An approach to movement disorders

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Neurology Diagnosis

Two main questions:
• What parts of the nervous system are affected?
• What is the etiology?

Answers based on:
• History
• Clinical examination
• Investigations
History and examination in a movement disorder case

Three points to stress in history:

• **Birth history** - anoxia, peri-natal problems, milestones (delayed onset movement disorders)

• **Family history** - positive, negative and “absent” family history (many movement disorders conditions are inherited)

• **Drug and toxin history**: neuroleptics, antiepileptics, illegal substances, toxins (many movement disorders are drug related)
Special points in examination of a movement disorder case

• Cognition/speech
• Eye movements- saccades and pursuit
  - Vertical gaze palsy and slow saccades in Progressive supranuclear palsy in a parkinsonian patient
  - Difficulty initiating saccades in Huntington’s disease
• Gait: Arm swing, stride-length, freezing, postural reflexes
• Bradykinesia: Repeated finger tapping- decrement and fatiguing, foot tapping
History and examination in a movement disorder case

• Level 1: **Phenomenology** - What is the main category of movement disorder?

• Level 2: **Distribution** of movement disorder, associated signs or features including history (age etc.) to help consider etiology

• Level 3: **Investigations** keeping in mind history and signs to arrive at diagnosis
Phenomenological Classification of Movement Disorders

- Movement Disorders are classified broadly into two main groups:
  - **HYPOKINETIC DISORDERS**: too little movement
    - bradykinesia (slowness of movements)
      (Parkinson’s Disease and other akinetic rigid syndromes)
  - **HYPERKINETIC DISORDERS**: too much movement
    - dyskinesias- (different types of involuntary movements)
Hyperkinetic Disorders

- Five main types:
  - Tremor
  - Tics
  - Chorea
  - Myoclonus
  - Dystonia

Decide which group does the patient best fit
Tremor

- **Definition**: Rhythmic oscillation of a body part.

- Tremors can be classified as:
  - *Rest*: occurs when affected body part is at rest
  - *Postural*: occurs when arms are outstretched
  - *Kinetic*: occurs during movement of body part.
Tremor

Resting tremor:
- Parkinson’s disease and other parkinsonian disorders, dystonic tremor, one component of rubral tremor, severe ET,

Postural:
- Essential tremor, Physiological
- PD, Dystonic tremor etc

Kinetic:
- Cerebellar disorders
Chorea

- **Definition**: Irregular, brief, purposeless movements that flit from one body part to another
Chorea

• Many causes: Acquired and inherited
  - Drugs/ Oral contraceptives
  - Basal ganglia lesions
  - Sydenham’s chorea
  - Antiphospholipid antibody syndrome
  - Huntington’s disease/ HD like diseases
  - Neuroacanthocytosis
Chorea

- 4 main considerations
  - Age of onset
  - Type of onset e.g. acute/subacute/ or chronic and worsening
  - Family history/drug history
  - Distribution of chorea/other clinical features
Tics

• Brief, repetitive and stereotyped movements or vocalisations.

• Tics are usually suppressible for a short period of time, but at the expense of mounting inner tension.

• Very common: 3-4% of the population are affected at some time in their lives, almost always starting in childhood.
Tics

- **Motor:**
  - eye blinking
  - head jerks
  - arm/leg jerks
  - complex sequence

- **Vocal:**
  - sniffing
  - grunting
  - snorting
Gilles de la Tourette Syndrome

• Typically, onset of persistent multiple motor and vocal tics, often with associated psychiatric disturbance [Attention deficit hyperactivity syndrome (ADHD); Obsessive compulsive disorder (OCD); copropraxia; coprolalia]
Myoclonus

- **Definition**: Brief shock-like jerks.

Many causes –

- Physiological,
- Fragment of epilepsy
- Metabolic encephalopathies/ Hypoxia
- Progressive myoclonic ataxia/epilepsy
- SSPE/CJD/other encephalitides
**Dystonia**

- Involuntary muscle spasms leading to abnormal posturing of limbs and writhing movements (athetosis).
- **Primary dystonia**: without any structural damage often inherited
- **Secondary dystonia**: Due to variety of environmental or heredodegenerative causes with structural damage to the CNS
- **Paroxysmal dystonia**: brief episodes of dystonia/dyskinesia
Primary dystonia:

Two main phenotypes depending on age of onset

Young onset: (below 28 yrs)
- lower limb onset
- spreads
- tends to generalise
- cranial-cervical
- less affected/spared
- often familial: DYT1 gene +ve

Prevalence: 3/100,000

Adult onset:
- affects upper body
- focal or segmental
- cranio-cervical most common
- (F>M)
- mostly sporadic
- Non-DYT-1

