Clinical History:

A 72 years old male presented with over few months history of:
Lateral bending of the trunk, decreased facial expression, depression, sleep and gait disturbances.

Imaging Findings:

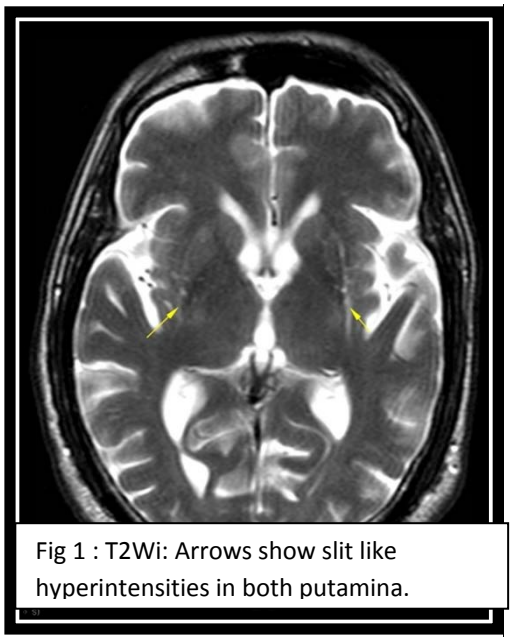

Fig 1 : T2Wi: Arrows show slit like hyperintensities in both putamina.

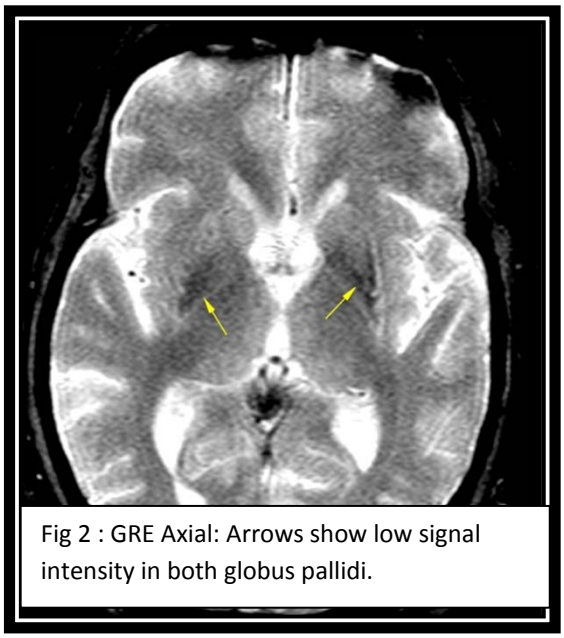

Fig 2 : GRE Axial: Arrows show low signal intensity in both globus pallidi.

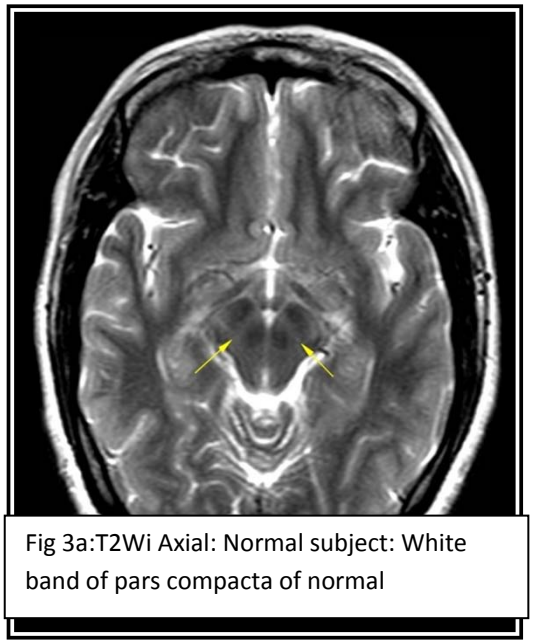

Fig 3a:T2Wi Axial: Normal subject: White band of pars compacta of normal

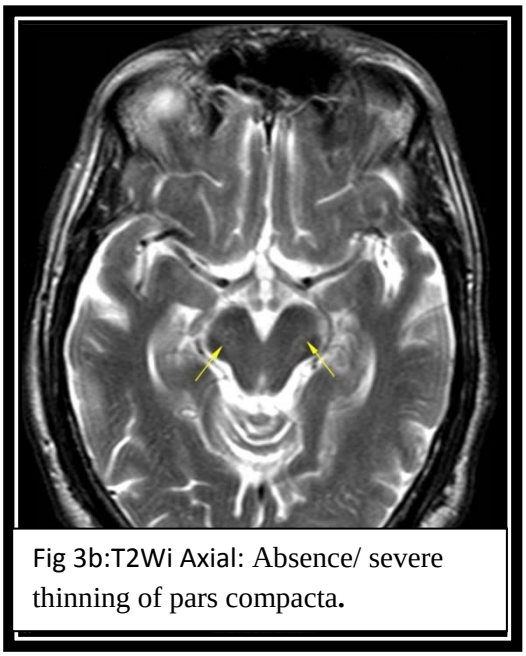

Fig 3b:T2Wi Axial: Absence/ severe thinning of pars compacta.

