mostly on Alzheimer's disease and also using the Neuropsychiatric Inventory, enables interesting parallels to be drawn between the respective study findings. The behavioural patterns associated with Parkinson's disease seem to differ from those in Alzheimer's disease, underscoring the notion that disparities in underlying pathophysiology drive distinctive clinical neuropsychiatric syndromes. We are in the nascent phases of comprehending these relationships, and high-quality, informative, long-term quantitative surveys and clinical trials of the neuropsychiatric aspects of Parkinson's disease are warranted. Clinical trials are particularly important, as the drugs used to treat the psychiatric aspects of Parkinson's disease often adversely interfere with the management of the motor aspects, leaving the clinician flailing in the midst of the "motion-emotion conundrum".⁶

The findings presented by Aarsland *et al* have implications for the understanding and appreciation of the neuropsychiatric agents of Parkinson's disease. This is highlighted in a recent editorial on care

of patients with Parkinson's disease, where mental health professionals were not specifically mentioned.⁷ Furthermore, the recent publication of the UK's National Institute of Health and Clinical Excellence guidelines on the management of Parkinson's disease accentuated the dearth of reliable evidence in the treatment of mental health aspects. Arguments for the improvement of mental health services and more neuropsychiatric research on people with Parkinson's disease can be made and, as a resultant uplift in service provision, will benefit both patients and their carers.

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Bias of space representations

Investigating the bias of space representations in patients with stroke

M Rousseaux, J Honoré

Can mis-orientation of spatial representation re-orient management of patients with stroke?

The analysis of spatial representation biases in patients with hemispheric stroke is the subject of two articles in this issue of the *Journal of Neurology, Neurosurgery and Psychiatry*. This confirms the growing interest for this topic, because it provides data about the brain coding of spatial information and contributes to explaining the behaviour of patients in clinical situations.

In the elaboration of the representation of the egocentred space, it has been suggested that the reference frame constituted by the medial body axis has a strategic influence on the perceptive motor actions in the peripersonal space.¹ The first bias of the representation of this reference was reported in patients with right hemispheric lesions and spatial neglect, and was found in the left-right

dimension (lateral) in relation to the head and body positions. Indeed, the assessment of the subjective straight ahead (SSA), obtained by pointing the index finger or by rod adjustment in front of the medial part of the body and in darkness, showed a deviation ipsilateral to the lesion.^{2–3} But now, the main question is to determine whether these patients also show biases in the other dimensions of the tri-dimensional space. In this issue, Barra *et al*⁴ (see p 43) have shown a contralateral tilt of the representation of the medial body axis in the sagittal plane. Importantly, this deviation was similar when using a visuoverbal or a visuohaptic task, which ruled out the role of an ocular cyclotorsion. In addition, the deviation was more frequent in right hemispheric lesions centred on the

frontoparietal cortex, and it strongly correlated with the severity of spatial neglect, sensory loss and postural disorders. This result provides new evidence for the multidimensional coding of spatial representations by the right hemisphere.

A complementary problem is to determine the relationship of the contralateral tilt with the ipsilateral SSA deviation, because the two phenomena are based on the same representation of the medial body axis. In a recent study,⁵ we showed that the representation of the body axis was at the same time deviated towards the ipsilateral side and tilted contralaterally, especially in patients with spatial neglect. Thus, the classical ipsilateral SSA deviation showed a rostrocaudal gradient. This conception of a pluridimensional misorientation of spatial references can explain some clinical disturbances such as the inclination of writing and the more severe omission rate in the lower or near part of the sheet of paper in cancellation tests.⁶

The subjective visual vertical (SVV) is of a different quality, and is considered to be an allocentric representation. The study by Bonan *et al*⁷ (see p 49) confirms the counterclockwise deviation of the SVV and its predominance in patients with neglect and temporoparietal lesions, which are now well-established facts, but the main interest of that study lies in the fact that the severity of the contralateral

tilt and especially the uncertainty in the SVV estimate strongly correlated with the late (6 months) evaluations of balance and patient dependence. This represents the first demonstration of such a predictability.

In conclusion, investigating the deviation of the representations of the body axis and visual vertical is not only of theoretical interest. These measures are also useful in the clinical management of patients with stroke, especially in implementing the most suitable techniques of posture rehabilitation. We strongly suggest their more systematic introduction in a neurological rehabilitation setting.

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ECHO

Risk factors may hold clues to reducing deficits from malaria

Please visit the *Journal of Neurology, Neurosurgery, and Psychiatry* website [www.jnnp.com] for a link to the full text of these articles.

Treatments to reduce long term neurological and cognitive harms arising from cerebral *Plasmodium falciparum* malaria in children may become a reality, thanks to ongoing work to identify underlying risk factors.

Recently more risk factors have been identified, among them history of previous seizures, exposure up to age 3 years, severe malnutrition, multiple seizures, focal neurological signs or signs of raised intracranial pressure, and extended coma. Different combinations of these seem to be significantly linked to particular impairments—in motor function; speech and language; and other cognitive functions like memory, attention, and non-verbal function—despite some overlaps. This suggests that specific impairments may have different pathogenetic mechanisms, affording potential clues to preventive treatments or interventions for rehabilitation. Among the children studied 34 (24%) who had had been exposed to cerebral malaria and 18 (10%) of those not exposed had one impairment or more 20 months later or more. The relative risks of impairments were 1.7–5 times higher for the exposed children.

The findings are an extension of a larger initial prospective study centred on the sole hospital in a coastal district of Kenya. Impairments were assessed in a cohort of 143 children aged 6–9 years identified from the hospital records as previously exposed to cerebral malaria and a random sample of 179 unexposed children in the same area.

In the initial study cerebral malaria predicted persistent neurological or cognitive impairments in almost a quarter of the survivors some nine years later. Then, commentators speculated whether their incidence might be reduced with some form of neurological protection during infection. Now, it seems it might.

Two billion a people year worldwide are exposed to *P falciparum* malaria, and the potential risk to children of cerebral malaria and its adverse educational and social consequences is huge.

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