Prevalence: 8, 33, 58*, and even 732**/100,000
<table>
<thead>
<tr>
<th>Name</th>
<th>Gene</th>
<th>Mode of Inheritance</th>
<th>Clinical Features</th>
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<tbody>
<tr>
<td>DYT 1*</td>
<td>TOR1A</td>
<td>AD</td>
<td>Young-onset primary generalized dystonia</td>
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<td>DYT 2</td>
<td>n.k.</td>
<td>AR</td>
<td>Recessive young-onset primary dystonia</td>
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<td>DYT 3</td>
<td>TAF1</td>
<td>XR</td>
<td>Dystonia-parkinsonism in Filipino males, Lubag</td>
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<td>DYT 4</td>
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<td>AD</td>
<td>Laryngeal dystonia (whispering dysphonia) +/- limb dystonia in a single Australian family</td>
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<tr>
<td>DYT 5 (DRD)</td>
<td>GTPCH1</td>
<td>AD</td>
<td>Young onset dopa-responsive dystonia/parkinsonism</td>
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<tr>
<td>DYT 6*</td>
<td>THAP1</td>
<td>AD</td>
<td>Youngish onset of primary craniocervical and limb dystonia</td>
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<tr>
<td>DYT 7</td>
<td>Linkage to 18p</td>
<td>AD</td>
<td>Single (?) German family with primary craniocervical dystonia</td>
</tr>
<tr>
<td>DYT 8 (PNKD)</td>
<td>MR-1</td>
<td>AD</td>
<td>Paroxysmal non-kinesigenic dystonia and chorea precipitated by coffee, alcohol and fatigue (PNKD)</td>
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<tr>
<td>DYT 9</td>
<td>Linkage to 1p</td>
<td>AD</td>
<td>Paroxysmal chorea and ataxia with progressive interictal spasticity</td>
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<tr>
<td>DYT 10 (PKD)</td>
<td>Linkage to chr. 16</td>
<td>AD</td>
<td>Paroxysmal kinesigenic chorea and dystonia precipitated by sudden movement (PKD)</td>
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<td>DYT 11</td>
<td>Epsilon sarcoglycan gene</td>
<td>AD</td>
<td>Myoclonus and dystonia</td>
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<td>DYT 12</td>
<td>ATP1A3</td>
<td>AD</td>
<td>Rapid onset of dystonia-parkinsonism following infection/exercise</td>
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<td>DYT 13</td>
<td>Linkage to 1p36</td>
<td>AD</td>
<td>Single Italian family with primary cranio-cervical dystonia</td>
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<tr>
<td>DYT 14</td>
<td>Linkage to 14q</td>
<td>n.k.</td>
<td>Dopa-responsive dystonia parkinsonism</td>
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<tr>
<td>DYT 15</td>
<td>Linkage to 18p</td>
<td>AD</td>
<td>Myoclonus and dystonia</td>
</tr>
<tr>
<td>DYT 16</td>
<td>PRKRA</td>
<td>AR</td>
<td>Young-onset torsion dystonia, parkinsonism in some</td>
</tr>
</tbody>
</table>
Other simple facts and points in a movement disorder patient

- Hemidystonia/Hemichorea always rule out contralateral structural cause (basal ganglia lesion etc)
- Remember to exclude treatable causes
Dopa Responsive dystonia

- An inherited condition characterised by early onset dystonia and parkinsonism.
- Responds very well to small doses of levodopa, and response lasts for life.
- Many people with DRD are misdiagnosed as having other conditions e.g cerebral palsy.
- Therefore, levodopa should be considered in all patients with dystonia, particularly those with young onset.
Wilson’s Disease

• An autosomal recessive defect of copper metabolism.
• Causes a variety of movement and psychiatric problems e.g. chorea, dystonia, cerebellar syndromes and parkinsonism.
• Kayser-Fleischer rings are seen, and tests reveal low ceruloplasmin and high plasma and urinary copper.
• Treatable with copper chelating agents such as D-penicillamine.
Test cases

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Clues Suggesting Symptomatic Dystonia:

- Unusual pattern for age of onset
- Rapid progression or early bulbar/pronounced oromandibular involvement
- Fixed rather than mobile spasms
- Hemidystonia
- Intellectual impairment or seizures
- Sensorineural Deafness
- Parkinsonism
- Abnormalities of eye movements, optic atrophy, RP, loss of postural reflexes, Pyramidal signs
Imaging clues

Common causes of bilateral holes in the basal ganglia on MRI:

• Wilson’s disease
• Leigh’s syndrome/
  mitochondrial disorders
• Post anoxic/toxins/acidosis
• Infantile striatal necrosis
• Hemolytic-uremic syndrome

Hemidystonia: contralateral basal ganglia lesion
Other Findings on Imaging

• **Basal ganglia calcification**
  - Hypoparathyroidism
  - Fahr’s disease
  - Mitochondrial disease

• **Brain Iron accumulation disorders**

• **Caudate atrophy**
  - Neuroacanthocytosis
  - Huntington’s disease, HDL2

• **Cerebral atrophy** (variety of degenerative causes)
Experience and knowledge

• Recognise rare conditions or syndromes causing movement disorders