

# Cytomegalovirus Infection: An Invisible Threat

Natalie Duin\*

Department of Infectious Diseases, University of Melbourne, Melbourne, Australia

## Abstract

Cytomegalovirus (CMV) infection is a stealthy menace that often lurks unnoticed within our communities. Despite its relatively low profile in public discourse, CMV is a widespread and potentially serious health concern, particularly for vulnerable populations such as newborns, transplant recipients and individuals with weakened immune systems. Cytomegalovirus belongs to the herpesvirus family and is one of the most common viral pathogens infecting humans worldwide. It is estimated that a significant proportion of the global population is seropositive for CMV, indicating exposure to the virus at some point in life. CMV transmission primarily occurs through close contact with bodily fluids, including saliva, urine, blood and breast milk. Additionally, transmission can occur through organ transplantation, blood transfusion and vertical transmission from mother to fetus during pregnancy.

**Keywords:** Cytomegalovirus infection • Congenital CMV • Herpesvirus

## Introduction

While CMV infection often remains asymptomatic in healthy individuals, it can cause severe complications in certain populations, such as congenital CMV infection in newborns, CMV retinitis in immunocompromised individuals and CMV pneumonitis in transplant recipients. The clinical manifestations of CMV infection can vary widely, ranging from mild flu-like symptoms to life-threatening organ damage. The diagnosis of CMV infection typically involves laboratory testing, including serological assays to detect antibodies against CMV and molecular techniques such as Polymerase Chain Reaction (PCR) to identify viral DNA or RNA in clinical samples. In cases of suspected congenital CMV infection, testing of newborns' saliva or urine can aid in early detection and intervention. Management of CMV infection depends on various factors, including the patient's age, immune status and the presence of underlying medical conditions.

Antiviral medications such as ganciclovir, valganciclovir and foscarnet are commonly used for the treatment of symptomatic CMV infection, particularly in immunocompromised individuals. However, the efficacy of antiviral therapy may be limited in certain cases and supportive care measures may be necessary to manage complications associated with CMV infection. Prevention of CMV infection remains a significant public health challenge due to its ubiquitous nature and diverse modes of transmission. In the case of congenital CMV infection, prenatal screening and counseling can help identify women at risk of transmitting the virus to their unborn babies and implement preventive measures, such as hygiene practices and avoidance of close contact with young children [1,2]. For transplant recipients and other immunocompromised individuals, prophylactic antiviral therapy may be recommended to reduce the risk of CMV reactivation or primary infection. Additionally, strict adherence to infection control measures, including hand hygiene, isolation precautions and screening of blood and organ donors, is essential to prevent nosocomial transmission of CMV in healthcare settings.

\*Address for Correspondence: Natalie Duin, Department of Infectious Diseases, University of Melbourne, Melbourne, Australia, E-mail: nataliaduinnd@gmail.com

**Copyright:** © 2024 Duin N. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Received:** 01 February, 2024, Manuscript No. jid-24-132420; **Editor Assigned:** 03 February, 2024, Pre QC No. P-132420; **Reviewed:** 17 February, 2024, QC No. Q-132420; **Revised:** 22 February, 2024, Manuscript No. R-132420; **Published:** 29 February, 2024, DOI: 10.37421/2684-4559.2024.8.247

## Literature Review

Furthermore, efforts to develop a safe and effective CMV vaccine have been ongoing for decades, with several candidates currently in various stages of clinical development. A prophylactic CMV vaccine could potentially offer long-term protection against primary CMV infection and its associated complications, particularly in high-risk populations such as pregnant women and immunocompromised individuals. To better understand the significance of CMV infection, it's essential to grasp its epidemiology. CMV is highly prevalent worldwide, with seroprevalence rates varying by geographic region, socioeconomic status and age group. In developing countries, where access to healthcare and hygiene practices may be limited, seroprevalence rates tend to be higher compared to developed nations. In the United States, for example, it's estimated that around 50% to 80% of adults are seropositive for CMV by the age of 40. This high prevalence underscores the widespread nature of CMV exposure in the general population.

Additionally, certain demographic factors, such as socioeconomic status and race, may influence the risk of CMV infection, with higher rates observed among individuals from disadvantaged backgrounds or minority groups. Among pregnant women, the prevalence of CMV seropositivity varies depending on factors such as age, parity and occupation. Primary CMV infection during pregnancy carries a risk of vertical transmission to the fetus, leading to congenital CMV infection, which can result in a range of developmental abnormalities, including hearing loss, cognitive impairment and vision problems. CMV infection can manifest in diverse clinical presentations, ranging from asymptomatic or mild flu-like illness to severe and potentially life-threatening complications [3,4]. In healthy individuals, primary CMV infection often goes unnoticed or presents with nonspecific symptoms such as fever, fatigue, sore throat and swollen glands. However, in certain populations, such as newborns, transplant recipients and individuals with compromised immune function, CMV infection can cause more severe and debilitating complications.

Congenital CMV infection, acquired through intrauterine transmission from an infected mother, can result in a spectrum of birth defects, including microcephaly, hepatosplenomegaly, jaundice and neurodevelopmental disorders. In immunocompromised individuals, such as those living with HIV/AIDS or undergoing organ transplantation, CMV can cause opportunistic infections affecting multiple organ systems. CMV retinitis, characterized by inflammation of the retina, is a common complication in people with advanced HIV disease, leading to vision loss if left untreated. Similarly, CMV pneumonitis, characterized by inflammation of the lung tissue, can occur in transplant recipients and severely immunocompromised individuals, resulting in respiratory failure and death if not promptly diagnosed and treated. The diagnosis of CMV infection relies on a combination of clinical evaluation

and laboratory testing. In symptomatic individuals, healthcare providers may perform serological assays to detect specific antibodies against CMV in blood samples.

