Korelacja zmian w funkcjonowaniu słuchowo-verbalnym pacjentów po wszczepieniu implantu ślimakowego z ich oceną w badaniu pozytonowej emisyjnej tomografii i komputerowej (PET)
Correlation of auditory-verbal skills in patients with cochlear implants and their evaluation in Positone Emission Tomography (PET)

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SUMMARY
Introduction: An assumption was taken that in central nervous system (CNS) in patients above 15 years of age there are possible mechanisms of neuronal changes. Those changes allow for reconstruction or formation of natural activation pattern of appropriate brain structures responsible for auditory speech processing.
Aim: The aim of the study was to observe if there are any dynamic functional changes in central nervous system and their correlation to the auditory-verbal skills of the patients.
Material and methods: Nine right-handed patients between 15 and 36 years of age were examined, 6 females and 3 males. All of them were treated with cochlear implantation and are in frequent follow-up in the Department of Otolaryngology at the Medical University of Warsaw due to profound sensorineural hearing loss. In present study the patients were examined within 24 hours after the first fitting of the speech processor of the cochlear implant, and 1 and 2 years subsequently. Combination of performed examinations consisted of: positone emission tomography of the brain, and audiological tests including speech assessment. In the group of patients 4 were postlingually deaf, and 5 were prelingually deaf.
Results: Postlingually deaf patients achieved great improvement of hearing and speech understanding. In their first PET examination very intensive activation of visual cortex V1 and V2 (BA17 and 18) was observed. There was no significant activation in the dominant (left) hemisphere of the brain. In PET examination performed 1 and 2 years after the cochlear implantation no more V1 and V2 activation region was observed. Instead particular regions of the left hemisphere got activated. In prelingually deaf patients no significant changes in central nervous system were noticeable neither in PET nor in speech assessment, although their hearing possibilities improved.
Conclusions: Positive correlation was observed between the level of speech understanding, linguistic skills and the activation of appropriate areas of the left hemisphere of the brain in postlingually deaf patients treated with cochlear implants. No such correlation was noted in prelingually patients treated with the same method.
Hasła indeksowe: implant ślimakowy, neuroplastyczność, pozytonowa emisyjna tomografia komputerowa, głęboki niedosłuch odbiorczy, głuchota prelingwaldna, głuchota postlingwaldna
Key words: cochlear implant, neuroplasticity, positone emission tomography, profound sensorineural hearing loss, prelingual deafness, postlingual deafness