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(RESEARCH ARTICLE)

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Neonatal Cytomegalovirus Infection: About Two Cases

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Abstract

Cytomegalovirus infection is a viral infection that can be contracted during the prenatal or perinatal period. It is the most common congenital viral infection worldwide and is also the cause of congenital malformations, psychomotor retardation, and deafness. The clinical picture of newborns infected with CMV via the mother-fetus route may present several isolated or associated signs, or they may be asymptomatic. Diagnosis is essentially biological, performed by isolating the virus using a PCR test in urine or saliva before 21 days, with a measurement of the viral load in the blood.

In Morocco, Ganciclovir is the only treatment used in neonatology. It is indicated for symptomatic congenital infections, is administered intravenously, and requires regular biological monitoring to prevent side effects.

We report the cases of two newborns with this infection who were hospitalized at the National Reference Center for Neonatology and Neonatal Intensive Care at the Children's Hospital in Rabat in 2025.

Keywords: Cytomegalovirus; CMV PCR; Antiviral Treatment; Neurodevelopment

1. Introduction

Cytomegalovirus (CMV) infection is a viral infection that can be contracted during the prenatal or perinatal period; it is the most common congenital viral infection worldwide and is also a cause of congenital malformations, psychomotor retardation, and hearing loss. The clinical presentation of newborns infected with CMV via the mother-to-fetus route may include several isolated or combined signs, though they may also be asymptomatic.

Diagnosis is primarily laboratory-based and involves isolating the virus via a PCR test in urine or saliva within 21 days, along with measurement of the viral load in the blood. In Morocco, Ganciclovir is the only treatment used in neonatology; it is indicated for symptomatic congenital infections, is administered intravenously, and requires regular laboratory monitoring to prevent side effects.

The objective of this study is to present two educational clinical cases to enable pediatricians to recognize the clinical signs of CMV infection early in the neonatal period, as well as the management strategies and comprehensive follow-up for newborns with CMV infection.

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2. Material and methods

2.1. Clinical cases

2.1.1. Case 1

This is a male newborn admitted to our department at 18 days of life for respiratory distress resulting from a poorly managed full-term pregnancy. The infectious history was negative; delivery was vaginal, with Apgar scores of 9/10/10. and he has been hospitalized since birth for respiratory distress at a Level 2 provincial hospital. where he was placed on an oxygen mask and started on a triple antibiotic regimen without any improvement, then referred to us for further care. The clinical examination upon admission revealed a cyanotic, hypotonic newborn of normal weight (2900 g), with a normal height of 51 cm and microcephaly (head circumference of 29 cm); he was afebrile at 37°C, the sucking reflex was weak, and the Moro and grasping reflexes were also weak; on chest and lung examination: the retractions score was 3/10, and chest and lung auscultation was unremarkable; the remainder of the physical examination was normal, particularly the cardiovascular examination. Upon admission, the newborn was placed on oxygen therapy with positive end-expiratory pressure (PEEP) and managed as a case of bacterial neonatal sepsis; the admission chest X-ray showed diffuse interstitial syndrome, the transthoracic ultrasound was normal, a nasogastric tube placement to test sputum for BK was negative, and the blood CMV PCR was positive with a viral load of 430 IU/ml, or 2.633 log IU/ml. The diagnosis of CMV infection was confirmed. The newborn was treated with ganciclovir for 2 weeks; the follow-up PCR with viral load remained positive. The patient subsequently received an additional 4 weeks of antiviral treatment, after which the follow-up PCR was negative. The course of the disease was marked by improvement in respiratory symptoms However, at 18 months of age, the patient had residual pulmonary issues consistent with bronchopulmonary dysplasia and moderate neurodevelopmental delays, which required multidisciplinary follow-up at the Medical-Psychosocial Support Center (CAMPS). Hearing screening revealed no abnormalities, and his brain MRI had identified polymicrogyria with abnormal cortical layering.

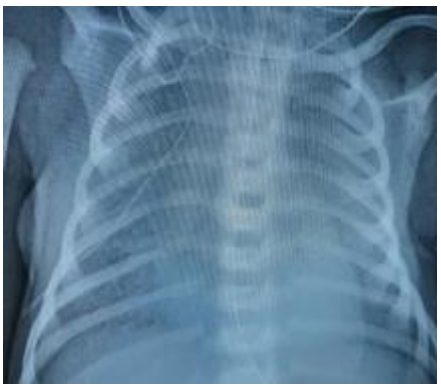

Figure 1 A chest and abdominal X-ray showing diffuse interstitial syndrome in both lung fields

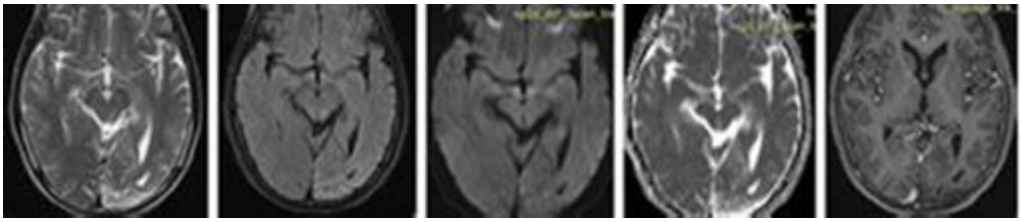

Figure 2 A brain MRI showing polymicrogyria

2.1.2. Case 2

This is a female newborn who was admitted immediately after birth to the National Reference Center for Neonatology and Neonatal Intensive Care at the Rabat Children's Hospital due to neonatal respiratory distress. Born to non-consanguineous parents, to a 35-year-old mother with no specific medical history, G3P3, the pregnancy was poorly monitored and terminated at 30 weeks of amenorrhea. Delivery was via cesarean section due to a retroplacental hematoma (RPH) with threatened preterm labor. The newborn was 30 weeks premature, the Apgar score was 8/9/9, the infectious history was negative, and the birth weight was 1850 g.

