Left inferior parietal lobule surgery

Surgery in the left dominant inferior parietal lobule (IPL) is challenging because of a high density of somatosensory and language structures, both in the cortex and white matter.

Cortical stimulation data showed that the inferior parietal lobule and the intraparietal sulcus were specifically related to calculation in all cases, regardless of the side (100% of cases, in both sides) ¹.

Case series

Fourteen consecutive patients underwent awake craniotomy for a left inferior parietal lobule glioma. Intraoperative motor, sensory, and language mapping was performed before and during the tumor removal, at both the cortical and subcortical levels, to optimize the extent of resection, which was determined based on functional boundaries. Anatomofunctional correlations were performed by combining the results of intraoperative mapping and those provided by pre- and postoperative MR imaging.

At the cortical level, the primary somatosensory area (retrocentral gyrus) limited the resection anteriorly in all cases, at least partially. Less frequently, speech arrest or articulatory problems were observed within the parietal operculum (4 cases). The lateral limit was determined by language sites that were variably distributed. Anomia was the most frequent response (9 cases) at the posterior third of the superior (and/or middle) temporal gyrus. Posteriorly, less reproducible reorganized language sites were seldom observed in the posterior portion of the angular gyrus (2 cases). At the subcortical level, in addition to somatosensory responses due to stimulation of the thalamocortical pathways, articulatory disturbances were induced by stimulation of white matter in the anterior and lateral part of the sugrical cavity (11 cases). This tract anatomically corresponds to the horizontal portion of the lateral segment of the superior longitudinal fascicle (SLF III). Deeper and superiorly, phonemic paraphasia was the main language disturbance (12 cases), elicited by stimulation of the posterosuperior portion of the arcuate fascicle. All these eloquent structures were surgically preserved. Despite slight cognitive disorders (working memory, writing, or calculation) in 6 cases, no patient retained a severe or a moderate postoperative deficit (except one with right hemianopia [mean follow-up 41.8 months]). Resection was total or near total in 9 patients and partial in 3 cases.

To the authors' knowledge, this is the first series dedicated to the surgery of gliomas involving the left IPL. Interestingly, a certain degree of interindividual variability was observed in the distribution of the cortical maps, especially for language. Therefore, it is suggested that no rigid pattern of resection can be considered within the left IPL, and that surgery in this region should be performed in awake patients to adapt the tumor removal to individual functional limits. Nonetheless, several landmarks have been regularly identified, especially at the subcortical levels (SLF III and arcuate fascicle); a better knowledge of these functional tracts could be helpful to optimize functional outcomes².

1)

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