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Plain MRI findings revealed:

- **Reduction in the volume of both putamina, more on left side. Linear slit-like T2 hyperintensity was seen in lateral part of both putamina which show increased ADC values. (fig 1)**
- **Low signal intensity was noted in both globus pallidi on GRE suggestive of iron deposition. (fig 2).**
- **Absence/ severe thinning of pars compacta on T2W axial images noted bilaterally.(fig 3b)**

- **There was no evidence of abnormal signal intensity in the pontine fibres. No atrophy of brainstem was seen.**

Final Diagnosis: **Parkinson's Disease (PD)**

Discussion:

Definition:

- **Progressive neurodegenerative disease predominantly caused by primary disorder of pars compacta of substantia nigra (SNpc) characterized by rigidity, tremors and bradykinesia.**
- **Major neuropathologic findings: the loss of pigmented dopaminergic neurons in the substantia nigra pars compacta (SNpc) and the presence of Lewy bodies**
- **Idiopathic PD (typically responsive to L-dopa therapy).**
- **"Parkinson-plus" syndrome: Parkinsonism combined with other clinical signs e.g., dementia with Lewy bodies, multiple system atrophy, progressive supranuclear palsy, corticobasal ganglionic disease.**

Etiology :

- **Various genetic markers are under study for increased susceptibility to developing PD**
- **Environmental exposure:possibly pesticide exposure**
- **Aging: Normal aging is associated with decrease of neurons in SNpc**
- **Genetics: Sporadic (10-20% of cases familial)**
- **Associated abnormalities: Increased iron content in SNpc**

Presentation:

- **Most common signs/symptoms: Resting tremors, "cogwheel" rigidity, bradykinesia, shuffling gait, masked fascies and later dementia in 40 %.**
  Other : Autonomic dysfunction, depression, sleep disturbance.
- **Age: Onset typically between 50 to 60 years**
- **Gender: M:F = 1.5:1**
- **Natural History & Prognosis : Onset of PD is typically asymmetric. Slowly progressive course of bradykinesia, rigidity, and gait difficulty → eventual disability after several years**

Imaging: Best diagnostic clue: Narrowing or absence of pars compacta of SNpc on T2WI.

MRI findings : In normal subjects, substantia niagra is 2-layered gray matter structure at upper midbrain level. SNpc narrows in Parkinsons disease and its difficult to distinguish it from pars reticulata of substantia niagra and red nucleus on T2Wi.
T2 hyperintense foci can be seen in putamen and globus pallidus in some PD patients; in addition, volume of putamen is also decreased.
Hypo intensities in basal ganglia on GRE sequences is indicative of abnormal increase in iron deposition in these areas.
DWI shows increased in ADC values in putamen and also in caudate nucleus.

D/D:

- **Multi system atrophy-P (MSA-P):15 to 30% volume decrease in pons and cerebellum. 85 % of cases show prominent T2 hypo intensity in putamen and caudate nucleus. (abnormal iron deposition)**
- **Progressive Supranuclear Palsy (PSP): MR shows midbrain tectal atrophy, atrophy of superior colliculi and high intensity to periaqueductal gray matter.**
- **Corticobasal Degeneration: Thinning of pre / post central gyri + central sulcus dilatation with marked parasagittal involvement.**
- **Dementia with Lewy Bodies: Lewy bodies found diffusely in brain.**

<u>Message:</u>

1. **MR Imaging is indicated as adjunct to narrow down the differential diagnosis and exclude treatable causes of bradykinesia like tumour , hydrocephalus and hematoma.**
2. **Idiopathic Parkinson's disease responds to L-dopa while MSA-P is less responsive to L-dopa and disease progression is rapid, hence diagnosis is important.**
3. **Best diagnostic clue: Narrowing or absence of pars compacta of SNpc on T2WI.**

Regards,

Dr.Deepa S.Nadkarni / Dr.Shaikh M.Mazhar

N.B: This case is authentic and from the archives of Radiance Diagnostics. For any queries / suggestions/feedback write to us at radiance@radiancediagnostics.in