.

Keywords: Chikungunya Virus, Neonatal Infection, Vertical Transmission, Sepsis-Like Illness, Hyperpigmented Rash, Thrombocytopenia

Introduction

Chikungunya virus (CHIKV) is a mosquito-borne alphavirus of the Togaviridae family, transmitted primarily by Aedes aegypti and Aedes albopictus mosquitoes. While typically associated with fever, arthralgia, and rash in adults, perinatal and neonatal CHIKV infection represents a distinct clinical entity with potentially severe consequences. Vertical transmission was first documented during the 2005–2006 Reunion Island outbreak[1], with subsequent reports confirming intrapartum transmission when maternal viremia occurs near delivery[2].

Neonatal CHIKV infection frequently presents as a sepsis-like syndrome characterized by fever, irritability, poor feeding, hypotonia, thrombocytopenia, and

dermatological manifestations including maculopapular rash and subsequent hyperpigmentation[2,3]. Central nervous system involvement, including encephalopathy and seizures, has been reported in up to 68.7% of vertically infected neonates[2]. The clinical overlap with bacterial sepsis and meningitis often leads to delayed diagnosis and unnecessary antibiotic therapy.

We present a case of neonatal chikungunya fever in a 23-day-old infant that was initially misdiagnosed as bacterial meningitis, emphasizing the characteristic clinical clues that facilitated the correct diagnosis and the importance of considering arboviral infections in the differential diagnosis of neonatal sepsis-like illness.

Case Presentation

A. Patient Information

A 23-day-old female infant, born at 38 weeks of gestation via full-term vaginal delivery with a birth weight of 3.0 kg, presented to our neonatal unit with complaints of fever for 5 days, irritability and poor feeding for 2 days, and decreased activity for 2 days. She was the third-born child to a mother with an unremarkable antenatal history. The pregnancy was registered and uncomplicated, with five antenatal scans (including an anomaly scan) reported as normal. The mother received routine iron and folic acid supplementation. The infant was discharged home on day 2 of life in stable condition.

B. Clinical Findings

General Examination: The infant was irritable but consolable. She was afebrile at presentation with a heart rate of 140 beats/min, respiratory rate of 40 breaths/min, and oxygen saturation of 96% on room air. Peripheral and central pulses were well felt, with capillary refill time of less than 3 seconds. The anterior fontanelle was open (2 × 2 cm) and flat. A generalized hyperpigmented rash was noted over the body. On detailed history, this rash had initially appeared as erythematous macules 4 days prior to admission, subsequently evolving into hyperpigmented lesions.

Systemic Examination: Cardiovascular examination revealed normal first and second heart sounds. Respiratory system examination showed adequate air entry bilaterally with clear lung fields. The abdomen was soft and non-tender. Central nervous system examination revealed generalized hypotonia with preserved deep tendon reflexes (2+). The Moro reflex was incomplete.

C. Timeline

A summary of the clinical course and key investigations is presented in Table 1.

Table 1: Clinical timeline and key investigations

Day of Life	Clinical Event / Investigation
Birth	Full-term vaginal delivery, 3 kg birth weight, discharged on DOL 2
6	Onset of fever
8	Admitted to outside hospital with suspected meningitis; received multiple antibiotics; NICU stay initiated
9	CSF analysis: 25 cells (2 polymorphs), sugar 46 mg/dL, protein 39 mg/dL; blood culture: no growth
16	Discharged against medical advice (DAMA) from outside hospital
17	Visited private practitioner; oral antibiotics prescribed
18	Outside laboratory investigations performed
23	Presentation to our institution with persistent symptoms; generalized hyperpigmented rash noted
28	Chikungunya IgM reported positive; clinical improvement observed

D. Diagnostic Assessment

Laboratory Investigations: Serial hematological parameters demonstrated an initial hemoglobin of 16.7 g/dL (DOL 8) that gradually declined to 9.9 g/dL (DOL 28). The total leukocyte count remained elevated (19,000–20,700 cells/mm³). Notably, platelet counts showed an initial decrease to 80,000/mm³ (DOL 9) with subsequent recovery to 2.8 lakh/mm³ (DOL 28). C-reactive protein was mildly elevated at 4 mg/L (DOL 8) and 10.2 mg/L (DOL 23), later normalizing to 2.5 mg/L (DOL 28). Ionic calcium was 1.3 mmol/L (DOL 9).

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Cerebrospinal Fluid Studies: CSF analysis performed at the outside hospital (DOL 9) showed 25 cells/mm³ with 2 polymorphs, glucose of 46 mg/dL (corresponding random blood glucose 80 mg/dL), and protein of 39 mg/dL. CSF and blood cultures showed no growth.

Imaging: Cranial ultrasonography was normal. Chest radiography was unremarkable.

Microbiological Workup: Given the sepsis-like presentation, extensive evaluation for bacterial sepsis was negative. In view of the characteristic hyperpigmented rash, fever, and neurological symptoms in an endemic region, serological testing for chikungunya was sent. **Chikungunya IgM was reported positive**, confirming the diagnosis of neonatal chikungunya fever.

