Relation between cortical auditory evoked potentials and behavioral auditory discrimination in cochlear implant children

Thesis

Submitted for the Partial Fulfillment of MD Degree in

Audiology

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2019

سورة البقرة الآية: ٣٢

Acknowledgement

First of all, thanks to Allah whose magnificent help was the main factor in completing this work.

My special thanks and deep appreciation to **Prof. Dr. Amany Ahmed Shalaby,** professor of Audiology, ENT department, faculty of Medicine, Ain Shams University, for her great support and guidance, advocating much of her time and effort to make this work at its best.

I am also thankful to **Prof. Dr. Wafaa Abdelhai Elkholy,** prof. of Audiology, ENT department, faculty of Medicine, Ain Shams University, for her guidance and generous help in all stages; starting from her great role in referral of children in the study, and through all stages to reach the goal of the study.

I am also thankful to **Prof. Dr. Dalia Mohammed Hassan,** prof. of Audiology, ENT department, faculty of Medicine, Ain Shams University, for her great and deep support and for her valuable remarks and patience.

Lastly, words fail to express my love, respect and appreciation to **my parents, brother and sisters** for their encouragement, support and ultimate faith in me that helped me to complete this work.

Contents

Subjects	Page

List of abbreviations II

List of Figures IV

List of Tables VI

- **Introduction and Rationale** 1
- **Aims of the Work** 4
- **Review of Literature**
  - **Chapter (1):** Sound coding in cochlear implant recipients 5
  - **Chapter (2):** Electrophysiological measures of auditory discrimination 31
- **Materials and Methods** 54
- **Results** 73
- **Discussion** 129
- **Conclusions** 157
- **Recommendations** 158
- **Summary** 159
- **References** 162
- **Appendix** 207
- **Arabic Summary**

List of Abbreviations

ACC : Acoustic change complex.

AEP : Auditory evoked potential.

AFT : Auditory Fusion test.

ANSD : Auditory neuropathy spectrum disorder.

BM : Basilar membrane.

CI : cochlear implants.

CAP : central auditory processing.

CAEP : Cortical auditory evoked potential.

CANS : Central auditory nervous system.

CNC : Consonant nucleus consonant.

CV : Consonant Vowel syllable.

DR : Dynamic range.

EACC : Electric Acoustic change complex.

E-CAEP : Electric cortical auditory evoked potentials.

ENV **:** Envelope.

ERP **:** Event related potential

F0 : Fundamental frequency.

GDT : Gap detection thresholds.

Hz : Hertz.

HA : Hearing aids.

IPI : Inter pulse interval.

MMN : Mismatch negativity.

NH : Normal hearing.

POA : Place of articulation.

PBKG : Phonetically balanced words list.

SDS : Speech discrimination scores.

SNHL : Sensorineural hearing loss.

TFS : Temporal fine structure.

WIPI : Word intelligibility by picture identification.

List of Figures

No.	Figure	Page
1	The envelope and fine structure components of a filtered speech signal.	7
2	Example of phase locking for temporal coding.	9
3	General scheme of signal coding strategy in CI.	10
4	Illustrating tonotopicity of basilar membrane.	14
5	Frequency place mismatch in CI.	25
6	ACC morphology to vowel change /u-i/ in adults and children.	42
7	Manipulations done to generate gap-in-tone with 100 msec gap duration	60
8	1000 Hz control stimulus (with no change)	61
9	Illustrate the IA ratio	67
10	Breakdown of the study group according to etiology of hearing loss	76
11	Mean aided warble tone sound field thresholds	77
12	Percentage of child and adult CAEPs morphologies in the study group	81
13	Illustrating the similarity between acoustic and electric CAEP in a child from the study	90

No.	Figure	Page
	group	
14	Percent detectability of ACC in the study group across stimuli	**92**
15	ACC traces in the same child, showing ACC detection across stimuli	**93**
16	Example of broad & sharp peaked ACC P1 to gap-in-tone stimulus	**95**
17	Mean of ACC P1 latency in the study group using different stimuli in relation to the 95% confidence interval of the control group	**97**
18	Prolonged latencies in gap-in-tone than other changes in the same child	**97**
19	Mean of ACC P1 amplitude in study group using different stimuli in relation to the 95% confidence interval of the control group	**102**
20	Smaller amplitude of ACC than onset response using gap-in-tone	**103**
21	Different morphology between ACC and onset response, all three children elicited ACC child morphology waveform.	**109**
22	Test of agreement between subjective gap detection thresholds (AFT at 1000 Hz) & objective gap detection thresholds (by ACC)	**113**
23	Higher detection in ACC to vowel change /i-u/ in good compared to poor performer	**115**

List of Tables

No.	Table	Page
1	Mean, median, interquartile range (IQR) and standard deviation (SD) of personal variables	75
2	Number and percentage of regularity of HA use prior to implantation and regularity of CI use	76
3	Mean (SD), median (IQR) and range of aided raw WIPI scores	78
4	Mean (SD), median (IQR) and range of aided speech discrimination scores (SDS) using PBKG	78
5	Comparison between AFT scores across frequencies in the study group using one-way ANOVA test	79
6	Correlation between personal variables and behavioral tests (AFT & SDS)	79
7	Correlation between SDS and AFT	80
8	Descriptive data for the two children who didn't elicit CAEPs	80
9	Descriptive data for the three children showing adult CAEPs morphology	82
10	Percentage of different morphologies of onset P1	82
11	comparison between onset-P1 & N2 latencies across different acoustic stimuli using one way ANOVA test	84
12	Comparison between onset P1 and N2 amplitude across different stimuli by One Way ANOVA test	85

