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Congenital Cytomegalovirus Infection in a Neonate with Severe Clinical Complications: A Case Report

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Abstract

Worldwide, cytomegalovirus (CMV) is a major cause of congenital infections that can result in a variety of clinical symptoms, especially in newborns. In this case study, a 2-month-old child was found to have a high CMV viral load in her urine sample using PCR testing. Her complicated medical history included neonatal convulsions, cyanosis, pneumonia, fever, and lymphadenopathy. She was born at home. In addition to examining the difficulties in managing neonates and optimizing outcomes, this report emphasizes the significance of prompt identification and treatments for congenital CMV, particularly in environments with limited resources. [*Bangladesh Journal of Infectious Diseases, December 2024;11(2):205-208*]

Keywords: Congenital cytomegalovirus infection; neonatal convulsions; lymphadenopathy; PCR; antiviral therapy; NICU; Bangladesh

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Introduction

The most frequent cause of congenital viral infections in the US, affecting between 20,000 and 30,000 infants each year, is cytomegalovirus (CMV)[1]. One of the main causes of neurological, developmental, and systemic problems in newborns is congenital cytomegalovirus infection (cCMV)[2-4]. Additionally, birth abnormalities and developmental disorders also caused by congenital cytomegalovirus (cCMV) infection, which is transmitted from mother to fetus during pregnancy. The most frequent cause of congenital infections is actually CMV[5], which can have long-term effects such sensorineural hearing loss (SNHL) and neuro disabilities[6].

In both high- and low/middle-income nations, the seroprevalence of CMV infection rises with age and is greater among those with lower socioeconomic level. These factors also affect the seroprevalence among women of reproductive age. In Europe, developed European nations, Japan, Latin America, and North America, the seroprevalence of CMV

IgG among women of reproductive age was 45.6% to 95.7%, 45.6% to 65.9%, 60.2%, 58.3% to 94.5%, and 24.6% to 81.0% cases respectively[7]. With an estimated pooled overall prevalence rate of cCMV of 0.67%, which varies from 0.48% in high-income nations to 1.42% in low/middle-income countries, CMV is the most prevalent cause of congenital infection worldwide[8]. In Bangladesh previous few studies suggest that 100.0% pregnant women were seropositive in their first antenatal visit, reflecting a high sero-prevalance in Bangladesh[9]. High seroprevalence (97.0%) was also observed in another study from Bangladesh[10]. Redwan et al[11] showed 83.6% prevalence in Bangladeshi population. Ashrafunnesa et al[12] observed slightly lower but still a high prevalence (68.6%) in antenatal population in Bangladesh. Socioeconomic status, level of education might be responsible for the high prevalence of CMV.

Congenital CMV infection, on the other hand, is still mostly unknown in both the developed and developing worlds[5]. A positive CMV DNA PCR in urine or saliva obtained within three weeks of birth is the basis for a verified diagnosis of cCMV[13]. Limited availability to newborn and prenatal CMV screening in Bangladesh can raise the risk of morbidity by delaying diagnosis and treatment. This report highlights the crucial need for diagnostic knowledge and therapy in neonatal intensive care settings by presenting the case of a 2-month-old female newborn with significant clinical problems linked to cCMV infection.

