Assessing the applications of Cortical Auditory Evoked Potentials as a biomarker in Cochlear implant children

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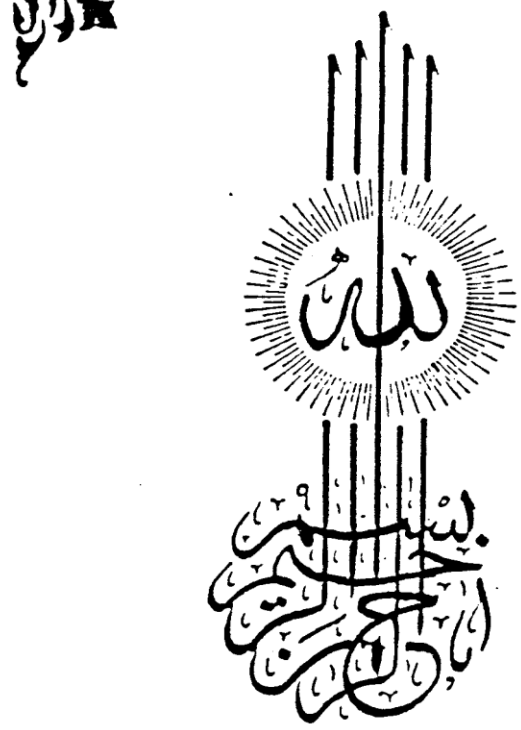

قالوا سبحانك لا علم لنا إلا ما
علمتنا إنك أنت العليم الحكيم .

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Abstract:

Introduction: cortical auditory evoked potentials (CAEPs) are non invasive measures that have a unique role in identifying central auditory system that has benefited from amplification or implantation. P1 CAEP reflects the maturation of the auditory system in general as it has developed over time **(Nash et al., 2007).**

Objective: 1-To assess the cortical auditory evoked potential in cochlear implant children versus age matched controls, 2-to study the different variables affecting the results, and 3-to compare pattern of P1 CAEP in cochlear implant patients versus hearing aid patients.

Methods: A total of 55 hearing impaired children (CI and H.A) (aged 3 to 16 years), were assessed by free-field auditory responses and P1 CAEP responses using tone-bursts at 500 and 2000 Hz at 100 dB SPL. Cochlear implanted children were examined twice in two scheduled sessions. The second session was six months after the first session. The hearing impaired children's results were compared to 20 normal hearing controls.

Results: Age showed significant effect on P1 latency in the normal hearing controls. There was no statistically significant difference between using either 500 Hz or 2000Hz on P1 CAEP test results. Cochlear implant children exhibited prolongation of P1 latencies compared to normal hearing children with overall delayed maturation. P1 CAEPs latency and amplitude results improved significantly after six months of device use. There was a statistical significant negative correlation between the age of onset of deafness and P1 latencies and amplitudes among cochlear implant group with a trend of shorter latencies and decreased amplitudes in post lingual hearing loss subgroup followed by peri lingual and then pre lingual hearing loss subgroup. P1 latencies in irregular HA users pre implantation were significantly different during first and second evaluation, while in regular HA users , no significant differences were found in P1 latencies between the two recording sessions. Moreover, regularity of device use, regularity of attendance of speech sessions, or history of consanguinity had no significant effect on CI P1 latencies and amplitude measures. There was no statistically significant difference as regards P1 latencies and amplitudes between our C.I and H.A users.

Conclusions: P1 CAEP test can be applied as an objective tool for measurement of central auditory system activity in hearing impaired children fitted with cochlear implant or hearing aids. This tool can be useful when monitoring child's progress with his CI and in auditory training.

Keywords: P1 Cortical auditory evoked potential, cochlear implants, hearing impaired children, free-field auditory responses.

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