

# DOES AN ALTERED PATTERN OF CORTICAL ACTIVATIONS IN PATIENTS AT PRESENTATION WITH CLINICALLY ISOLATED SYNDROMES SUGGESTIVE OF MS CONTRIBUTE TO THE PREDICTION OF AN EVOLUTION TO CLINICALLY DEFINITE MS?

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## Introduction

In a previous study<sup>1</sup>, we have shown an altered pattern of movement-associated cortical activations in patients presenting with clinically isolated syndromes (CIS) of the central nervous system (CNS) highly suggestive of multiple sclerosis (MS), when compared to healthy volunteers, thus suggesting that cortical plasticity is a rather early phenomenon in the course of MS. In order to assess whether this altered pattern of cortical reorganization might contribute to the prediction of the evolution of CIS patients to definite MS, we followed up these patients for one year and compared the movement-associated pattern of cortical activations, at disease onset, between patients with and those without disease evolution.

## Patients and methods

We studied 16 right-handed patients at presentation with CIS suggestive of MS and paraclinical evidence of dissemination in space<sup>2</sup> (F/M=10/6, mean age=31.7 years, 12 patients had an EDSS score of 0.0, and four had residual visual deficits, which resulted in an EDSS score of 1.0), and 15 sex- and age-matched healthy volunteers. Functional MR images, during the performance of a simple motor task with the dominant right upper-limb, were acquired using a T2\*-weighted EPI sequence at baseline. A dual-echo turbo spin echo (TSE) and a post-contrast T1-weighted sequences were also acquired when fMRI was obtained and after one year (mean follow up duration=12 months, SD=1 month). Patients were also evaluated clinically at baseline and follow up. FMRI data were analyzed using SPM99.<sup>3</sup>

## Results

During the follow-up, 11 patients evolved to MS. This was demonstrated by MRI alone in 8 patients, and by MRI plus a second clinical episode in 3 patients.<sup>2</sup> The remaining 5 patients did not show any clinical or MRI evolution (4 of them had had as presenting symptom an optic neuritis, whereas the remaining patient had had a trigeminal neuralgia).

Compared to healthy volunteers and to patients with disease evolution, CIS patients with no evolution had increased activations of the contralateral primary sensorimotor cortex (SMC), supplementary motor area (SMA), inferior frontal gyrus (IFG), and ipsilateral cerebellar hemisphere. Compared to healthy volunteers and to patients without disease evolution, CIS patients with disease evolution to MS had increased activations of the superior frontal sulcus, bilaterally, the intraparietal sulcus, bilaterally, the thalamus and basal ganglia, bilaterally.

## Conclusions

This study demonstrates that, in patients at presentation with CIS suggestive of MS, the assessment of the brain pattern of cortical activations should be considered among the factors predicting the subsequent disease evolution. An activation of the regions classically involved in the execution of a given task seems to be a favourable prognostic factor, whereas a widespread recruitment of additional areas seems to be associated with a subsequent short-term disease evolution.

## References

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- 3) Friston KJ, Holmes AP, Poline JB, et al. *Neuroimage* 2, 45-53, 1995.