Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 6s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

A Rare Case of Neonatal Chikungunya Meningitis

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Cite this paper as: Dr. Abhishek D Denge, Dr. Sudhir Malwade, Dr. Sarnya Verma, Dr. Sanjay Chavan, (2025) A Rare Case of Neonatal Chikungunya Meningitis. *Journal of Neonatal Surgery*, 14 (6s), 586-589.

ABSTRACT

This case report presents a rare occurrence of Neonatal Chikungunya Meningitis diagnosed in a term male neonate in the second week of life. The infant, initially asymptomatic after birth, developed fever, feeding difficulties, and respiratory distress by day 6 of life with subsequent neurological manifestations. Despite initial treatment for suspected bacterial sepsis, the patient showed no improvement. Diagnostic confirmation was achieved through positive Chikungunya RT-PCR in cerebrospinal fluid, supported by characteristic clinical findings including diffuse macular rash and hyperpigmentation on the nose (Chik sign). The case highlights the importance of considering Chikungunya as a differential diagnosis for neonatal meningitis, particularly in endemic areas and with maternal history of intrapartum fever with rash. With supportive care and without antiviral therapy, the infant recovered by day 14 of life with no immediate sequelae. This report emphasizes the challenges in diagnosing this condition due to its non-specific presentation that mimics bacterial sepsis and other arboviral infections.

Keywords: *Neonatal Chikungunya, Viral Meningitis, Vertical Transmission, RT-PCR, Encephalopathy, Chik Sign*

1. INTRODUCTION

Chikungunya is a viral infection (Alphavirus being the causative agent) transmitted by a vector- Aedes mosquito [1,5]. Vertical transmission from infected mother to child is uncommon.

Neonatal presentation of chikungunya infection includes signs and symptoms resembling those of early onset sepsis and severe infection may result in neurological complications- such as meningitis, encephalitis and cerebral hemorrhages [3,8]. Though chikungunya is not a true neurotrophic virus, perinatal transmission causes encephalitis in the neonate. High incidence of neurological involvement has been seen in neonatal chikungunya in various populations [14,15]. The neurological sequelae of Chikungunya is an increasing cause of concern especially in neonatal period- as it closely resembles other viral infections (dengue and Zika virus) and causes long term neurodevelopment impairment.

The diagnosis of neonatal chikungunya meningo-encephalitis is based on clinical presentation (including maternal history of infection during intrapartum period) and laboratory evidence including viral isolation with RT-PCR, which is confirmatory or viral serology. The treatment is largely based on supportive therapy, consisting of monitoring and fluid management. Antiviral drugs are not indicated [14].

The non-specific clinical presentation, especially in the neonatal period makes diagnosing the infection a challenge [2,4].

2. CASE REPORT

A term male neonate was brought to the hospital on 8th day of life with complaints of fever, refusal to feeds and vomiting since 2 days.

The baby was delivered via emergency LSCS in view of foetal distress with a birth weight of 2.8kg. Peripartum maternal history of fever with rash for 3 days was present. Postnatally, the baby was discharged on 3rd day of life and was asymptomatic- active and accepting breastfeeds well at home.

By 6th day of life, mother noticed symptoms of fever, irritability, feeding difficulties including refusal to breastfeeds and vomiting, increased work of breathing and poor activity. These complaints worsened over 2 days, urging parents to bring the baby to the hospital.

Upon presentation, the baby was haemodynamically stable though he had lethargy, respiratory distress and eventually, signs of encephalopathy. Neurological examination revealed abnormal tone and reflexes. Initial laboratory investigations including complete blood count, C-reactive protein, blood culture and sensitivity were sent and chest x ray was done. A lumbar puncture was performed and cerebrospinal fluid (CSF) was sent for routine, microscopy and culture. He was started on IV antibiotics with clinical suspicion of late onset neonatal sepsis. The lab investigations revealed mild thrombocytopenia and an elevated CRP level. While CSF routine and microscopy report revealed a meningitis picture, CSF culture as well as blood culture did not yield any growth. However, depending on clinical condition of the baby, antibiotics were continued as a definitive etiology of meningitis was not established.

By 9th day, the baby developed diffuse macular rash involving the face, trunk, back and limbs. Marked hyperpigmentation was noted on the nose (Chik sign or brownie nose).

A **B** **C**

Image 1 (A: Chik sign or brownie nose- characteristic hyperpigmentation present over nose seen in Chikungunya infection. B, C: diffuse hyperpigmentation present over trunk, abdomen and back regions).

Despite continuing antibiotics, baby showed no signs of improvement. Therefore, alternate diagnoses were thought of and serum Dengue antigen and antibodies were sent, that tested negative and serum Chikungunya RTPCR was sent which tested positive. Furthermore, CSF RTPCR for Chikungunya tested positive, confirming our diagnosis of Chikungunya meningitis.

Type of sample :	CSF
Method:	Real time PCR
Results:	
Dengue virus RNA	-
Chikungunya virus RNA	**DETECTED**

Image 2 : Cerebrospinal Fluid (CSF) Real Time Polymerase Chain Reaction (RTPCR) report for Dengue virus RNA

During the course of NICU stay, the baby had no episodes of seizures or bleeding manifestations. Supportive care was continued, no platelets transfusions were required. The baby did not show any evidence of multiorgan dysfunction syndrome.

