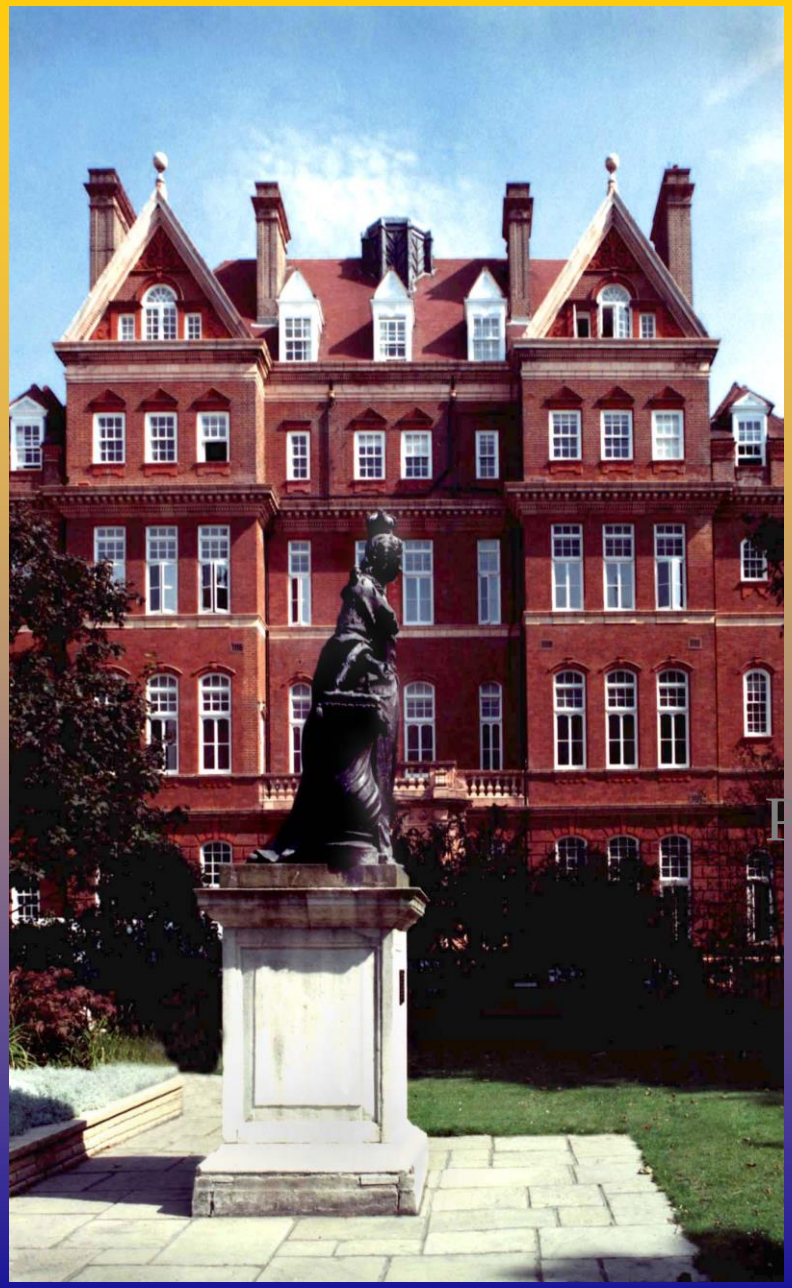

An approach to movement disorders

Kailash Bhatia, DM, FRCP
Professor of Clinical Neurology
Institute of Neurology
Queen Square, London

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).
- P*rimary 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

Dystonia genes

Name	Gene	Mode of Inheritance	Clinical Features
DYT 1*	TOR1A	AD	Young-onset primary generalized dystonia
DYT 2	n.k.	AR	Recessive young-onset primary dystonia
DYT 3	TAF1	XR	Dystonia-parkinsonism in Filipino males, Lubag
DYT4	n.k.	AD	Laryngeal dystonia (whispering dysphonia) +/- limb dystonia in a single Australian family
DYT 5 (DRD)	GTPCH1	AD	Young onset dopa-responsive dystonia/parkinsonism
DYT 6*	THAP1	AD	Youngish onset of primary craniocervical and limb dystonia
DYT 7	Linkage to 18p	AD	Single (?) German family with primary craniocervical dystonia
DYT 8 (PNKD)	MR-1	AD	Paroxysmal non-kinesigenic dystonia and chorea precipitated by coffee, alcohol and fatigue (PNKD)
DYT 9	Linkage to 1p	AD	Paroxysmal chorea and ataxia with progressive interictal spasticity
DYT 10 (PKD)	Linkage to chr. 16	AD	Paroxysmal kinesigenic chorea and dystonia precipitated by sudden movement (PKD)
DYT 11	Epsilon sarcoglycan gene	AD	Myoclonus and dystonia
DYT 12	ATP1A3	AD	Rapid onset of dystonia-parkinsonism following infection/exercise
DYT 13	Linkage to 1p36	AD	Single Italian family with primary cranio-cervical dystonia
DYT 14	Linkage to 14q	n.k.	Dopa-responsive dystonia parkinsonism
DYT15	Linkage to 18p	AD	Myoclonus and dystonia
DYT16	PRKRA	AR	Young-onset torsion dystonia, parkinsonism in some

