Pyramid and Palm Tree Test

Awake craniotomy pursues a balance between extensive tumor resection and preservation of postoperative language function. A dilemma exists in patients whose tumor resection is restricted due to signs of language dysfunction observed during awake craniotomy. In order to determine the degree to which recovery of language function caused by tumor resection can be achieved by spontaneous neuroplasticity, the change in postoperative language function was compared to quantified intraoperative linguistic performance.

METHODS: The modified, short-form Boston Diagnostic Aphasia Examination (sfBDAE) was used to assess pre- and postoperative language functions; visual object naming (DO 80) and semantic-association (Pyramid and Palm Tree Test, PPTT) tests assessed intraoperative linguistic performance. DO 80 and PPTT were performed alternatively during subcortical functional monitoring while performing tumor resection and sfBDAE was assessed 1-week postoperatively.

RESULTS: Most patients with observed language impairment during awake surgery showed improved language function postoperatively. Both intraoperative DO 80 and PPTT showed significant correlation to postoperative sfBDAE domain scores (p < 0.05), with a higher correlation observed with PPTT. A linear regression model showed that only PPTT predicted the postoperative sfBDAE domain scores with the adjusted R2 ranging from 0.51 to 0.89 (all p < 0.01). Receiver operating characteristic analysis showed a cutoff value of PPTT that yielded a sensitivity of 80% and specificity of 100%.

CONCLUSION: PPTT may be a feasible tool for intraoperative linguistic evaluation that can predict postoperative language outcomes. Further studies are needed to determine the extent of tumor resection that optimizes the postoperative language following neuroplasticity ¹⁾.

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Chang WH, Pei YC, Wei KC, Chao YP, Chen MH, Yeh HA, Jaw FS, Chen PY. Intraoperative linguistic performance during awake brain surgery predicts postoperative linguistic deficits. J Neurooncol. 2018 Apr 10. doi: 10.1007/s11060-018-2863-z. [Epub ahead of print] PubMed PMID: 29637508.

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