Case Presentation

At the National Institute of Laboratory Medicine and Referral Center (NILMRC), in Dhaka, a child of two months and eight days old, arrived with signs that were typical of a serious congenital illness. After submitting a urine sample for polymerase chain reaction (PCR) testing, the results showed a high viral load of CMV. With the help of a qualified nurse, she was delivered at term at home by a typical vaginal delivery with an episiotomy. Her first presentation was crucial, even though she was born at full term. Child was unconscious right after delivery and had bluish skin discoloration, which could indicate respiratory difficulty and newborn hypoxia. After being quickly taken to the hospital, she was admitted for emergency oxygenation to the newborn intensive care unit (NICU). She experienced convulsions within the first hour after being admitted to the NICU; these were treated with anticonvulsant medication. She also contracted pneumonia during her stay in the NICU, which required continuous monitoring of her vital signs, breathing assistance, and medications. She spent 33 days in the hospital due to her serious condition. Her clinical trajectory remained difficult following her initial release. She was readmitted at around two months of age due to fever, frequent convulsions, and lymphadenopathy, which raised the possibility of an underlying infectious cause. Congenital CMV infection was confirmed by her laboratory tests, which showed a positive CMV PCR test with a high viral load. In order to control her symptoms and lessen the viral burden, antiviral medication was started. PCR Test (urine sample): Positive for CMV with high viral load. Complete Blood Count (CBC): it was performed frequently that exhibit occasional mild lymphocytosis otherwise normal findings in all the times. Urine R/M/E shows no abnormalities. Biochemistry results were within normal limits. Serum Electrolyte were normal. She began taking ganciclovir as part of an antiviral treatment plan after it was confirmed that she had a CMV infection. Antipyretics for fever, anticonvulsants for seizures, and antibiotics for pneumonia and secondary infection prevention were all part of supportive care. She also received nutritional and respiratory support to help her heal. Her condition stabilized after antiviral therapy and symptomatic care. She was kept under observation for any CMV side effects, which are frequent in congenital CMV cases and include hearing loss, developmental delays, and motor deficiencies. Her family had follow-up appointments to track developmental milestones and education on how to spot signs of recurrence or problems.

Discussion

Globally, congenital cytomegalovirus (CMV) infection continues to be a major contributor to infant morbidity and mortality, especially in environments with low resources. The serious clinical consequences of congenital CMV infection are highlighted in this case report from NILMRC, Dhaka, highlighting the significance of early detection and care[14-15]. The infant in this instance had severe IUGR, microcephaly, hepatosplenomegaly, and significant cerebral impairments. The "cytomegalic inclusion disease" phenotype, which is seen in 10.0% to 15.0% of symptomatic infants with congenital CMV infection, is consistent with such presentations[14]. These signs point to tissue damage and extensive viral replication during fetal development. A direct cytopathic effect of CMV on neural progenitor cells and inflammatory reactions inside the developing brain is suggested by microcephaly, which is

frequently linked to calcifications observed on neuroimaging[16].

Although difficult, early detection of congenital CMV infection is essential. Polymerase chain reaction (PCR) testing of neonatal urine, a very sensitive and specific diagnostic technique, was used in this instance to confirm the diagnosis[16]. Because of the possibility of false-positive and false-negative outcomes, serological tests, such CMV IgM, are less accurate in neonates. The diagnosis in this instance was further confirmed by neuroimaging and laboratory results, such as thrombocytopenia and increased liver enzymes[17]. This instance emphasizes how urgently public health measures are needed to lessen the prevalence of congenital CMV infection in Bangladesh. Transmission risks can be decreased by health education initiatives that focus on maternal cleanliness and pregnancy-related CMV knowledge[14]. Results can also be enhanced by routinely screening pregnant women and neonates for CMV and providing follow-up services for afflicted infants[16].

Challenges in Resource-Limited Settings: The detection of congenital infections may be delayed in Bangladesh due to the lack of prenatal CMV screening and restricted access to early diagnostic tools. Serious newborn problems, extended hospital stays, and higher medical expenses are frequently the outcome of this diagnosis delay. The significance of establishing CMV screening procedures for high-risk pregnancies and expanding access to PCR testing for early newborn infections is highlighted by this instance.

Conclusion

Improving newborn outcomes requires early detection and treatment of congenital CMV infection. The therapeutic difficulties and complications of treating congenital CMV in a context with minimal resources are highlighted in this case study. Improved prognoses for afflicted infants and the avoidance of serious problems depend on increased knowledge and easily available diagnostic testing for CMV. The effects of early antiviral treatment and routine CMV screening in neonates with high-risk birth histories require more research.

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Conflict of Interest
None

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All of the listed authors have reviewed and approved the manuscript.

Data Availability
Any questions regarding the availability of the study's supporti ng data should be addressed to the corresponding author, who can provide it upon justifiable request.

Ethics Approval and Consent to Participate
Written informed consent was obtained from the patient prior to the publication of their medical information and images. All personal identifiers have been carefully omitted to ensure the patient's privacy and confidentiality are fully respected.

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