On clinical examination, the newborn was hypotonic, with respiratory distress rated 3/10 on the Silverman score; the infant was hemodynamically stable with no clinically detectable malformations. The newborn was eutrophic with a birth weight of 1850 g; height was normal at 48 cm, and microcephaly was present with a head circumference of 28 cm. The remainder of the physical examination was unremarkable. Given the generalized hypotonia, a brain CT scan was ordered, revealing microcephaly, bilateral gyral atrophy with normal-thickness cortex, and agenesis of the corpus callosum.

A diagnosis of CMV infection was suspected; a CMV polymerase chain reaction (PCR) test was ordered and returned positive, with a viral load of 3,067 IU/mL.

The other serological tests were negative, notably the rubella serology.

The patient was treated with ganciclovir for six weeks, with a follow-up CMV PCR and viral load test that were negative. He was subsequently referred to our center's Medical-Psychosocial Support Center (CAMPS) for long-term multidisciplinary follow-up, including neurological and psychomotor monitoring. The hearing screening revealed no abnormalities, with normal auditory evoked potentials (AEPs). The brain MRI showed bilateral gyral hypoplasia with agenesis of the corpus callosum. The EEG showed type B rolandic positive spikes. The patient continued to exhibit severe psychomotor developmental delay at 12 months.

3. Results and discussion

Congenital CMV infection is the leading non-genetic cause of neurodevelopmental impairment in children[1,2].

CMV affects the global population. The infection is endemic, with prevalence inversely correlated with socioeconomic status[1].

The prevalence of CMV is estimated at between 0.2% and 2% of births, depending on the population. On average, it is 0.5% in Europe[3,4].

Congenital CMV pneumonia affects approximately 1% of live births. In symptomatic children (10% of cases), pulmonary involvement is rare.

Approximately 90% of newborns with CMV are clinically asymptomatic at birth, and among them, the risk of neurosensory sequelae is estimated to be between 5% and 15% [4,5]. The frequency of sequelae in symptomatic newborns approaches 60% [6].

The mortality rate among symptomatic newborns is 5% to 10%; among survivors, the rate of sequelae is 90%. In 70% of cases, psychomotor retardation is accompanied by neurological abnormalities and microcephaly. Hearing loss is present in 50% of cases; it is most often bilateral and, in half of the cases, progressive. Optic atrophy or chorioretinitis is observed in 20% of cases[2].

Congenital CMV infection may present at birth as isolated pulmonary, interstitial, or vascular involvement. The absence of CMV viral replication in the blood should not rule out the diagnosis. A blood culture should be performed if congenital CMV infection is suspected.

In Case 2, the medical history, clinical and radiological findings, and the course of respiratory distress were not consistent with a typical cause of neonatal respiratory distress. Clinical signs of respiratory distress were present within minutes of birth and did not respond to oxygen therapy or antibiotic treatment. The chest X-ray was consistent with diffuse alveolar-interstitial syndrome, suggesting congenital CMV infection, which was confirmed by CMV PCR.

Neurological disorders affect motor, cognitive, social, and behavioral functions to varying degrees and may occur in combination or in isolation, depending on the severity and extent of central nervous system involvement.

In a review of 15 studies, Dollard et al. reported an average rate of neurological sequelae of 58% among children who were symptomatic at birth and 13.5% among those who were asymptomatic [6]. These results are similar to those observed in a 2013 Swedish study, which found a 42% rate of sequelae among symptomatic children and a 14% rate among asymptomatic children [4,7]. All cases of moderate and severe neurological impairment were identified within the first year of life.

The two cases we reported in this study had retained moderate to severe neurodevelopmental sequelae.

In 2017, Lopez et al. reported that the development of children with asymptomatic CMV, with or without hearing impairment, is the same as that of uninfected children[8].

Postnatal brain imaging consists of transfontanellar ultrasound (TFU), possibly supplemented by MRI.

The findings observed are not specific to CMV; they are diverse and may occur in isolation or in combination.

In a 2007 prospective study, abnormalities on the ETF were more common in symptomatic children and were significantly associated with long-term sequelae ($p < 0.001$). In contrast, no symptomatic child with a normal ETF developed long-term sequelae. Among asymptomatic children with a normal ETF, 8.1% developed hearing loss. Two asymptomatic children had pathological ETF, and one of the two developed severe long-term sequelae[9].

In our two patients, brain MRI revealed gyration abnormalities and cortical atrophy with long-term psychomotor sequelae.

Intravenous ganciclovir and oral valganciclovir (a prodrug of ganciclovir) are the two most commonly used medications. They result in a temporary reduction in viral load. In Morocco, only the intravenous form is available.

Several studies have demonstrated the efficacy of six-week treatment with ganciclovir and valganciclovir in newborns with symptomatic CMV infection and central nervous system (CNS) involvement, showing a reduced risk of progression to severe hearing loss and a more favorable neurological outcome at 1 year[10].

Unfortunately, the two patients reported in this study retained neurological sequelae of congenital CMV infection despite standard treatment for six weeks.

Follow-up continues until the child is 4 to 7 years old, depending on the medical team, for children who are asymptomatic at birth. Specialized multidisciplinary care is necessary in cases of neurosensory developmental disorders.

4. Conclusion

Congenital CMV infection is unique in that it can be both severe and mild; its sequelae and impact on the newborn's development underscore the importance of prenatal screening to optimize care and improve patients' quality of life.

The diagnosis of congenital CMV infection during the fetal and/or neonatal period should enable the implementation of early screening and management of potential complications, thereby improving the functional prognosis for affected children.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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