



The PSP Association's International Medical Workshop 7th July 2009

ABSTRACT

Title of Talk: Imaging to Help Diagnosis of PSP

Part 1: Speaker(s) details	
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Part 2: Abstract (Maximum 400 words) Please make your abstract easy to understand as it will appear on our website and will be read by people with PSP and their carers who are not scientists but who will want to understand your work and what it means for them.

Currently there are no reliable biomarkers (tests which help make a diagnosis or measure the severity of the disease) for PSP. With the ability of MRI to examine the brain during life hopes have been high that we will be able to detect abnormalities specific for PSP on MRI scans. Not only would this aid in making a diagnosis, but also enable monitoring of the progression of the illness: it would be an invaluable tool particularly once disease modifying treatments become available as their effect on MRI changes could be assessed.

There is an ever-expanding literature on MRI in PSP and other diseases with which cases of PSP may be clinically misdiagnosed. Over 35 abnormalities have been described on conventional MRI scans. PSP and other similar diseases affect specific regions of the brain, which 'atrophy' (shrink). In PSP the most specific finding on MRI is midbrain atrophy. This may be seen on MR images as the silhouette of a penguin or hummingbird, or the profile of a morning glory flower or the '*Mickey Mouse sign*'. When these signs are seen on the MRI scan it is likely that the diagnosis is PSP; however, these features are present in at most two thirds of cases of PSP and this may be a late sign some years into the illness. Further studies have examined objective measurements of the midbrain and found that these may help disentangle the diagnosis more accurately than visual assessment alone.

Two research techniques have shown promise in measuring the progression of the disease to date: Volumetric MRI and Diffusion Tensor MRI. By comparing 'volumetric' images in the same patient over time, the rate of atrophy in PSP is the greatest in the midbrain when compared to other illnesses. There is potential for using this measure in clinical trials of new treatments. Diffusion tensor imaging allows assessment of the brain structure before atrophy of the brain has occurred. In multiple system atrophy (MSA - another disease similar in some aspects to PSP) this has been used to show changes in a specific brain region (the putamen which is known to be affected in MSA), when conventional MRI scans look normal; in addition, the changes progress with time in accordance with the progression of the illness. Although such changes have not yet been seen in PSP this technique looks promising. Various other MRI techniques have also shown promise in this field ('magnetization transfer imaging', 'inversion recovery' and 'MRI relaxometry').

Currently MRI in PSP has a supportive role in making a diagnosis of PSP and excluding other diagnoses such as vascular disease. Limitations of the currently published studies include a paucity of imaging studies early in the disease, exclusion of unusual presentations of PSP, the lack of post-mortem confirmation of diagnosis, and difficulties of comparing findings of advanced MRI techniques between different sites.