Cortical function in the persistent vegetative state

Nicholas D. Schiff and Fred Plum

The recent article by Menon and colleagues might represent the first functional brain imaging of recovery of awareness identified in such a condition. Menon et al., using clinically diagnosed women in a persistent vegetative state (PVS) whose right occipito-temporal regions demonstrated functional activity induced by visual stimuli, have led to a significant subtraction image? Is the response due solely to injury or is it a response to the soothing sounds to be the random expression of prosodic processing in a remnant circuit linking the cortico-cortical connections of the temporal–parietal–occipital junction with prefrontal cortex seen in Fig. 1. The capacity to activate the cortical processing, however, must depend equally on the relative integrity of the related basal ganglia–thalamocortical loops of the right hemisphere. In this patient, auditory evoked MEG responses existed only in the right hemisphere and localized to Heschl’s gyrus, thereby indicating the unilateral preservation of a thalamocortical relay. We conclude that the presence of such an isolated processing module in this patient and the others we have studied may persist indefinitely as the disused brain atrophy, cannot be taken for granted and should be approached with caution. Among the many questions generated by identifying preserved functional modules in the vegetative state, the
Response from Menon, Owen and Pickard

We thank Schiff and Plum for their lucid commentary on our article. They raise a number of important issues regarding the putative role of functional neuroimaging in the detection of covert cognitive processing in patients diagnosed as being in a persistent vegetative state (PVS).

Despite converging agreement about the definition of PVS, recent reports have raised concerns regarding the accuracy of this diagnosis in some patients, and the extent to which, in some cases, residual cognitive functions might remain undetected.

While the investigation of such patients using resting blood flow and glucose metabolism as markers of neural capacity (or its potential) is important, establishing that such activation is related to the presence of residual cognitive function is of greater significance. Objective assessment of residual cognitive function can be extremely difficult because motor responses can be minimal, inconsistent, and difficult to document in many patients, or undetectable in others because no cognitive output is possible. In the absence of such output, functional neuroimaging, particularly with positron emission tomography (PET), cannot provide the definitive evidence needed to make an accurate diagnosis.

References