Co-occurrence of radiological features of progressive supranuclear palsy and corticobasal degeneration

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We report an interesting case demonstrating co-occurrence of radiological features of progressive supranuclear palsy (PSP) and corticobasal degeneration (CBD). The clinical features were typical of PSP but magnetic resonance imaging (MRI) showed both typical brainstem changes of PSP and an atypical pattern of cortical atrophy. While the MRI had markers of CBD, the clinical features were not classical of CBD.

Key words: Corticobasal degeneration, progressive supranuclear palsy, tauopathies

Progressive supranuclear palsy (PSP) and corticobasal degeneration (CBD) are considered as two different clinicopathological entities. However, the diseases have considerable overlap in their clinical, neuropathological and genetic features.[1] The magnetic resonance imaging (MRI) findings of asymmetric fronto-parietal atrophy in CBD and severe midbrain atrophy in PSP are the most consistent and useful means to differentiate between them during life.[2] We present an unusual case that showed radiological features of both conditions.

Case Report

A 69-year-old right-handed man presented to us with gradual onset of slowness of all movements and abnormal posturing of his right hand and leg for two years. The abnormal postures were flexion at his right wrist and extension of his right big toe while walking. Six months later he started falling backwards. He later developed slurring of speech, pseudo bulbar affect and precipitation of micturition. He gave no history of rest or action tremor, involuntary jerks of limbs, alien hand phenomenon, cognitive decline, ataxia, postural syncope or impotence. He had no psychiatric symptoms. His family history was negative for any neurological illness. He was a diabetic, had coronary artery disease but there was no history of strokes, TIAs or encephalitis. He was treated elsewhere with L-dopa/C-dopa 600 mg daily with insignificant improvement in his symptoms.

His neurological examination showed normal cognitive functions by MMSE and bedside lobe function tests. There was down gaze palsy, slowness of horizontal saccades and sluggish palatal movements with a brisk gag reflex. He had moderate neck rigidity, mild appendicular rigidity (more on the right side), moderate bradykinesia and significant postural instability. There was no rest tremor, apraxia of eyelid opening, blepharospasm, square wave jerks in the eyes, motor apraxia, cortical sensory loss, alien hand phenomenon, myoclonus, cerebellar or pyramidal signs or postural hypotension.

His clinical features favored a diagnosis of “clinically probable PSP” based on NINDS mandatory inclusion criteria.[3] His MRI also showed severe midbrain atrophy with an anteroposterior diameter of 11 mm, thinning of tectal plate and hyperintensities in the periaqueductal grey area [Figure 1], which are characteristic of PSP. Interestingly, his MRI also showed asymmetric left parietal atrophy [Figure 2], which is a radiological NINDS exclusion criterion for PSP but is well known in CBD.[2] There were no infarcts or gliotic regions in the brain. He had no previous CT or MRI study of the brain or MRI study of the brain.

Discussion

Our patient had clinical features that were sufficient to diagnose PSP, consisting of progressive levodopa-unresponsive parkinsonism with vertical supranuclear gaze palsy, prominent postural instability with falls within one year of onset of illness and no evidence of other diseases which could explain these.[3] Asymmetric signs and dystonia which were seen in our patient are known to occur in about 27% of patients with PSP and dystonia.
Progressive supranuclear palsy and CBD are also known to have overlap in their pathological and genetic features. The characteristic microscopic feature of PSP is argyrophilic tau reactive globose neurofibrillary tangles (NFT) and achromatic ballooned neurons in CBD. However, swollen neurons in the cortex are also described in PSP. Neuronal inclusions in CBD can closely resemble globose type NFT of PSP and show tau positivity and basophilia but they are not ubiquitin-positive.[12] Progressive supranuclear palsy and CBD are classified as ‘tauopathies’ and are further linked by the predominance of four repeat (4-R) isoforms in neuronal and glial tau-positive inclusions.[13] Further overlap was shown by identical H1 and H1/H1 tau haplotype in CBD and PSP.[14] The recent report documenting occurrence of CBD and PSP in two individuals in a single family who presented with corticobasal syndrome and had other affected siblings with clinical PSP supports a unifying genetic etiology behind these ‘tauopathies’. [15]

An alternative diagnosis of CBD could also be considered in our patient based on the asymmetry and dystonia. Early falls can occur in those with foot dystonia. Although oculomotor apraxia with normal saccadic velocity is an early eye sign in CBD, eventually, supranuclear gaze palsy indistinguishable from PSP can occur in CBD. Pathologically proven CBD is known to have a phenotype identical to PSP[16] There are no validated criteria to diagnose CBD similar to those for PSP, though a few have been proposed.[6-8] Litvan and colleagues have identified that lateralized motor signs (such as asymmetric parkinsonism, dystonia or myoclonus) and cognitive signs (ideomotor apraxia, aphasia or alien limb phenomenon) may even be a presenting feature of PSP.[4] Our patient also had focal parietal atrophy which is an exclusion criterion for PSP. There were no other causes for focal cortical atrophy in him. Moderate to severe diffuse cortical atrophy is usually seen in MRI in PSP. Focal parietal cortical atrophy has not been reported in MRI in patients with clinically diagnosed PSP though pathologically, parietal cortical volume loss is known in PSP.[5]

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References


