

(fMRI) : fMRI 5 (2 , , ,
1) 7 . fMRI 1.5T
MR BOLD . PC
SPM : , , -

가 . 가

fMRI

(functional magnetic resonance imaging; fMRI) (functional brain mapping) 가

. fMRI 가 para -
BOLD(blood oxygen level dependent) digm

deoxyhemoglobin fMRI . fMRI
(1, 2). fMRI , , 가
, 가 (3-20).

가 5 7 2 (
(21-27). 1) ,
Wada 1 .

(intraoperative invasive cortical mapping) 가 fMRI가
가 fMRI 가
(28-31). , fMRI 가
(homunculi) 가

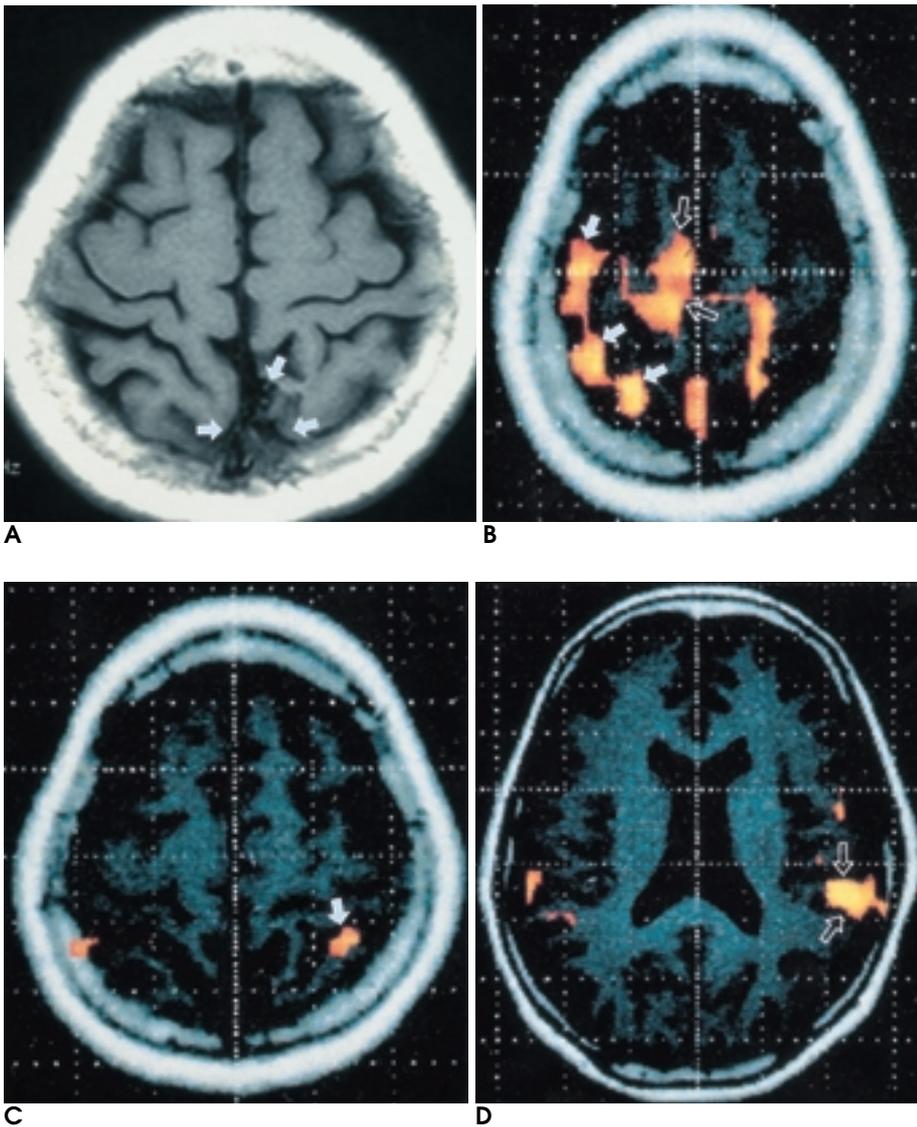


Fig. 3. Functional MR images of the patients with arteriovenous malformation in left fronto-parietal lobe during motor and sensory stimuli.

A. T1-weighted MR image shows vascular lesion with dilated signal voids and nidus representing heterogeneous low signals in left parietal lobe (arrows).

B. Activation map images during motor stimuli of right foot show strong signals in right primary sensori-motor area (arrows) and supplementary motor area (blank arrows). A weak signal is seen in left area.

C, D. Activation map images during sensory stimuli of right foot shows displaced and weakly activated signals in left primary sensory-motor area (arrow). There are also strong signals in left posterior temporal lobe (blank arrows).

(1). , (neural activity) 가 가가 deoxyhemoglobin Deoxyhemoglobin (paramagnetic) T2 deoxyhemoglobin 가 가 MR 가 MR MR (image fMRI BOLD EPI . fMRI postprocessing) 가 BOLD deoxyhemoglobin

fMRI가 가 , ,
 fMRI - ,
 (central sulcus)
 , MR 가 ,
 가 72 - 75%, 가 25 - 27% 가
 75% 25%
 (5, 18, 21).
 fMRI 가
 가 fMRI (21 - 26).
 가 fMRI
 가 가
 가 가
 Yoshiura (25) 가 가
 가 (compensatory reorganization)
 가 가 가
 (25, 26). 가
 가 가 2
 가 (15).
 가
 , fMRI가 가
 가 fMRI

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Functional MR Imaging Using Sensory and Motor Task in Brain Tumors and Other Focal Cerebral Lesions¹

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Purpose: To determine the usefulness of the functional MRI (fMRI) using motor and sensory stimuli in patients with brain tumors or focal cerebral lesions.

Materials and Methods: This study involved five patients with brain tumors ($n=2$) or cerebral lesions [cysticercosis ($n=1$), arteriovenous malformation ($n=1$), focal infarction ($n=1$)] and seven normal controls. For MR examinations a 1.5T scanner was used, and during motor or sensory stimulation, the EPI BOLD technique was employed. For image postprocessing an SPM program was utilized.

Results: In volunteers, contralateral sensori-motor cortices were activated by both motor and sensory stimuli, while supplementary motor cortices were activated by motor stimuli and other sensory cortices by sensory stimuli. Preoperative evaluation of the relationship between lesions and important sensory and motor areas was possible, and subsequent surgery was thus successful, involving no severe complications. Activation of ipsilateral or other areas occurred in patients with destruction of a major sensory and/or motor area, suggesting compensatory reorganization.

Conclusion: fMRI could be a useful supportive method for determining the best approach to surgery treatment in patients with brain tumors or focal cerebral lesions.

Index words : Brain, blood flow
Brain, function
Brain, MR
Magnetic resonance(MR), vascular study

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