Hemiparkinsonism-Hemiatrophy Syndrome

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INTRODUCTION

- Hemiparkinsonism and hemiatrophy syndrome (HP-HA) is a rare form of parkinsonism first described by Klawans in 1981.
- Some key clinical features differentiates this condition from Parkinson's disease, which include hemiatrophy on the side of hemiparkinsonsim, early age of onset of parkinsonism, frequently associated action induced dystonia, slower progression and variable response to levodopa.
- To date, only two case series have been published consisting of fifteen and eleven patients and few case reports.
- We describe the clinical and radiological features of 30 patients with HP-HA, with a view to further characterizing the spectrum of clinical and radiological manifestations of this rare form of parkinsonism and provide insights into possible pathogenetic mechanisms for this asymmetric neurodegenerative disorder.

METHOD

- Thirty patients with hemiparkinsonism (HP) and ipsilateral hemiatrophy (HA), attending the Movement Disorders Clinic at Baylor College of Medicine between 1982 and 2006, were selected.
- Body atrophy was defined as unilateral loss of body mass observed in two or more regions of the head, face, arm, hand, leg, foot or trunk. The onset of HP-HA was dated to the onset of tremor, slowness, or other parkinsonian features or dystonia as recalled by the patient or a family member.
- A detailed history focused on prenatal and perinatal events were taken and parkinsonian findings were rated by the Unified Parkinson's Disease Rating Scale (UPDRS). Video recordings of all patients were reviewed to confirm the clinical findings and the diagnosis.
- All MRI scans were evaluated and carefully examined for evidence of cerebral hemiatrophy and any other lesion.

RESULTS

- There were 18 female and 12 male patients.
- The mean age at onset of parkinsonism was 44.2 years (15-63 years). The mean duration of disease was 9.7 years (2-20 years).
- Left and right side of the body were equally represented.

Pt No	Side	Hemiatrophy	MRI findings
1	R	ptosis, face, leg	Normal
2	R	face, body	L Enlarged lateral ventricle and cisterns
3	L	hand, leg	Small cystic lesion at the L temporal area and basal ganglia with mild deep white matter change
4	R	face, hand	Normal. mild Arnold-Chiary malformation
5	R	foot, face	Normal
6	R	face, hand	Arachnoid cyst occupying posterior fossa with hypoplasia of the vermis and cerebella hemispheres.
7	R	face, hand, forearm, thigh	Atrophy of L basal ganglia and L basal ganglia infarction
8	R	face, hand	Normal
9	R	hand, foot	Small R lacuna infarct over the R pons
10	L	upper extremity	Normal
11	L	face , leg	R enlarged lateral ventricle
12	L	leg, foot, face, hand	Normal
13	L	hand, foot	Normal
14	L	hand, feet	Foreign body in L middle cranial fossa/temporal lobe
15	R	face, small nails	L sided cortical atrophy with dilated lateral ventricle
16	L	face ,hand	R Enlarged lateral ventricle
17	R	face, hand	L enlarged lateral ventricle
18	L	face, trunk	Normal
19	L	face, hand	R Enlarged lateral ventricle.
20	R	thumb, face	Normal
21	L	leg, foot, face	small vessel disease in L centrum semiovale
22	L	face , body	Persistent cavum septum pellucidum and cavum septum interposition
23	R	hand, foot	Increase T2 lesion in frontal pole of L lateral ventricle
24	L	face, arm	Enlarged R ventricle. Hyperintense lesion in deep parietal region
25	R	face, arm, trunk	Multiple small foci T2 signal in the subcortical and periventricular white matter bilaterally.
26	L	face, hand, foot	Thalamic cyst
27	L	foot, hand, face	Multiple T2 punctate areas of increased signal intensity frontal, parietal lobes
28	R	hand, foot, ptosis	Normal
29	L	face, trunk	Normal
30	R	face, trunk	L dilated lateral ventricle

Table 1 MRI findings and body regions showing asymmetry

- Hemiatrophy was observed in face, arm, hand, leg or feet of varying severity. The degree of hemiatrophy varied from patient to patient, and in the same patient atrophy was not uniform and one body part was affected more than the rest of the body on the same side.
- Twenty one (70%) patients had dystonia during the course of the illness and fifteen (50%) had dystonia as the initial presenting symptom.
- Seven (23%) patients had brisk reflexes on the side of HA. Five had extensor plantar responses. Three patients had Dyskinesia.
- Eleven (36%) patients had scoliosis. Six (20%) patients had a striatal hand and 2 with striatal foot deformity.
- Response to levodopa was rated as good in 18 (60%), moderate in 6(20%) and poor in 6(20%).
- Seven (23%) patients subsequently developed bilateral symptoms after an average of 5.8 years.
- Five patients successfully underwent surgery, thalamotomy in three patients, Vim Deep Brain Stimulation (DBS) in one and Subthalamic Nucleus DBS in one patient.

Figure 1 Twins with HP-HA showing asymmetry of upper extremity and chest.

- Nine of 19 (47.4%) patients in whom birth history was available, had difficult birth or a severe febrile illness in the first few months of life.
- Six (20%) patients had delayed milestones. Three had low IQ requiring special school. Ten (33%) patients had difficulty in walking during early childhood.

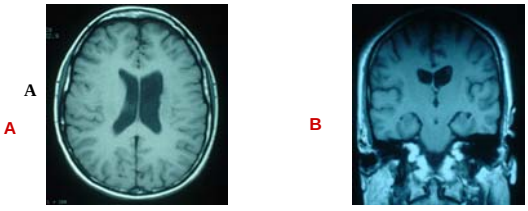

Figure 2 T1-weighted MRI (A) axial film and (B) coronal film showing marked ventricular asymmetry with dilatation of left ventricle.

- MRI findings were heterogeneous (table 1). Nine (30%) patients had evidence of cerebral hemiatrophy suggested by asymmetrical lateral ventricles and loss of volume in the cortex and subcortical areas. Eleven (33%) scans were normal.

DISCUSSION

- In this, the largest reported series of patients with HP-HA, The mean age at onset of parkinsonism were 44.2 years, was similar to the mean age at onset of 43.7 years in a study of 15 patients (Buchman et al., 1988) and 38.1 years in a study of 11 patients (Giladi et al., 1990).
- The presence of cerebral injury at birth or first few years of life, in a significant percentage of patients in our study (50%), supports that HA-HP could be related to the cerebral injury sustained early in life. The presence of delayed milestones, low IQ and limp as a child as well as the pyramidal signs on the side of HP-HA could be related to the cerebral injury which extends beyond the extrapyramidal system.
- The reasons for the observed variable latency from the initial insult to the onset of parkinsonian symptoms (15-63 years in our study) are not clear, but may be related to the variable degree of brain neuroplasticity and dopamine reserve depending on the severity, extent and the type of injury.
- MRI findings were heterogeneous and 30% showed significant cerebral hemiatrophy contralateral to the side of HP and HA.
- Scoliosis and striatal hand and foot deformity were also seen in a significant percentage which were not reported previously.
- A good response to levodopa therapy were seen in 60% of patients and overall 80% responded to levodopa therapy.
- Seven (23%) patients went on to develop bilateral disease over the course of the illness but continued to maintain asymmetric disease, with worst symptoms on the side of HA.
- Studies into the pathogenesis of HP-HA may provide insights not only into this disorder but also into other neurodegenerative disorders. It is possible that a pre- or perinatal event or process predisposes some individuals to start with fewer dopaminergic neurons at the time of birth and with age-related attrition reach the critical threshold when clinical features of dopaminergic deficiency become manifested (Jankovic, 2005; Logroscino et al, 2005).

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