P444

SCREENING AND DIAGNOSTIC
NEWBORN HEARING SCREENING

Hearing results in children affected by congenital infectious diseases

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Abstract

Congenital infections constitute a significant risk factor for sensorineural hearing loss (SNHL) in infants. SNHL may be mild to severe, late-onset, unilateral, or progressive. All newborns referred to the Audiology-Neurotology department of the ENT Clinic of Chania General Hospital, due to a history of congenital infectious disease, underwent an audiologic evaluation and subsequent regular audiologic examination every six months, The most common congenital infection recorded was congenital cytomegalovirus (cCMV).

Objectives

The study aims to investigate the impact of TORCH (Toxoplasma, Rubella, Cytomegalovirus, Herpes) and other congenital infections on children's hearing through the national newborn hearing screening program in western Crete.

Methods

The study population consisted of newborns referred to the Audiology-Neurotology department of the ENT Clinic of Chania General Hospital, from November 2015 to November 2023, due to a history of congenital infectious disease. A total of 158 children were referred, with 52% being male and 48% female. At the time of the first evaluation, their mean age was 3,9 months. A record was fulfilled for each infant regarding family history, weight, prematurity, birth injuries, jaundice, Apgar score, NICU hospitalization, and the responsible pathogen for the congenital infection. Audiologic evaluation included distortion product otoacoustic emissions, tympanometry, acoustic reflexes, and auditory brainstem responses. All children were subjected to a regular audiological examination every six months. Caregivers of children diagnosed with hearing loss were recommended to proceed with ophthalmologic, cardiologic, and genetic evaluations.

Results

72,7% of children showed normal hearing thresholds, while 27.9% of children presented with hearing loss (Fig.1). The most common congenital infection recorded was congenital cytomegalovirus (cCMV) (73,5%) (Fig. 2). It is also the only pathogen that caused delayed SNHL in our sample. 31% of children with cCMV were found to have SNHL at the first evaluation, while four children showed delayed mild SNHL, and three children delayed moderate SNHL. In three of the children with moderate SNHL a mutation in the GJB2 gene was also identified. The risk of SNHL was not greater after cCMV compared to all other congenital infections p=0.073, Fig 3).

	CMV	TOXO	HERPES	SYPHILIS	LISTERIA	HIV	TOTAL
NORMAL HEARING	80	29	6	0	0	0	**115**
SSD	9	2	0	0	0	0	**11**
MILD HL	9	0	0	0	0	0	**9**
MODERATE HL	14	1	0	2	1	1	**19**
SEVERE HL	4	0	0	0	0	0	**4**
TOTAL	**116**	**32**	**6**	**2**	**1**	**1**	**158**

Fig.1. Hearing results vs pathogen

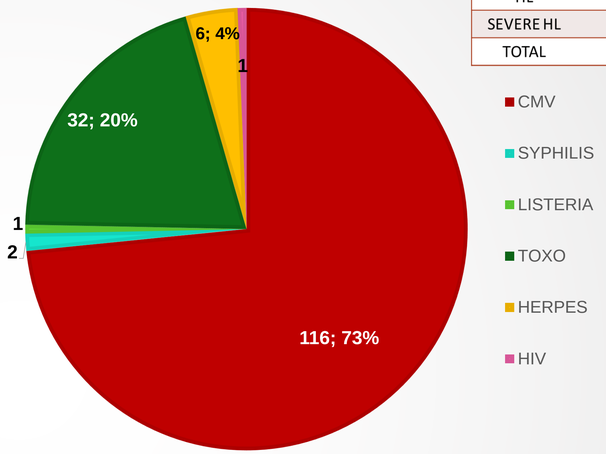

Fig.2.Incidence of different congenital infections in the study population

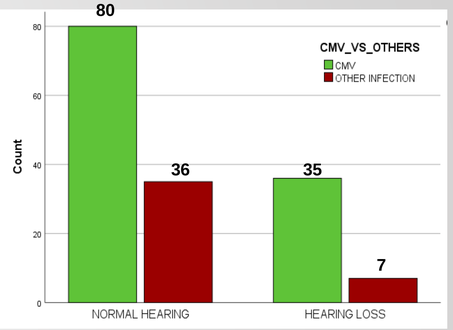

Fig.3.Hearing results in cCMV vs other pathogens

Conclusion

The national Greek vaccination program has eliminated congenital rubella. Every child with TORCH or other congenital infection should undergo a thorough audiological evaluation every six months until the age of 6 years old for early diagnosis of late-onset hearing loss. Congenital infection must not rule out a genetic cause of hearing loss. Hearing and speech milestones should be in the vigilance of parents and pediatricians.

References

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19›22 September 2024
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