Common Movement Disorders: Evaluation, Management, & Expectations

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Goals

- Differentiate between types of tremor
- Recognize parkinsonism
- Diagnose and treat common movement disorders
Traditional Classification of Movement Disorders

- **Hypokinetic**
  - Parkinson’s disease (sporadic and genetic)
  - Atypical parkinsonian disorders (parkinsonism plus)
    - PSP, MSA, DLB, CBD, AD, FTD
  - Secondary parkinsonism
    - Drug, vascular, toxic, traumatic, NPH, infection, metabolic, endocrine, hereditary

- **Hyperkinetic**
  - Chorea
  - Hemiballismus
  - Athetosis
  - Dystonia
  - Tremor
  - Tics
  - Stereotypy
  - Ataxia
  - Myoclonus
Protein Aggregate Classification of Movement Disorders

- Pathologic by causative protein aggregate
  - $\alpha$-synuclein
    - Parkinson’s disease
    - Dementia with Lewy bodies
    - Multiple system atrophy
  - Tau protein
    - Progressive supranuclear palsy
    - Corticobasal degeneration
    - Frontotemporal dementia with parkinsonism linked to chromosome 17
    - Alzheimer’s disease
Traditional Classification of Movement Disorders

(PARKinsonISM)

• Hypokinetic
  – Parkinson’s disease (sporadic and genetic)
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Parkinsonism

- Tremor (rest tremor)
- Rigidity
- Akinesia
- Postural instability
Classification of Tremor

- Rest tremor – occurs at rest
- Action tremor – produced by voluntary contraction of muscle
  - Postural tremor – while maintaining a position against gravity
  - Kinetic tremor – occurs during any voluntary movement
    - Simple kinetic tremor – occurs throughout a motion
    - Intention tremor – increased amplitude when reaching the target of a movement (Cerebellar Dz)
  - Isometric tremor – occurs during muscle contraction against a stationary object
Video Examples of Tremor
Video – Rest Hand Tremor

Tip: Rest tremor is accentuated with mental arithmetic and during walking
Video – Rest Hand Tremor

Tip: Rest tremor is accentuated with reversing the months of the year
Video – Rest Hand Tremor EMG

Tip: PD rest tremor is 3-6Hz
Video – Rest Jaw Tremor
Video – Rest Foot Tremor

Tip: Asymmetrically reduced arm swing is a sign of asymmetric bradykinesia
Video – Handwriting Sample of Simple Kinetic Tremor
Video – EMG of Simple Kinetic Tremor
Video – EMG of Simple Kinetic Tremor

Tip: ET action tremor is 6-8Hz
Essential Tremor – Dx & Eval

• Simple Kinetic and Postural Tremor
• Usually a family history
• Better with EToH & rest
• Worse with caffeine, stress, fatigue, illness
• Rule out medication side effect
  – Antidepressants & stimulants
• Check TSH (24hr Cu if young – Wilson’s)
Essential Tremor – Rx & f/u

- Dirty Secret: meds reduce tremor amplitude by only 25%
- Med side effects >>> treatment effect
- Options:
  - Propranolol – start with ½ 40mg tab
  - Primidone – start with ½ 50mg tab
  - Topiramate – start with ½ 25mg tab
  - Gabapentin – start with 100mg capsules
Essential Tremor – Handwriting

Tip: Follow ET with handwriting samples

8/22/12
10:15 AM

ON Propanolol 40mg BID

Sincerely,

[Signature]

ON Gabapentin 300mg TID
Essential Tremor – Handwriting

Tip: Follow ET with handwriting samples
Essential Tremor – Handwriting

Tip: Free apps to measure tremor

- ParkinsonMeter
  - Start
  - Demo
- LIFTpulse
  - Hold phone in hand and press record.
Video – Intention Tremor

Tip: Cerebellar findings include ataxia, dysdiadochokinesia, dysarthria, nystagmus
Video – Nystagmus

Tip: Direction-changing nystagmus is unique to cerebellar disease
Video – Dysmetria FNF Testing

Tip: Cerebellar findings include ataxia, dysdiadokinesia, dysarthria, nystagmus
Video – Dysmetria FNF Testing