## Discussion

The presence of Immunoglobulin M (IgM) antibodies indicates recent or acute infection, while the detection of Immunoglobulin G (IgG) antibodies suggests past exposure or immunity to CMV. Molecular diagnostic techniques, such as Polymerase Chain Reaction (PCR) assays, are used to detect CMV DNA or RNA in various clinical specimens, including blood, urine, saliva and tissue samples. PCR testing is particularly useful for diagnosing congenital CMV infection in newborns and monitoring viral load in immunocompromised individuals receiving antiviral therapy. The management of CMV infection depends on several factors, including the patient's age, immune status and the presence of underlying medical conditions. In asymptomatic or mild cases of CMV infection, supportive care measures such as rest, hydration and over-the-counter pain relievers may be sufficient to alleviate symptoms and promote recovery.

In more severe cases, particularly in immunocompromised individuals or those at risk of complications, antiviral therapy may be warranted. Ganciclovir, valganciclovir and foscarnet are the mainstay of treatment for CMV infection, with intravenous formulations available for severe cases and oral formulations for outpatient management. Antiviral therapy aims to suppress viral replication, reduce viral load and prevent the progression of CMV-related complications. However, prolonged use of antiviral medications may be associated with adverse effects such as bone marrow suppression, renal toxicity and gastrointestinal disturbances, necessitating close monitoring and dose adjustments as needed [5,6]. In cases of refractory or resistant CMV infection, alternative treatment options such as cidofovir, letermovir and brincidofovir may be considered, although their efficacy and safety profile may vary.

Practicing good hand hygiene, including frequent handwashing with soap and water, can help reduce the risk of CMV transmission, especially in settings where close contact with bodily fluids is common, such as daycare centers and healthcare facilities. Using barrier methods such as condoms during sexual activity can help prevent sexual transmission of CMV, particularly among individuals at risk of acquiring or transmitting the virus. Screening of blood and organ donors for CMV infection can help prevent transmission of the virus through transfusion or transplantation. Testing donated blood and organs for CMV antibodies or viral DNA/RNA can identify potentially infectious units and reduce the risk of transmission to recipients. Screening pregnant women for CMV serostatus during prenatal care visits can identify those at risk of primary infection or reactivation.

Counseling pregnant women about the risks of CMV transmission to the fetus and implementing preventive measures, such as hand hygiene and avoiding contact with young children's saliva or urine, can help reduce the risk of congenital CMV infection. Development of a safe and effective CMV vaccine remains a top priority for researchers and public health authorities. A prophylactic CMV vaccine could potentially offer long-term protection against primary CMV infection and its associated complications, particularly in high-risk populations such as pregnant women and immunocompromised individuals.

## Conclusion

Cytomegalovirus infection poses a significant public health burden globally,

with the potential for serious complications in vulnerable populations. Despite its pervasive nature, CMV often goes unnoticed due to its asymptomatic presentation in healthy individuals. However, the impact of CMV infection can be profound, particularly in newborns, transplant recipients and individuals with weakened immune systems. Advances in diagnostic techniques and treatment modalities have improved our ability to identify and manage CMV infection effectively. Nevertheless, prevention remains the cornerstone of CMV control efforts, emphasizing the importance of prenatal screening, infection control practices and the development of prophylactic vaccines. By raising awareness of the invisible threat posed by CMV infection and implementing comprehensive prevention strategies, we can mitigate its impact on public health and improve outcomes for individuals at risk of CMV-related complications.

## Acknowledgement

None.

## Conflict of Interest

None.

## References

1. Kumar, Amit, Laurie Coquard, Sébastien Pasquereau and Laetitia Russo, et al. "Tumor control by human cytomegalovirus in a murine model of hepatocellular carcinoma." *Mol Ther Oncolytics* 3 (2016).
2. Jurak, Igor and Wolfram Brune. "Induction of apoptosis limits cytomegalovirus cross-species infection." *EMBO J* 25 (2006): 2634-2642.
3. Erkes, Dan A., Nicole A. Wilski and Christopher M. Snyder. "Intratumoral infection by CMV may change the tumor environment by directly interacting with tumor-associated macrophages to promote cancer immunity." *Hum Vaccines Immunother* 13 (2017): 1778-1785.
4. Nagel, Brittany M., Lexi R. Frankel, Amalia Ardeljan and Matthew Cardeiro, et al. "The association of human cytomegalovirus infection and colorectal cancer: A clinical analysis." *Cureus J Med Sci* (2021).
5. Rashid, Selena, Amalia Ardeljan, Lexi R. Frankel and Matthew Cardeiro, et al. "Human Cytomegalovirus (CMV) infection associated with decreased risk of bronchogenic carcinoma: Understanding how a previous CMV infection leads to an enhanced immune response against malignancy." *Cureus* 15 (2023).
6. Lachmann, Raskit, Anna Loenenbach, Tim Waterboer and Nicole Brenner, et al. "Cytomegalovirus (CMV) seroprevalence in the adult population of Germany." *PLoS one* 13 (2018): e0200267.

**How to cite this article:** Duin, Natalie. "Cytomegalovirus Infection: An Invisible Threat." *Clin Infect Dis* 8 (2024): 247.