

Comparison of Language Cortex Reorganization Between Cerebral Arteriovenous Malformations and Gliomas: A Functional Magnetic Resonance Imaging Study

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Introduction

To demonstrate the difference in language cortex reorganization between cerebral AVMs and gliomas by blood oxygen level-dependent (BOLD) functional magnetic resonance (fMR) imaging evaluation..

Methods

We retrospectively reviewed clinical and imaging data of 63 patients with unruptured cerebral AVMs (AVM Group) and 38 patients with gliomas (Glioma Group) who underwent fMR imaging studies. All patients were right-handed and all lesions were located in the left cerebral hemisphere. Patients were further categorized into subgroups according to lesion locations: BA Subgroup: overlying or adjacent to the inferior frontal or middle frontal gyri (Broca area); WA Subgroup: overlying or adjacent to supramarginal, angular, or superior temporal gyri (Wernicke area).

Results

In AVM Group, right-sided lateralization of BOLD signal activations was observed in 23 patients (36.5%) In the 29 patients of AVM-WA Subgroup, 2 (6.9%) had right lateralization of Broca area and 13 (44.8%) had right lateralization of Wernicke area. In Glioma Group, 6 patients (15.8%) showed right lateralization of Wernicke area. No patient showed right-sided lateralization of Broca area. Moreover, although the incidence of right-sided lateralization is higher in low grade gliomas (5 in 26, 19.2%) than in high grade gliomas (1 in 12, 8.3%), no significant difference was detected between them ($p=0.643$). Compared with AVM Group, the incidence of aphasia is significantly higher ($p<0.001$) and right lateralization of language areas is significantly rarer ($p=0.026$) in Glioma Group.

Conclusions

The potential of reorganization for glioma patients appears to be insufficient compared with AVM patients, suggested by both clinical manifestations and fMR imaging findings. Moreover, our study seems to support that in AVM patients, the nidus near Broca area mainly lead to right-sided lateralization of Broca area, and nidus near Wernicke area mainly lead to right-sided lateralization of Wernicke area.

Learning Objectives

To demonstrate the difference in language cortex reorganization between cerebral AVMs and gliomas by blood oxygen level-dependent (BOLD) functional magnetic resonance (fMR) imaging evaluation.

References

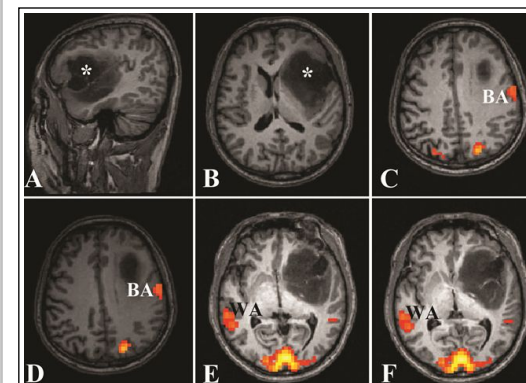


table 2

Groups		Number of patients with right lateralization of BOLD signal activations			
		Broca area alone	Wernicke area alone	Both Broca and Wernicke areas	None
AVM Group (n=63)	BA Subgroup (n=34)	6	1	3	24
	WA Subgroup (n=29)	0	11	2	16
Glioma Group (n=38)	BA Subgroup (n=24)	0	2	0	22
	WA Subgroup (n=14)	0	4	0	10
Total (n=101)		6	18	5	72