An Often Unknown Cause of Hearing Loss in Children

Understanding and Preventing CMV in the Educational Setting

The leading cause of sensorineural hearing loss is heredity, but many people don't realize that the second most common cause of SNHL in children is due to Congenital Cytomegalovirus or cCMV. It is also the most common congenital viral infection in the United States and resulting hearing loss may be preventable. CMV can cause wide variation in hearing loss, including progressive loss.

What is CMV?

Cytomegalovirus is a herpes virus that causes minimal to no symptoms in most people. In the U.S, by age 40, most of us have evidence of a past infection. CMV becomes a concern in primarily two scenarios - in a pregnant woman or in a severely immunocompromised individual. Most women are unaware of CMV and the risk of infection during pregnancy.

What is the size of the CMV problem?

cCMV is the most common congenital viral infection in the United States. Approximately 1 out of every 200 infants are infected with CMV prior to birth. With 3.8 million births in the US in 2018 we can assume that 19,000 children were infected with CMV.

Of those who are infected, how many children end up with hearing loss?

Of the 1 in 200 infants infected with cCMV, approximately 10% will be "symptomatic" and have serious symptoms at birth that may include microcephaly, enlarged liver/spleen, cerebral palsy, cognitive impairment, vision loss and sensorineural hearing loss(SNHL). Another 10% - 20% of the 200 infected infants are "asymptomatic" will have or go on to develop SNHL. Using the 3.8 million births in the US in 2018 as an example again, 1900 would have had symptomatic CMV and 950-1900 would have had asymptomatic CMV that caused hearing loss.

Characteristics of CMV SNHL
Hearing loss in infants/children with cCMV can be unilateral, bilateral, present at birth, late onset, fluctuating or progressive. ANY child with hearing loss could potentially have had it caused by cCMV!

Audiological follow-up data for 860 children with congenital CMV. Dahle et al 2000, extrapolated by Walter 2017

	Asymptomatic at birth, n=651	**Symptomatic** at birth n=209
Hearing loss	7.4%	40.7%
Unilateral	52%	33%
Bilateral	48%	67%
High frequency only	37.5%	12.9%
Delayed onset	37.5%	27%
Median age of delayed onset	44 months range (24-182)	33 months range (6-197)
Progressive	54%	54%
Fluctuating	54%	29%

CMV is so common! Can't we test for it before it causes hearing loss and other problems?

Presently, most infants are not tested for cCMV at birth. Infants with obvious symptoms of cCMV are being tested, and in a few states with recent legislation, those infants who fail their newborn hearing screen are tested. If an infant is not tested for cCMV by 3 weeks of age, any positive test after 3 weeks of age may indicate an acquired infection rather than a congenital infection. It is therefore difficult to estimate what proportion of SNHL is due to congenital CMV in children outside of the newborn period.

If an infant is known to have passed the newborn hearing screen but has tested positive for CMV, the most recent JCIH statement recommends a full pediatric audiology evaluation by 3 months of age and then future monitoring "every 12 months to age 3 or at shorter intervals based on parent/provider concerns".

How is CMV spread?

Cytomegalovirus is primarily spread through saliva, mucous and urine. Infants and young children are commonly shedding the virus. Small children have behaviors that are more likely to lead to the transmission of CMV. Women of child bearing age should be aware of the risks of congenital CMV and methods of prevention. Women who are pregnant or planning on becoming pregnant can take precautions that may reduce their risk of exposure to CMV. Clinical studies with antivirals for CMV and trials for a CMV vaccine are ongoing.

How can we prevent CMV?

Educators who work with young children are at greater risk of contracting CMV and can help to prevent transmission of CMV by treating all body fluids as if they are infectious.

This includes:

- Wash hands frequently with soap and water, lathering for at least 15 seconds
- Avoid kissing a child near the nose or mouth
- Do not put things in your mouth that have been in a child's mouth such as a pacifier, cups, utensils or food
- Wear gloves for all contact with body fluids, and always wash hands after removing gloves
- Use EPA approved disinfectants to frequently clean workplace surfaces that may be contaminated with body fluids
- Do not use diaper wipes to clean potentially contaminated workplace surfaces
- Disinfect small toys or objects that may have been contaminated with body fluids

Any and all children, both in the classroom and in the home, or extended family setting, may potentially transmit CMV to a woman of childbearing age or a pregnant woman. It is prudent to use good hygiene precautions in all of these settings.

Resources

- https://www.cdc.gov/cmv/index.html
- JCIH 2019 position statement: https://digitalcommons.usu.edu/jehdi/vol4/iss2/1