

FACTORS AFFECTING NEURAL RESPONSE TELEMETRY RECORDINGS IN THE CHRONICALLY STIMULATED CAT

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Purpose: There is an increasing tendency to provide cochlear implants to patients at a young age; however, determining stimulation levels in such young patients can be challenging. Therefore, systems to record the electrically evoked compound action potential (ECAP) have been developed, including Neural Response Telemetry (NRT). Many factors may affect the ability to record ECAPs, including electrode impedance, electrode location, and evoked auditory brainstem responses (EABRs) thresholds. **Methods:** Two months after neonatal deafening, profoundly deaf cats (n=8) were implanted with intracochlear electrode arrays and received unilateral electrical stimulation. Electrode impedance was monitored daily, NRT was measured every two weeks and EABRs were recorded every month for each electrode (n=56). **Results:** It was possible to record EABRs from 49 electrodes (87%) and NRTs from 28 electrodes (50%). When both an EABR and NRT was present there was no difference between EABR and NRT thresholds (Student T-test; $p = 0.342$). For 21 electrodes (37%) it was possible to record EABRs but not NRTs. When compared to electrodes for which it was possible to record both EABRs and NRTs, these electrodes did not have significantly different electrode impedances (Student T-test; Access Resistance: $p=0.403$; Total Impedance: $p=0.705$), EABR thresholds (Student T-test; $p=0.130$) nor were they located within different regions of the cochlea (Chi-square; $p=0.720$). In no case was it possible to record an NRT but not an EABR. **Conclusion:** It was possible to record NRTs in only 57% of cases where there was an EABR. However, electrode impedance, electrode location, and threshold were not contributing factors. Improvements in the ability to objectively determine threshold and maximum comfortable levels of stimulation are still required as they may contribute to an improved clinical performance among subjects implanted at a very young age.