No.	Table	Page
13	Comparison between P1N2 inter-amplitudes across different stimuli using Friedman test	86
14	Descriptive data for CAEPs onset response parameters for the three children with adult morphology	87
15	Percent detectability of E-CAEP elicited at different electrodes	88
16	Mean, SD, median and range for E-CAEP thresholds across electrodes and the mean of T & C levels of the current MAP	88
17	Comparison between acoustic and electric P1 using paired t test	89
18	Number and percentage of children who elicited ACC to different stimuli and Fischer exact test results for comparison to NH children	91
19	Comparison between % detectability of ACC across different stimuli using McNemar Test	92
20	Percentage of sharp peaked ACC P1 using different stimuli and Chi-square test in comparison with NH children	94
21	Percentage of similarity in P1 morphology between ACC and onset response	94
22	Comparison between ACC P1 latency across different stimuli used with one way ANOVA test and compared to NH children using unpaired t test	96
23	Comparison between onset and ACC P1 latency across stimuli using paired t test	98

No.	Table	Page
24	Comparison between ACC N2 latency across different stimuli used with one way ANOVA test and compared to NH children using unpaired t test	99
25	Comparison between onset and ACC N2 latency across stimuli using paired t test	100
26	Comparison between ACC P1 amplitude across different stimuli used with one way ANOVA test and compared to NH children using unpaired t test	102
27	Comparison between onset and ACC P1 amplitude across different stimuli	103
28	Comparison between ACC N2 amplitude across different stimuli used with one way ANOVA test and compared to NH children using unpaired t test	104
29	Comparison between onset and ACC N2 amplitude across different stimuli	105
30	Mean, SD, median and range of ACC / onset P1/N2 inter amplitude ratio with different acoustic stimuli and Mann Whitney U test in comparison to NH children	106
31	Mean, SD, median and range of ACC thresholds to gap-in-tone and frequency change	107
32	Mean of ACC response parameters for the three children showing adult onset morphology	108
33	Comparison between ACC response parameters at threshold and suprathreshold in gap-in-tone using paired t test	110
34	Comparison between ACC response	111

No.	Table	Page
	parameters at threshold and suprathreshold in frequency pairs using paired t test	
35	Comparison between ACC response parameters between the alternating change of vowel pairs using paired t test	**111**
36	Correlation between AFT thresholds to ACC thresholds using gap-in-tone	**112**
37	Comparison between good and poor performers as regards % detectability of ACC using Chi-square test	**114**
38	Comparison between good and poor performers as regards morphology of onset P1 using Chi-square test	**115**
39	Comparison between good and poor performers as regards morphology of ACC P1 using Chi-square test	**116**
40	Comparison between good and poor performers as regards onset P1 latency using unpaired t test	**116**
41	Comparison between good and poor performers as regards P1 latency of ACC using unpaired t test	**117**
42	Comparison between good and poor performers as regards onset P1 amplitude using unpaired t test	**118**
43	Comparison between good and poor performers as regards P1 amplitude of ACC using unpaired t test	**118**
44	Comparisons between good and poor	**119**

No.	Table	Page
	performers as regards ACC /onset P1N2 inter-amplitude ratio using Mann Whitney U test	
45	Comparisons between good and poor performers as regards ACC threshold to gap-in-tone & AFT thresholds using unpaired t test	**119**
46	Demographic data for the three children who couldn't perform speech perception tests	**120**
47	ACC response parameters for the above three children	**120**
48	Mean, SD and point biserial correlation test for correlation of ACC detectability using different stimuli to personal variables	**121**
49	Mean, SD and point biserial correlation test for correlation of onset P1broad peaked morphology using different stimuli to personal variables	**122**
50	Mean, SD and point biserial correlation test for correlation of ACC P1 broad peaked morphology using different stimuli to personal variables	**123**
51	Correlation between personal variables and Onset P1 latency using different stimuli	**124**
52	Correlation between personal variables and ACC P1 latency using different stimuli	**125**
53	Correlation between personal variables and onset P1 amplitude using different stimuli	**125**
54	Correlation between personal variables and ACC P1 amplitude using different stimuli	**126**
55	Correlation between personal variables ACC inter-amplitude ratio	**127**

No.	Table	Page
56	Correlation between personal variables to ACC thresholds in gap detection and frequency change	**127**

Introduction and Rationale

Cochlear implants (CI) can partially or totally revert the effects of sensory deprivation and redirect the central auditory structures to their primary function; thus, enabling the development of auditory abilities, which is a prerequisite for oral language acquisition and speech production **(Martinez-Beneyto et al., 2009).**

However, there remains a large amount of variability in speech perception outcome among CI listeners **(Lopez Valdes et al., 2014).** Factors contributing to this variation involve individual auditory experience of the implant candidate, device-related factors **(Tyler et al., 2000),** the electrode neural interface and the status of the peripheral auditory nerve, variations in central auditory processing (CAP) and the ability of central system to adapt to novel neural patterns of excitation **(Abbas & Brown, 2014).** These factors can lead to variations in amplitude, temporal and spectral resolution processing capabilities which are necessary to detect ongoing changes in the incoming complex speech signals in quiet and in difficult listening situations **(Shannon, 2002).**