Neurophysiological sensitivity for impaired phonological processing in the acute stage of aphasia

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RESULTS

Phoneme discrimination

<table>
<thead>
<tr>
<th>Place</th>
<th>Manner</th>
<th>Voicing</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMN</td>
<td>aphasia = norm</td>
<td>aphasia = norm</td>
</tr>
<tr>
<td>P300</td>
<td>aphasia &lt; norm</td>
<td>aphasia &lt; norm</td>
</tr>
</tbody>
</table>

MMN: more right-lateralized instead of left-lateralized = compensation mechanism [46]

Within the aphasic patients

- MMN: place > voicing; place > manner; voicing = manner
- P300: place > voicing; place = manner; voicing = manner

DISCUSSION AND CONCLUSION

Phoneme discrimination

<table>
<thead>
<tr>
<th>Place of articulation less subject to neuronal loss?</th>
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<tr>
<td>More spared than manner and voicing</td>
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<tr>
<td>Better imprinted because of larger spectral differences and/or additional auditory-motor interface</td>
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</tbody>
</table>

Effect attention!

- Pre-attentive = only voicing diminished compared to norm
- Attentive = all 3 distinctive features diminished compared to norm
- Neuronal resources for attention allocation suppress neuronal activation dedicated to deviance detection

Word recognition

Intact pseudoword effect in aphasic patients

- Detection of irregular phonological structure and difference in lexical status
- BUT more cognitive effort/less inhibition during processing of lexical properties (P200 ↑)!

CONCLUDING REMARKS

The paradigms seem to be sensitive enough for clinical, neurophysiological evaluation of phoneme discrimination and word recognition in acute aphasia

However

Be critical when using the attentive task (P300 potential) because of other influencing cognitive factors!

REFERENCES


MATERIALS AND METHOD

Patient group
10 patients: 5 men/5 women
Mean age: 69.4 jaar (+/- 3.46)
< 2 weeks post-stroke = acute stage!

Norm group [3]
44 subjects: 20 men/24 women
Equivalent mean age: (p = 0.783)

Behavioural testing
AAT (only patients)
PALPA (subtests phonological input)

Neurophysiological testing
Electroencephalogram (EEG) recorded through 23 electrodes
international 10-20 system
Phoneme discrimination based on 3 distinctive features (place, manner, voicing)
6 oddball paradigms (3 distinctive features, pre-attentive and attentive condition)
Word recognition based on RW – PW contrast
1 oddball paradigm (passive)

Analysis (BrainVision Analyzer)
Filter 0.5-30 Hz → ICA → segmentation → artefact rejection → averaging stimuli → ERP

REFERENCES