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SCREENING AND DIAGNOSTIC

The contribution of expanded targeted screening to the detection of infants with Cytomegalovirus-related hearing loss

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Background

- ✓ Sensorineural hearing loss (SNHL) is the most common sequela of congenital cytomegalovirus (cCMV) infection, which may be present at birth or delayed in onset
- ✓ Early identification of cCMV infants is crucial for timely hearing monitoring, antiviral treatment, and intervention
- ✓ Most cCMV cases are asymptomatic or show occult symptoms, making detection challenging
- ✓ In the absence of a consensus on the necessity of universal cCMV screening, a hearing-targeted (HT) screening approach for infants who fail universal newborn hearing screening (NHS) has been suggested
- ✓ This HT approach, however, may miss: (1) infants with mild SNHL, which is challenging to detect with the current two-stage NHS methods; (2) infants with occult symptoms who may benefit from antiviral treatment; (3) infants who develop late-onset hearing loss
- ✓ An expanded targeted cCMV screening program was proposed and has been operating at our medical center since 2014

Objectives

We aimed to evaluate in a large cohort of infants: (1) the rate of cCMV cases detected via our expanded cCMV screening protocol; (2) the predictors for a diagnosis of cCMV; (3) the rate of infants with cCMV-related SNHL detected by the expanded protocol

Materials and Methods

- ✓ The cohort consisted of all infants born between January 2014 and December 2019, tested for cCMV ≤21 days due to NHS failure and/or maternal suspicion during pregnancy, and/or clinical suspicion of cCMV infection at birth
- ✓ The diagnosis was based on saliva DNA and confirmed by urine. Positive infants were sent for further clinical and audiological investigation

Results

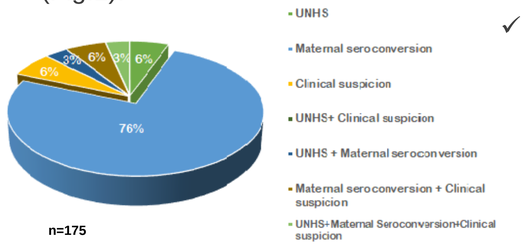
The rate of cCMV cases

- ✓ During the study period, 3,541 infants (5.58% of the 63,404 live births at SMC) met expanded screening criteria. The cohort consisted of 3,418 (5.4%) of the infants who were successfully screened for cCMV
- ✓ cCMV infection was identified in 175 infants, accounting for 5.12% (95% CI, 4.41%-5.91%) of the cohort and **0.28% (95% CI, 0.24%-0.32%) of all live births**

Results (Cont.)

The predictors for cCMV diagnosis

- ✓ The majority of the infants (154/175, 88%) were identified due to a history of suspected or proven maternal CMV infection during pregnancy, while the minority (22/175, 13%) due to NHS failure (Fig.1).



- ✓ The variables that were mostly associated with cCMV infection were **suspected or confirmed maternal CMV** (OR 11.008, 95% CI, 5.689-21.303, P<0.001) and **thrombocytopenia** (OR 15.473, 95% CI, 5.502-43.510, P<0.001). **NHS failure was not significantly associated with the risk of cCMV** (OR 1.757, CI, 0.941-3.283, p=0.077)

Fig. 1: Expanded criteria that prompted cCMV screening

The rate of SNHL

- ✓ A total of 22 infants (22/164, 13.4%) were diagnosed with SNHL (Fig.2)
- ✓ NHS identified 55% of infants with SNHL (12/22) **but missed 45% of infants with mild SNHL** (10/22)
- ✓ The incidence of SNHL was higher in the symptomatic group (10/48, 21%) than in the asymptomatic group (12/127, 9.5%)

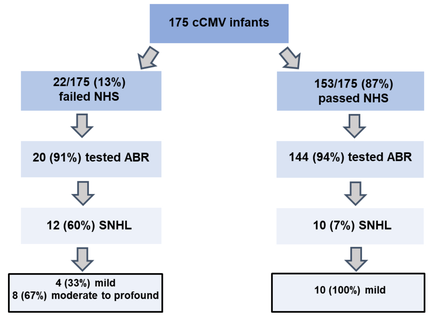


Fig. 2: Hearing screening and audiological evaluation outcome

Conclusions

- ✓ Applying our expanded protocol to a minority of live births contributed to the detection of infants with cCMV-related SNHL who passed UNHS and could benefit from timely intervention
- ✓ Maternal seroconversion was the primary contributing factor in detecting cCMV including infants with occult symptoms that could be offered antiviral treatment, suggesting a need for more research on maternal screening strategies

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