E. Differential Diagnosis

The initial differential diagnosis included:

1. Bacterial meningitis/sepsis: Supported by fever, irritability, poor feeding, and CSF pleocytosis; however, negative cultures and lack of response to antibiotics argued against this.
2. Viral meningoencephalitis: Considered given the CSF findings and negative bacterial cultures.
3. TORCH infections: Considered given the rash and neurological symptoms; however, the characteristic evolution of rash and negative history of maternal infection made this less likely.
4. Neonatal chikungunya: Supported by the combination of fever, irritability, thrombocytopenia, and the pathognomonic hyperpigmented rash evolving from erythematous lesions.

Therapeutic Interventions and Clinical Course

The infant had been previously treated with multiple empirical antibiotics at the outside hospital for suspected bacterial meningitis, without sustained clinical improvement. Upon presentation to our unit, antibiotics were not continued given the strong clinical suspicion of a viral etiology and the pending chikungunya serology.

Supportive management included:

- Maintenance of intravascular volume and adequate hydration
- Antipyretics for fever control
- Nutritional support with maintenance of breastfeeding
- Close monitoring of vital signs, sensorium, and feeding tolerance

The infant showed marked clinical improvement within a few days of admission. Feeding and activity improved progressively. The rash showed gradual resolution of the hyperpigmented lesions. No neurological sequelae, seizures, or hemorrhagic complications were observed during the hospital stay.

Follow-UP and Outcomes

The infant was discharged after clinical stabilization with resolution of fever and improved feeding. At discharge, the platelet count had normalized to 2.8 lakh/mm³, and inflammatory markers had declined. The parents were counseled regarding the benign and self-limiting nature of the infection and the expected gradual resolution of skin hyperpigmentation, which typically fades over several months of life[3].

Neurodevelopmental follow-up was advised given the documented risk of neurological sequelae in vertically transmitted CHIKV infection[2].

Discussion

Neonatal chikungunya infection represents a diagnostic challenge due to its clinical mimicry of bacterial sepsis and meningitis. The case presented here illustrates several hallmark features of vertically transmitted CHIKV infection: prolonged fever, irritability, poor feeding, hypotonia, thrombocytopenia, and a rash that

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evolved from erythematous macules to hyperpigmented lesions[2,3].

The pathophysiology of vertical transmission involves intrapartum microtransfusion during maternal viremia, with neonates typically developing symptoms within the first week of life[1]. However, late-onset presentations, as seen in our case at 23 days of life, may represent intrauterine transmission or delayed clinical manifestation. The systematic review by Monte and colleagues reported that approximately 94% of infected neonates present with a sepsis-like syndrome requiring intensive care, 70% develop fever, and 55.2% exhibit dermatological manifestations including hyperpigmentation[2].

Thrombocytopenia is a frequent laboratory abnormality in neonatal CHIKV infection and has been associated with severe disease, including intracranial hemorrhage and disseminated intravascular coagulation[1,2]. In our case, the initial thrombocytopenia (80,000/mm^3) with subsequent spontaneous recovery is consistent with the natural history of the infection. The mild CSF pleocytosis (25 cells, predominantly lymphocytic) with normal glucose and mildly elevated protein is characteristic of viral meningitis and should not be misinterpreted as bacterial meningitis in the appropriate clinical context.

The hyperpigmented rash observed in our patient is a well-documented cutaneous manifestation of neonatal chikungunya, particularly associated with perinatal infection, and serves as an important diagnostic clue[2,3]. The rash evolution from erythema to hyperpigmentation, in conjunction with the sepsis-like presentation and negative bacterial cultures, should prompt clinicians to consider CHIKV infection.

Management of neonatal chikungunya remains supportive, with no specific antiviral therapy currently available[5]. Antibiotics should be discontinued once bacterial infection is reasonably excluded and virological diagnosis is established. Close monitoring for neurological complications, including seizures, encephalopathy, and neurodevelopmental delay, is essential given that approximately 50% of symptomatic infants may experience developmental delay[2].

Learning Points

• Neonatal chikungunya infection can present with a sepsis-like syndrome indistinguishable from bacterial meningitis.

• A characteristic hyperpigmented rash evolving from erythematous lesions is a valuable diagnostic clue.

• Thrombocytopenia with spontaneous recovery and sterile cultures with mild CSF pleocytosis support a viral etiology.

• Early serological testing for CHIKV in endemic areas can prevent unnecessary antibiotic exposure and prolonged hospitalization.

• Supportive care is the mainstay of management; neurodevelopmental follow-up is essential.

Conclusion

This case underscores the importance of maintaining a high index of suspicion for neonatal chikungunya fever in infants presenting with sepsis-like illness, fever, thrombocytopenia, and characteristic dermatological manifestations, particularly in endemic regions. The clinical overlap with bacterial meningitis can lead to misdiagnosis, unnecessary antibiotic therapy, and increased healthcare costs. Recognition of the characteristic rash pattern and appropriate serological testing facilitates timely diagnosis, allows discontinuation of empirical antibiotics, and guides

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supportive management. As chikungunya continues to expand its geographic range[6], heightened awareness among neonatologists and pediatricians is essential for optimal patient care.

Patient Perspective

The parents of the infant were extensively counseled regarding the diagnosis, natural history, and expected favorable outcome of neonatal chikungunya infection. They expressed relief upon understanding the viral etiology and the absence of need for prolonged antibiotic therapy. They were advised regarding the expected gradual fading of the hyperpigmented skin lesions and the importance of neurodevelopmental follow-up.

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