

# Late-Onset Hearing Loss and Antiviral Therapy for Congenital Cytomegalovirus Infection



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## Abstract

**Background:** Congenital cytomegalovirus (cCMV) is the leading non-genetic cause of sensorineural hearing loss (SNHL) in children. While SNHL is often present at birth, as many as 25% of congenital CMV-infected infants may develop late-onset hearing loss. Antiviral therapy improves hearing outcomes, but its effect on the occurrence of late-onset SNHL is not fully known. Thus, our objective was to describe the prevalence of late-onset SNHL among congenital CMV-infected children treated with antiviral therapy in the first month of age.

**Design/Methods:** From 2013 to 2019, infants with congenital CMV infection referred to Nationwide Children's Hospital's (NCH) NEO-ID Clinic, Columbus, OH underwent complete evaluation including hearing testing. Pertinent demographic, clinical, laboratory, and radiographic data were obtained and managed using REDCap electronic data capture tools. Infants who passed the newborn hearing screen and subsequently developed late-onset SNHL were identified and compared with respect to receipt of antiviral therapy in the neonatal period. Statistical analyses were performed using GraphPad Prism for macOS version 8.3.0.

**Results:** During the 6-year study period, 99 infants had congenital CMV infection and 69 (70%) of them passed the newborn hearing screen. 46 (46%) neonates received antiviral therapy (1, ganciclovir; 38, valganciclovir; 7, both) for clinically apparent congenital CMV infection. One (2%) child developed late-onset SNHL. This infant was born at 37 weeks' gestation (birth weight, 2525 g) with microcephaly (head circumference, 31 cm) and cerebral calcifications and was diagnosed with congenital CMV infection at 8 days of age. Treatment with valganciclovir was initiated at 9 days of age, and he developed mild unilateral SNHL at 1 month of age while on treatment and subsequently right severe-profound SNHL and left mild-moderate SNHL. In comparison, among 23 infants with clinically inapparent disease who passed the newborn hearing screen and did not receive antiviral therapy, 5 (22%) subsequently developed SNHL (p=0.014).

**Conclusion:** Infants who received antiviral therapy for clinically apparent congenital CMV infection had significantly less late-onset SNHL than untreated infants, thus supporting a hearing protective effect of antiviral treatment.

## Background

- Congenital CMV (cCMV) infection is the leading non-genetic cause of sensorineural hearing loss (SNHL) in childhood and can be present at birth (early-onset) or develop later in life (late-onset).
- The effect of antiviral therapy on the occurrence of late-onset SNHL is not fully known.

