

Preventing Acquired Hearing Loss in the Neonatal Intensive Care Unit

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This is a prospective study examining the roles of noise exposure and aminoglycoside exposure on hearing outcomes in the neonatal intensive care unit (NICU). Noise and aminoglycosides can both independently, and synergistically, induce permanent hearing loss in rodent models. Hearing loss rates in NICU patients run at 2-15% of admissions, compared to the 0.2-0.3% prevalence of congenital hearing loss present in full-term births. Although the management of NICU admissions is medically more challenging than full-term births, the precise etiology behind this increased prevalence (10-50x greater) hearing loss remains unknown. While some NICU admissions may have congenital hearing loss, these cases represent an insignificant fraction of the total rate of hearing loss in NICUs. Substantial noise is generated by medical equipment in the vicinity of the patient, and no studies measuring the effects of these sound levels on individual patients have been reported.

This pilot investigation will establish a human cohort to examine the synergistic effect of sustained noise and aminoglycoside exposures on hearing loss. We will test the hypothesis that aminoglycoside-related ototoxicity and noise exposure synergistically enhance the rate and onset of acquired hearing loss in humans. The innovation in this study resides in measuring sound levels within the occupied isolette. If the above hypothesis is not disproven, these data will lead to improved standard of care policies to prevent or ameliorate life-long auditory dysfunction induced by noise and/or aminoglycoside exposure for those infants who graduate from the NICU.