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

- Level 1: Phenomenology- What is the main category of movement disorder?
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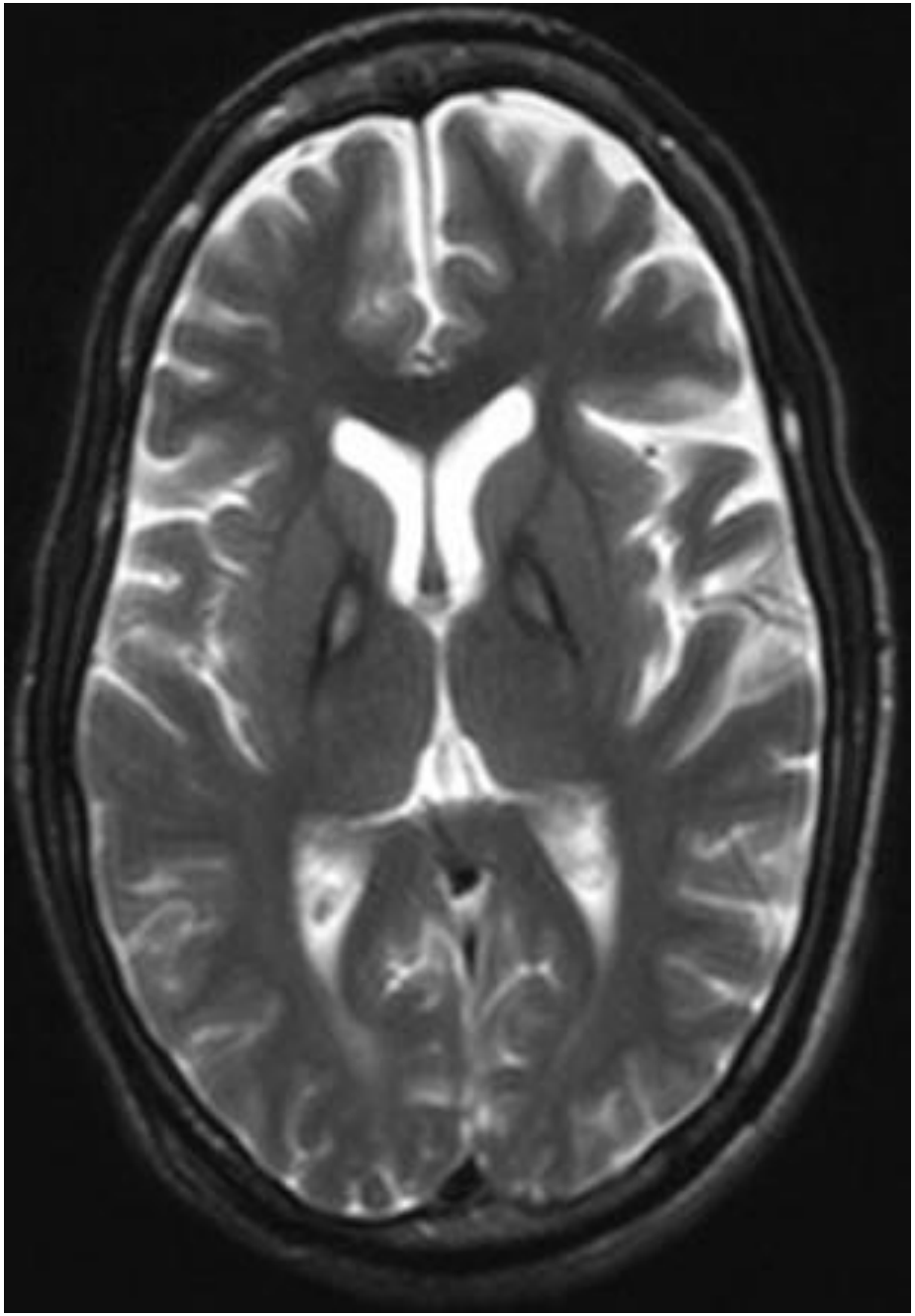
Clues Suggesting Symptomatic Dystonia:

- 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