Bilateral Perfusion Defect/Hypoperfusion in Temporal and Parietal Regions on Brain SPECT

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THE PATIENT was a 74-year-old man with dementia consistent with Alzheimer's Disease for 8 years. He was provided complete supportive care at a local health and rehabilitation center. The patient underwent Tc-99m ECD brain single photon emission tomography (SPECT) on 4/25/95, surface three-dimensional (3D) display showed multiple perfusion defects in the posterior temporal, parietal, and frontal lobes (Fig 1) compatible with Alzheimer's Disease. The patient's last hospitalization was 7.5 months after the brain SPECT was performed for dysphagia, dehydration, hypokalemia, hypernatremia, and urinary tract infection. He died 8 months after the brain SPECT, and autopsy confirmed the diagnosis of Alzheimer's Disease revealing characteristic neurofibrillary plaques and tangles in quantity sufficient for the pathologic diagnosis.

Surface or volume 3D displays easily delineate the extension of cerebral cortical involvement, the displays view the brain from all angles and enhance and simplify SPECT images interpretation.[1-7] This image interpretation has been applied in stroke patients,[3,8] normal pressure hydrocephalus,[6] noncommunicating hydrocephalus,[7] seizure,[8] depression,[9] and slow progressive apraxia.[10] Compared with baseline brain SPECTs, surface 3D images display an expanded perfusion defect with Diamox[8,10]; the expanded defect represents the areas of failed vasodilatation.[10] Three-dimensional displays can be applied to characteristic perfusion defects of Alzheimer's Disease, such as in our patient. Bilateral posterior cortical defects, a pattern highly predictive of AD, may not be pathognomic for Alzheimer's Disease. Other possibilities of such cortical perfusion defects are listed.

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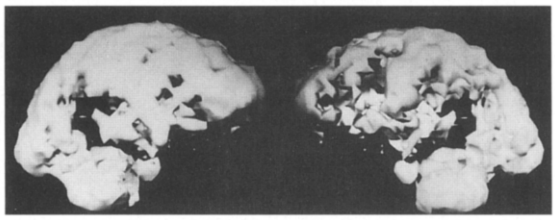

Fig 1. Surface three-dimensional (3D) displays (right lateral view, Lt; left lateral view, right) show multiple perfusion defect in both frontal lobes and posterior temporal lobes, and extending to the parietal lobes; these abnormal defects are worse on the left hemisphere.

COMMON

Alzheimer's Disease[11]
Normal pressure hydrocephalus[6]
Noncommunicating hydrocephalus[7]
Parkinson's Disease[12,13]

UNCOMMON

Hypoglycemia[14]
Carbon monoxide poisoning[13]
Vascular dementia[15]
Mitochondrial encephalopathy[16]
Bilateral parietal subdural hematomas[17]
Bilateral parietal stroke[17]
Bilateral parietal radiation therapy ports[17]

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