He started improving clinically and gradually, breastfeeding was re-established by 12th day of life and antibiotics were stopped after a total of 8 days. By 14th day of life, the baby showed recovery and was discharged with no immediate sequalae of the disease.

3. DISCUSSION

Chikungunya infection, if uncomplicated, is a self-limiting disease. It may progress to a severe infection and involve multiple organ-systems including the central nervous system (CNS) [5,9].

Intra-partum maternal infection is described as infection 2 days before to 2 days after the delivery of the baby [12,14] and transmission rate during this period is approximately 50% [14,16]. Vertical transmission from a mother infected more than 7 days before delivery is not seen [16].

Transplacental transmission from mother to baby was first reported in 2005-2006 in La Reunion. Out of a total of 39 neonates with mothers with intra-partum infection, 19 were found affected, showing significant transmission rate of 48.7% [14]. Studies globally also reveal that maternal Chikungunya infection in early trimester do not affect the foetus whereas, there are higher risk of neonatal infections if transmitted in later months of pregnancy [12,13].

Affected neonates are usually asymptomatic at birth and present with clinical signs and symptoms after 3rd day of life [10,14]. They can present with initial non-specific complaints of fever, poor feeding and irritability. Bleeding manifestations in the form of petechiae can be seen. More severe infection can present with neurological features of encephalopathy with underlying meningo-encephalitis and/or cerebral hemorrhages [12]. Untreated or uncontrolled infection may progress to cause multi-organ failure and even death in some cases.

CNS involvement is of concern because it is not only associated with increased mortality in an otherwise self-limiting disease, but also it frequently leads to long-term neurodevelopmental sequalae- including developmental delay, cognitive impairment and microcephaly. These are reported in almost half of neonates with symptomatic infection [12].

Laboratory investigations commonly reveal thrombocytopenia in most cases, followed by lymphopenia and transaminitis.

The non-specific spectrum of CNS manifestations of Chikungunya including meningitis, encephalopathy and encephalitis adds to the limitations. A total 856 cases of Chikungunya associated neurological diseases are reported, out of which 796 were reported in adults and children who got infected directly via mosquito, 60 neonatal cases that were transmitted vertically from mother to the baby [7].

A thorough clinical and laboratory evaluation of our patient led to a diagnosis of meningitis secondary to infective aetiology. After ruling out the bacterial causes of meningitis and noting no response to antibiotic therapy, alternate diagnoses were sought after.

The skin manifestations (macular rash, hyperpigmentation on the nose- Chik sign) and signs of encephalopathy steered us towards the possibility of viral meningitis- either dengue or chikungunya. Positive maternal history of fever with rash was corroborative evidence. Thus, it is essential to elicit maternal history of fever with rash and/or arthralgia during intrapartum period especially in cases admitted with neonatal encephalopathy.

Viral isolation by RT-PCR is helpful to confirm the diagnosis early [14]. Serum as well as RT-PCR can be performed. CSF RT-PCR is highly sensitive and specific of CNS infection. Our case with neonatal chikungunya meningitis has a positive CSF RT-PCR report whereas, most other Indian studies are deficient in viral isolation from CSF. Unavailability MRI Brain study is the limitation in our case due to financial constraints. Serology, if performed in early infection, could have yielded negative results and therefore, RT PCR was the preferred investigation.

In other reports of neonatal chikungunya, encephalopathy is not the commonest finding whereas our case presented with features of encephalopathy [4].

In similarity with most other viral infections, neonatal chikungunya is a self-limiting infection. The management primarily involves supportive therapy in the form of intravenous fluid management, antipyretics, analgesics and close monitoring of vitals. Prevention, prompt detection and early treatment of complications is of utmost importance in order to reduce morbidity, long term consequences and eventually, mortality. During outbreaks, distinguishing Chikungunya from other arboviral infections such as Zika or Dengue is essential. Notably, coinfections may exacerbate disease severity, suggesting a need for comprehensive arboviral diagnostic panels. Furthermore, the implementation of CSF RT-PCR has proven invaluable in diagnosing Chikungunya-associated neurological conditions. In cases where bacterial cultures are negative, RT-PCR can confirm the viral etiology, guiding appropriate management and potentially preventing unnecessary treatments [2,4].

The increasing incidence of neonatal infections during outbreaks calls for public health strategies focusing on maternal awareness, early diagnosis, and timely interventions [3]. Continued research is essential to further elucidate the long-term sequelae of neonatal Chikungunya and develop effective preventative measures.

Arboviral infections such as Dengue and Chikungunya closely resemble one another, showing a similar course of infection and clinical picture [5]. It became prudent in our case to investigate the baby for these infections as a cause of meningitis. Symptomatic and supportive management are the cornerstone in management of Chikungunya infection. Antivirals have no role in treatment of Chikungunya infection with or without neurological involvement [15].

4. CONCLUSION

Neonatal Chikungunya meningitis is a rare and challenging diagnosis to establish because of variability and non-specificity of clinical features. A thorough maternal history of fever with rash especially during intra-partum period not only aids in early diagnosis but also saves the cost of unnecessary expensive investigations. Although a rare cause, Chikungunya meningitis should be thought of as a differential diagnosis of meningitis after ruling out common bacterial and viral causes of meningitis especially in endemic areas.

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