Neurophysiological test battery to assess the role of primary auditory perception, gating and attention in the auditory perception of sound intensity: A pilot study

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Background

Parkinson’s disease (PD) is a neurodegenerative disorder that has been associated with auditory intensity perception deficits. To date, the audiological and neurophysiological background of these perception deficits is unknown, and it is unclear which levels of auditory intensity perception are involved. Our group aimed to develop a neurophysiological test battery to investigate the role of primary auditory perception, gating and attention in the auditory perception of sound intensity in PD.

Method

Subjects: 7 healthy participants (2 M, 5 W) – Mean age 63 years

Case: 1 PD patient (W) – Age 57 years

EEG - Experimental paradigms

(1) Intensity dependence of auditory evoked potentials (IDAEPs)

(2) Mismatch negativity (MMN)

(3) P3

(4) MMN - Noise

(5) P3 - Noise

Results

(1) Higher N1/P2 amplitude values were evoked by increasing intensity levels in the IDAEP measurement (Fig 1).

(2) Stronger IDAEPs were found in the PD patient (Fig 2).

(3) Statistical significant difference between 70 dB SPL and 90 dB SPL deviant in MMN and P3 measurements in 7 HC.

(4) Statistical significant effect of noise in MMN and P3 measurements in 7 HC (Fig 4).

(5) Strong and significant correlations between the outcome variables: Accuracy (%), Reaction time (ms), Peak amplitude (µV) and Peak latency (ms) in 7 HC.

Conclusion

The currently used paradigms seem relevant for the neurophysiological evaluation of auditory intensity perception. Further work needs to be done to establish whether an auditory perception deficit in patients with PD can be demonstrated neurophysiologically.

References


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