Presurgical language mapping: What are we testing?

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Abstract

Gliomas are brain tumors infiltrating healthy cortical and subcortical areas that may host cognitive functions like language. The patient might develop word retrieval or articulation problems if these areas are damaged during surgery. For this reason, many glioma patients are operated on awake while their language functions are tested. For this practice, simple tests are used, such as picture naming. In this presentation, the process of picture naming (noun retrieval) will be described, and the timeline and localization of the distinguished stages are shown, from activation of the concept, via the retrieval of the word to the planning and execution of articulation. This information can guide the neurosurgeon and the clinical linguist in choosing the language tests during the operation. A novel technique to localize the language areas in a brain tumor patient allows the neurosurgeon to acquire the relevant information surgically. With navigated Magnetic Stimulation (nTMS), the function of small cortical areas can be inhibited very shortly, allowing the identification of the areas involved in the language production process. Thus, nTMS can guide the neurosurgeon in approaching and removing the tumor. It will be argued that nouns and verbs should be tested since sentences are built around verbs, and sentences are what we use in daily life. Two case studies of glioma patients illustrate this approach's relevance.

Keywords: Word production, Presurgical language testing, Nouns vs. verbs

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