attributed to the excitation of a predominantly crossed occipitopretectal tract.[3] Cogan stated that "removal of the pupillo-constrictor zone in one occiput of the cat results in anisocoria with the larger pupil on the opposite side".[4] This finding presumably explains the unilateral pupillary dilatation reported here as a negative ictal phenomenon.

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## Glial cytoplasmic inclusions are not exclusive to multiple system atrophy

In 1989 Papp *et al*[1] reported finding argyrophilic inclusions in the cytoplasm of oligodendrocytes in cases of multiple system atrophy, and their presence in the sporadic form of this condition has since been confirmed.[2] The value of glial cytoplasmic inclusions as a diagnostic hallmark of multiple system atrophy has been emphasised by one of the authors[3] as well as by others.[2]

At the UK Parkinson's Disease Society Brain Bank in London, tissue is donated by patients with principally movement disorders. Glial cytoplasmic inclusions occurred in all brains from patients with multiple system atrophy (total 56); however, in three of seven cases with a pathological diagnosis of corticobasal degeneration and two of 18 cases with Steele-Richardson-Olszewski syndrome similar intracytoplasmic oligodendrocyte inclusions were identified. These were filamentous argyrophilic structures (figure) immunoreactive with tau and ubiquitin antiserum. In corticobasal degeneration they were most numerous in white matter underlying the affected cortex, in the corpus callosum, internal capsule, and in one case, the basis pedunculi; occasional similar inclusions were also identified in the affected cerebral cortex and in the brain stem as well as in cerebellar hemispheric white matter, in the absence of any neuronal abnormalities. In the cases of Steele-Richardson-Olszewski syndrome inclusions were most prominent in cerebellar white matter. We have not counted or mapped the distribution of glial inclusions in our cases, but have the impression that they are less numerous than in multiple system atrophy.

*Frontal hemispheric white matter; corticobasal degeneration with argyrophilic cytoplasmic inclusions in oligodendrocytes (some arrowed); modified Bielschowsky originally × 400.*

These findings have important implications for histological diagnosis and our understanding of disease pathogenesis. There is increasing awareness of overlap between many neurodegenerative conditions, in particular those associated with parkinsonism; thus the Lewy body, Pick body, neurofibrillary tangle, or the glial cytoplasmic inclusion are not exclusive to any of the conditions in which they abound. One explanation may be that neurons and glia have a limited repertoire of responses to a variety of different stimuli, resulting in morphological similarities between clinically distinct neurodegenerative diseases. Alternatively, shared pathogenetic pathways may underlie the cytoskeletal abnormalities seen in these conditions, the exact pattern of pathology being dictated by host factors such as age of exposure and genotype.

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## Is visual neglect body-centric?

One theory of unilateral visual neglect proposes that it results from disruption of representations of space. But what exactly is the nature of the spatial map that is disrupted? Is it retinotopic, head-centric, body-centric, mapped with respect to gravity, or even possibly object centred? Many of those who have been attracted by representational hypotheses have suggested that it may be body-centric. In other words, the hemispace that patients with left sided visual neglect fail to attend to is that to the left of the body sagittal midline.

Evidence in favour of a disruption of body-centric (or socalled egocentric) spatial representation has been presented from measurements of saccadic latency to briefly illuminated targets with the head turned at various angles with respect to the trunk.[1] Furthermore, Heilman and Valenstein have shown that line bisection is more accurate when the task is presented to the right of the body midline.[2] Cancellation tasks are another way of assessing neglect. If left sided visual neglect is body-centric there should be amelioration, or even complete absence, of neglect when the task is performed in the hemispace right of the body midline.

Eight right handed patients presenting acutely with visual neglect were examined. All of them had left sided visual neglect on the day of presentation; some also had left sided hemiplegia or somatosensory loss. None of the patients were considered to have a substantial visual field loss on clinical examination at the bedside. (Assessment of the left half of the visual field was aided by cueing attention, but not gaze, to the left. Patients were asked to fix their gaze on the author and simultaneously encouraged to say whether relatively large objects—for example, flowers—on the left were being moved. Once patients were accustomed to this task, the flowers were held stationary at the edge of the left visual field and patients were asked to keep attending towards the flowers. A hatpin was then used to map visual fields, but patients needed to be reminded constantly to attend to the left. I was eventually able to convince myself that all the patients reported here could see a moving hatpin in each quadrant of the visual field.) All eight patients had CT performed within five days of presentation. Evidence of cortical infarction involving the right parietal cortex, or frontal cortex, or both was found on all of the tomograms (table).

Each patient was asked to perform the cancellation task devised by Weintraub and Mesulam.[3] Patients were first shown the target shape (a circle with eight spokes and a diagonal running through the circle) on a small piece of card. They were then presented with the task, which has 60 such targets disposed among 318 distractor shapes on an A4 sheet of paper. Thirty targets are present in each half of the sheet, so the maximum score is 60. Patients were asked to ring all the targets visible to them. No time limit was imposed.

The task was first presented on a table directly in front of the patients so that in this condition the head and body midlines were aligned. Patients were instructed to let the experimenter know when they thought that they had completed the task. After a short break, the task was presented on the table at 45° right of the body midline. Patients performed the second trial with the head turned 45° to the right and the trunk held still in the original position. The table shows the results of the experiment. As expected, patients cancelled items only on the right half of the cancellation sheet (by contrast with patients with only visual field loss, who are able to cancel targets on both sides of the paper).

The mean cancellation score when head and trunk were aligned was 6·7 (SD 4·7) items; when the head was turned to the right it was 5·9 items (SD = 5·2). There was no significant difference in performance between these two conditions (paired $t = 1·1$, $df = 14$, $p = 0·3$). Thus patients performed just