## Objective

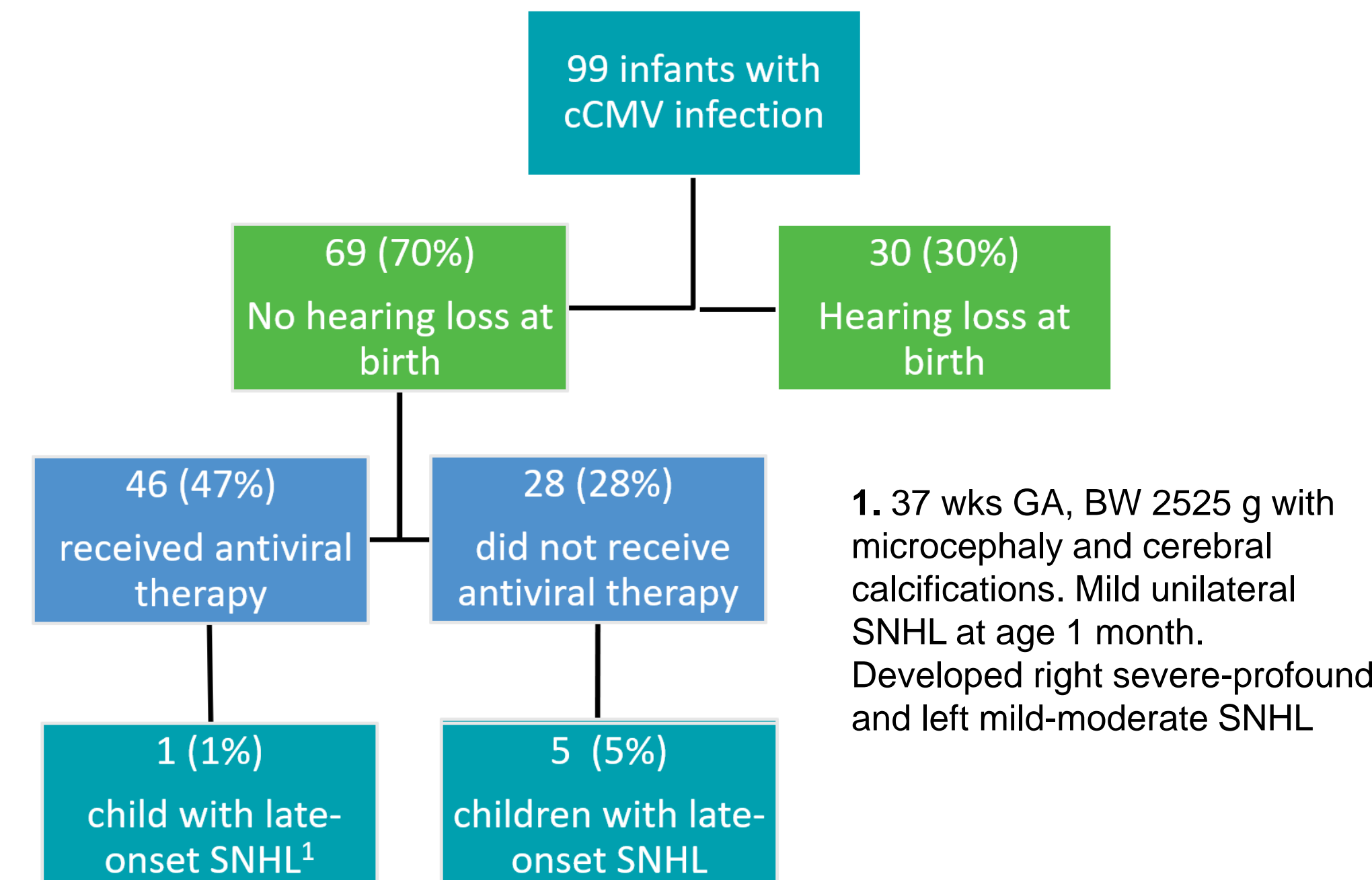
- To describe the prevalence of late-onset SNHL among cCMV-infected children treated with antiviral therapy in the first month of age

## Methods

- Infants with cCMV infection underwent complete evaluation that included hearing testing.
- Infants received antiviral therapy if clinical, laboratory, and/or radiographic signs of cCMV infection.
- Infants treated with antiviral therapy in the first month of age were compared to those who were not treated (either asymptomatic or evaluated after 1 month of age).
- Statistical analyses were performed using GraphPad Prism.

## Results

**Figure 1. 99 children referred to NCH NEO-ID Clinic from 2013 to 2019.**



## Results

- 99 children were referred for cCMV infection (Figure 1), 69 of whom did not have hearing loss at birth (Table 1).
- 46 infants received antiviral therapy for clinically apparent cCMV infection (1 ganciclovir, 38 valganciclovir, 7 both)
- 1 of these children developed late-onset SNHL compared with 5 children who did not receive antiviral therapy (Figure 1; Table 1).

**Table 1.** Characteristics of children without hearing loss at birth, stratified by receipt of antiviral therapy for cCMV infection.

	Treated	Not Treated	P-value*
No. of infants	46	28	
Gestational age (weeks; median [IQR])	38 [35-39]	37 [34-38]	0.15
Birth weight (g; median [IQR])	2264 [1760-2608]	2876 [1900-3150]	0.03
Sex			0.20
Female	16 (35%)	12 (52%)	
Male	30 (65%)	11 (48%)	
Late-onset hearing loss	1 (2%)	5 (7%)	0.01

\* Mann-Whitney or Fisher's Exact Test as appropriate

## Conclusions

- Antiviral therapy provided to infants with clinically apparent cCMV infection was associated with less late-onset SNHL, supporting a hearing protective effect of antiviral treatment.