Recommended Audiologic and Vestibular Monitoring Protocol for Children with Congenital Cytomegalovirus (cCMV)

Children diagnosed with cCMV require comprehensive monitoring for hearing and vestibular changes due to the progressive nature of the virus's impact on these systems. This protocol outlines the recommended audiologic and vestibular monitoring procedures, referral pathways, and management strategies to ensure timely interventions. It also emphasizes the importance of early intervention services and parental education to support optimal outcomes for children with cCMV.

1. Audiologic Monitoring:

Developmentally Appropriate Testing: Audiologic evaluations should be suited to the child's age and developmental abilities. Testing may include:

- Diagnostic Auditory Brainstem Response (ABR), to include high-intensity click and tone burst threshold testing
- Visual Reinforcement Audiometry (VRA)
- Conditioned Play Audiometry (CPA)
- Otoacoustic Emissions (OAEs)
- Acoustic Reflexes
- Tympanometry

Ear-Specific Testing: Always perform ear-specific testing at regular intervals, with adjustments based on the child's clinical status. More frequent testing should be considered if a change in hearing is detected.

Unilateral Hearing Loss Monitoring: Both ears should be monitored following the same protocols, as unilateral hearing loss often progresses to bilateral hearing loss in cases of congenital cytomegalovirus (cCMV). The poorer hearing ear is likely to decline faster.

2. Vestibular Monitoring:

Screening Protocol: Vestibular screening should be included at each audiologic diagnostic visit to assess the vestibular system's health. For younger children, developmental checklists may be used to screen vestibular function.

Specialist Referral: If there is a concern regarding vestibular function, refer to appropriate specialists, such as:

- Audiologist for detailed vestibular evaluation
- Ear, Nose, and Throat (ENT) provider
- Physical therapist

3. Ear, Nose, and Throat (ENT) Referral:
Children diagnosed with any form of hearing loss, whether permanent or transient, and/or vestibular concern should be referred to an ENT provider for further medical assessment.

4. Early Intervention Services:
All children diagnosed with cCMV qualify for Babies Can't Wait services whether they have a diagnosed permanent hearing loss or not. Refer the child for early intervention services using SendSS for newly identified permanent hearing loss or via the Children 1st Referral Form, submitted to the local health district Children 1st Coordinator.

5. Audiologic Management Recommendations for Children with Confirmed cCMV and Hearing Loss:
Amplification Management: Children should be fit with hearing aids that are adaptable to changes in hearing status. Audiologists may choose devices with a wider fitting range to accommodate potential worsening of hearing over time.

Cochlear Implant Consideration: For children with confirmed sensorineural hearing loss, cochlear implants should be evaluated based on their pure tone audiometry and word recognition capabilities.

6. Parent Education:
Understanding Hearing Status: Parents should be fully informed about their child's hearing status and educated on the possibility of changes as their child grows.

Home Monitoring: Parents should be vigilant in noticing any changes in their child's hearing between appointments and should request an earlier evaluation if concerns arise.

Ongoing Monitoring After Age 10: Even if a child does not show hearing loss by age 10, parents should continue to monitor hearing, especially if the child has tested positive for cCMV.

Audiological and Vestibular Testing Recommendations for Children with Confirmed or Presumed cCMV

NOTE: The below recommendations are for all children who are cCMV+, regardless of passed newborn hearing screening (NBHS) status.

Initial Evaluation	**Diagnostic Hearing Evaluation by 3 months of age.** Recommend diagnostic auditory brainstem response (ABR) testing (and additional tests, such as tympanometry and Otoacoustic Emissions (OAEs) take place within 1 month of confirmation of cCMV.	
0 months – 12 months of age	**Diagnostic Hearing Evaluation every 3-6 months** Recommend second evaluation by 4-5 months of age. **Vestibular Function Screening** Consider using CDC's Milestone Checklist or Ages and Stages Questionnaire to monitor child's motor milestones. Encourage families to download CDC's Milestone Tracker App to monitor themselves.	
1-3 years of age	**Diagnostic Hearing Evaluation every 6 months** **Vestibular Function Screening** Consider using CDC's Milestone Checklist or Ages and Stages Questionnaire to monitor child's motor milestones. Encourage families to download CDC's Milestone Tracker App to monitor themselves.	
3-10 years of age	**Diagnostic Hearing Evaluation every 12 months** **Vestibular Function Screening** Consider using Single Leg Stance Screen* (ages 3+) or Pediatric Dizziness Handicap Inventory for Caregivers (DHI-PC) (ages 5+)	
10+ years of age	**If no signs of hearing loss are present**, annual evaluations can stop at recommendation of managing audiologist. Parents should be educated to schedule an additional evaluation if there are	If **diagnosed with hearing loss,** complete Diagnostic Hearing Evaluation every 12 months **Vestibular Function Screening** Consider using Single Leg Stance Screen* or Pediatric Dizziness Handicap Inventory for Caregivers (DHI-PC).

	concerns of hearing loss after 10 years of age.	

*Single Leg Stance Screen: Complete on stable ground with eyes open and hands on hips. 36 months=2 sec, 42 months=4 seconds, 48 months=6 seconds, 54 months=8 seconds, 60 months=10 seconds, 72 months=12 seconds, 7 years=15 seconds, 9 years=30 seconds

Helpful Resources:

Centers for Disease Control and Prevention Milestone Checklist

Centers for Disease Control and Prevention Milestone Tracker App

Referral to Department of Public Health Child Health Programs (Babies Can't Wait, etc)

Vanderbilt Pediatric Dizziness Handicap Inventory (DHI-PC) (Age 5-12)

Part II: Vestibular Assessment for Children - Vestibular Disorders Association

Ages and Stages Questionnaire

National CMV Foundation "Congenital CMV: Support and Next Steps"

References:

American Academy of Audiology. (2023). *Position statement on early identification of cytomegalovirus in newborns*. https://www.audiology.org/wp-content/uploads/2023/03/American-Academy-of-Audiology-CMV-Position-Statement.pdf

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