Tip: Cerebellar findings include ataxia, dysdiadokinesia, dysarthria, nystagmus
Video – Dysmetria HS Testing

Tip: The heel-to-shin slide is insensitive at detecting ataxia
Video – Dysmetria HS Testing

Tip: Heel-to-shin taps are much more sensitive for detecting ataxia
Video – Intention Tremor

Tip: Make the patient reach for your finger
Video – Scanning cerebellar dysarthria

Tip: Dilantin is a neurotoxin. Do not use it long term.
Video – Scanning cerebellar dysarthria

Tip: Dilantin causes cerebellar degeneration and neuropathy (like EToH)
Cerebellar Disease Eval

• Drugs: EToH & Phenytoin
• Family history: SCA, FXTAS
• MRI Brain – stroke, tumor, MS
• Anti-gliadin antibodies (gluten sensitivity)
• Paraneoplastic antineuronal antibodies
• Vitamins: B12, B1, E
Parkinsonism

- Tremor (rest tremor)
- Rigidity
- Akinesia
- Postural instability
Increased Muscle Tone

- **Rigidity** – increased resistance to passive movement (basal ganglia)
  - Not an upper motor neuron finding
- **Cogwheel rigidity** – tremor + rigidity (rigidity masks a rest or action tremor that emerges faintly during limb manipulation)
- **Spasticity (not rigidity)** – rate dependent increase in muscle tone (corticospinal tracts)
  - An upper motor neuron finding: accompanied by hyper-reflexia, extensor plantar response, weakness, and possibly clonus.
Video Examples of Increased Muscle Tone
Video – Cogwheel Rigidity

Tip: Examine head & neck, shoulders, elbows, wrists, knees, ankles
Video – Spasticity

Tip: Vary the rate of movement to detect spasticity (rate dependent increase)
Video – Clonus in a patient with spasticity

Tip: Remember the company that spasticity keeps: hyper-reflexia & ↑ toes
Video – Babinski sign in a patient with spasticity

Tip: Remember the company that spasticity keeps: hyper-reflexia & ↑ toes
Parkinsonism

• **Tremor** (rest tremor)
• **Rigidity**
• **Akinesia**
• **Postural instability**
Akinesia and bradykinesia

- Features of basal ganglia disease
- Slowness in the initiation and execution of movement
  - Masked facies (hypomimia)
  - Low voice (hypophonia)
  - Drooling (saliva swallowing < production)
  - Slower limb movements
  - Lower amplitude of rapid limb movements
  - Micrographia
  - Reduced arm swing when walking
Video Examples of Akinesia/Bradykinesia
Video – Bradykinesia

Tip: Watch the patient get out of a chair. Note the lack of arm swinging when walking.
Video – Bradykinesia

Tip: Bradykinesia is asymmetric early in Parkinson’s disease.
Video – Bradykinesia

Tip: Ask patient to write a long continuous sentence to detect micrographia
Parkinsonism

- **Tremor** (rest tremor)
- Rigidity
- Akinesia
- Postural instability
Postural Instability

- A late feature of Parkinson’s Disease
- An early feature of PSP
- Characterized by:
  - Stooped, flexed posture of neck, trunk, limbs
  - Shuffling gait
  - En bloc turning
  - Inability to make rapid adjustments to tilting or falling: assess with the pull test
    - Patient makes a series of small corrective steps that are difficult to stop (festination)
Video – Postural Instability
Diagnosis of Early PD

<table>
<thead>
<tr>
<th>Presence of</th>
<th>Absence of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rest tremor</td>
<td>Postural instability</td>
</tr>
<tr>
<td>Cogwheel rigidity</td>
<td>Dementia</td>
</tr>
<tr>
<td>Asymmetric bradykinesia</td>
<td>Peripheral Neuropathy</td>
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<tr>
<td>Response to L-Dopa</td>
<td>Autonomic dysfunction</td>
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<tr>
<td></td>
<td>Hallucinations</td>
</tr>
<tr>
<td></td>
<td>Eye movement abnormalities</td>
</tr>
</tbody>
</table>
Treatment of PD

