insonism has been reported; that patient also had pyramidal signs. A further patient exhibited dys- responsive tremor and facial impassivity during recovery from a more typical presentation of pontine myelination with supratentorial eye movements and tetraparesis. Pathological changes in the basal ganglia have been well documented in typical cases of pontine myelination, and it has been suggested that the pontine lesion masks the extra-pontine clinical features. In our case the large lesion in the pons was clinically silent. MRI is clearly the investigation of choice in patients presenting with neurological syndromes associated with hypoponatremia; subclinical or clinically atypical pontine myelination may be more common than is currently realised.

We are grateful to Dr S P Kane for permission to report a patient under his care.

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Visual hallucinations and the cholinergic system in dementia

Cholinergic deficits are associated with various forms of dementia, including Alzheimer's and Parkinson's disease, in which they relate to the degree of cognitive impairment. New findings on the chemical pathology of senile dementia of Lewy body type (SDLT) suggest that particularly extensive cholinergic abnormalities in certain neocortical regions are associated with visual hallucinations. SDLT may thus be the second most common form of dementia in the elderly (after Alzheimer's disease). It is characterised, clinically, by acute presentation with confusion frequently accompanied by hallucinations and, neuropathologically, by the presence of Lewy bodies, particularly in arcuicular areas. The relative absence of neocortical neurofibrillary tangles in SDLT also suggests such patients might be more amenable to transmitter replacement therapy.

In 12 SDLT cases with frozen tissue available for neurochemical analyses, visual hallucinations had been noted in six at presentation and continued throughout the course of the illness. In the remainder this symptom was not recorded. Choline acetyltransferase (ChAT) activities were reduced in both SDLT sub-groups compared with normal levels but were significantly lower in those with hallucinations compared with those without for two of three cortical areas examined (see table). Thus in hallucinating cases ChAT activities in parietal and temporal cortex were reduced by 80–85%, compared with 50–55% in the non hallucinating cases. No other neurochemical or neuropathological parameter so far examined (including dopamine, serotonin, cholinergic receptors, Lewy bodies or plaques) divided the two groups.

The suggestion that extensive ChAT loss in SDLT cases with hallucinations may be related to this clinical feature is supported by psychopharmacological data. Thus, although no patient was receiving any anticholinergic medication at the time they presented, drugs such as scopolamine are known in certain cultural or medical situations to induce hallucinations. Severe degeneration of cholinergic neurons innervating certain cortical areas in demitting disorders such as SDLT may similarly give rise to this symptom. If confirmed, this observation is important in relation to the function of cholinergic innervation of human neocortex (innervation of other areas such as hippocampus being involved in memory) and in relation to selecting suitable cases of dementia for cholinergic therapy (those with hallucinations having a more profound cholinergic defect).


Table. Cortical choline acetyltransferase activities in senile dementia of Lewy body type, mean, SD

<table>
<thead>
<tr>
<th></th>
<th>Parietal</th>
<th>Temporal</th>
<th>Occipital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10,8,5,2</td>
<td>8,7,5,6</td>
<td>11,6,3,4</td>
<td></td>
</tr>
<tr>
<td>SDLT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7)</td>
<td>(11)</td>
<td>(8)</td>
</tr>
<tr>
<td>With</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hallucinations</td>
<td>5,1,2,7</td>
<td>9,2,4,0</td>
<td>(5)</td>
</tr>
<tr>
<td></td>
<td>(2)</td>
<td>(6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,6,1,4</td>
<td>1,5,1,6</td>
<td>6,0,4,2</td>
</tr>
<tr>
<td></td>
<td>(6)</td>
<td>(6)</td>
<td>(4)</td>
</tr>
</tbody>
</table>

*CHAT expressed as nmol/mg protein in Brodmann areas 39 or 40 (parietal), 21 or 22 (temporal) and 17, 18 or 19 (occipital). Case numbers in parentheses.

In parietal and temporal but not occipital cortex, ChAT was significantly different between the two subgroups (p = 0.009 and 0.015, respectively, Mann Whitney U test). The normal and SDLT groups were matched for age and postmortem delay mean (SD) 78 (61), 76 (71) years; 27 (12), 41 (24) and 23 (15) hours, respectively.


Type 1 Arnold-Chiari malformation in a 77 year old woman

Chiari malformations may present in a variety of ways, most commonly between the ages of 20 and 60 years. Onset of symptoms after the seventh decade is distinctly unusual. A 77 year old woman had fallen and was found unconscious by her general practitioner. She was thought to have aspirated. She stopped breathing before reaching hospital but was successfully resuscitated and needed artificial ventilation for a week. As she recovered, frequent choking and aspiration of fluids were noted. On closer questioning she admitted having dysphagia with nasal regurgitation over a two year period. During the previous six months she had become steady and dizzy, with a tendency to fall, and there had been fleeting episodes of diplopia. Some years before she had had bilateral total hip replacement and had experienced several serious falls.

The right hip prosthesis had loosened in a recent fall and she was unable to walk. Her eye movements were full and there was no nystagmus in the primary position. There was down beating nystagmus on downgaze and obliquely down beating nystagmus on lateral gaze to either side. Palatal movement and gag reflexes were absent although pharyngeal sensation and tongue movements were preserved and speech was normal. Fluid aspiration occurred consistently and she was fed through a nasogastric tube. Her limbs were ataxic, but there were no pyramidal features.

A sleep study demonstrated considerable nocturnal hypoxia (SaO2 < 80%). MR imaging showed cerebellar hypoplasia and tonsillar herniation down to the level of the second cervical vertebral body (fig). The medulla was elongated and kinked over the odontoid peg. There was mild associated hydrocephalus. Her foramen magnum was deformed, the dura incised and a fascial graft was inserted. Although there was no change in the physical signs following operation, she was able to swallow fluids normally without choking, aspirating or regurgitating. The nasogastric tube was successfully removed and she was discharged from hospital.


Figure. Sagittal MR image.
Visual hallucinations and the cholinergic system in dementia.

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