- Patient age is a key determining factor
  - < 65
    - Dopamine agonists: suddenly fall asleep, Charlie Sheen Syndrome, edema
      - Pramipexole: possible heart failure posted by FDA 9/19/12
      - Ropinirole
    - MAOI:
      - Rasagiline: do not take with meperidine, DM, tramadol, methadone, St. John’s wort, cyclobenzaprine; warning of serotonin syndrome with ciprofloxacin and/or antidepressants
      - Selegiline: too many drug & food interactions
  - Dyskinesia treatment: Amantadine – livedo reticularis
  - Tremor predom: Trihexyphenidyl – strong anticholinergic
Patient age is a key determining factor

- > 65
  - Sinemet (carbidopa/levodopa) 25/100 – more mild Charlie Sheen Syndrome, nausea, OH, sleepiness, video dreams possible hallucinations
# Atypical Parkinsonian Disorders

<table>
<thead>
<tr>
<th>Features</th>
<th>PSP</th>
<th>CBD</th>
<th>MSA</th>
<th>DLB</th>
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</thead>
<tbody>
<tr>
<td>Parkinsonism</td>
<td>Symmetric/axial</td>
<td>Asymmetric/distal</td>
<td>Asymmetric/distal</td>
<td>Symmetric/distal</td>
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<tr>
<td>L-Dopa response</td>
<td>Initial?/absent</td>
<td>Absent</td>
<td>Minimal/moderate</td>
<td>Minimal/moderate</td>
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<tr>
<td>Cognitive disturbance</td>
<td>Frontal (severe)</td>
<td>Sensory neglect</td>
<td>Absent</td>
<td>Frontal or cortical</td>
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<tr>
<td></td>
<td></td>
<td>Alien limb/apraxia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myoclonus</td>
<td>Absent</td>
<td>Unilateral/bilateral</td>
<td>Distal</td>
<td>Present</td>
</tr>
<tr>
<td>Dystonia</td>
<td>Axial (retrocollis)</td>
<td>Asymmetric/limbs</td>
<td>Axial(ante collis) &gt;</td>
<td>Absent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>limb</td>
<td></td>
</tr>
<tr>
<td>Contracture</td>
<td>Late</td>
<td>Early</td>
<td>Late</td>
<td>Absent</td>
</tr>
<tr>
<td>Postural instability</td>
<td>Early within 1 year</td>
<td>Present (variable)</td>
<td>Present within 3</td>
<td>Present within 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>years</td>
<td>years</td>
</tr>
<tr>
<td>Saccades</td>
<td>Vertical &gt; horizontal</td>
<td>Vertical = horizontal</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Saccades latency</td>
<td>Normal</td>
<td>Increased</td>
<td>Normal</td>
<td>Normal</td>
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<tr>
<td>Saccades speed</td>
<td>Slow</td>
<td>Normal</td>
<td>Normal</td>
<td>Normal</td>
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<tr>
<td>Pyramidal signs</td>
<td>Late (bilateral)</td>
<td>Unilateral/bilateral</td>
<td>Present (bilateral)</td>
<td>Late (bilateral)</td>
</tr>
<tr>
<td>Cerebellar signs</td>
<td>Absent</td>
<td>Absent</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Dysautonomia</td>
<td>Absent</td>
<td>Absent</td>
<td>Initial and severe</td>
<td>Present (mild-mod)</td>
</tr>
<tr>
<td>Gait</td>
<td>Unsteady, ataxic</td>
<td>Apraxic/small-step</td>
<td>Small-step, ataxic</td>
<td>Small-step</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>Apathy</td>
<td>Depression</td>
<td>Depression</td>
<td>Hallucinations</td>
</tr>
</tbody>
</table>
Parkinsonism Red Flags

1. Early dementia
2. Hallucinations
3. Early falls (postural instability)
4. Lack of tremor
5. Restricted or slowed vertical eye movements
6. Axial > appendicular tone
7. Prominent ataxia
8. Dystonia
9. Dysautonomia
Top Five Take-Home Points

1. Parkinsonism (TRAP)
2. Rest tremor = parkinsonism
3. Asymmetric bradykinesia = PD
4. Postural tremor and/or simple kinetic tremor = essential tremor
5. Use caution when treating any movement disorder; the juice isn’t always worth the squeeze
The End