# Parkinsonism



## Presentation

- TRAP - any 2 of **T**remor, **R**igidity, **A**kinesia/bradykinesia, **P**ostural instability
- ***Parkinson's Disease***
  - Clinical Diagnosis
  - Cardinal S&S: Distal Resting Tremor (3-6Hz, pill-rolling); Rigidity; Bradykinesia; Asymmetrical onset
  - Additional S&S: Difficulty turning over in bed, opening jars, rising from a chair; Poor heel-to-toe gait; Shuffling gait; Loss of balance; Micrographia; Loss of olfaction
  - Therapeutic Challenge: adequate response to levodopa trial

## Differential Diagnosis

- ***Symptoms Suggesting Alternate Diagnosis:*** Lack of Levodopa response, hallucinations, prominent/early dementia, early postural instability, severe & early autonomic dysfunction, upward gaze paralysis, involuntary mvmts (other than tremor)

| | History | S&S | Levodopa Response | Imaging | Comments |
|---|---|---|---|---|---|
| ***Drug-Induced Parkinsonism*** | Causative Drug, eg antipsychotic, metoclopramide | Tremor, rigidity, bradykinesia<br>Bilateral symptoms | | N | May persist up to 1yr after drug discontinuation |
| ***Vascular Parkinsonism*** | Stepwise progression<br>CVA, TIA; comorbid CVD | Fixed deficits from prev events | | White Matter Lesions +/- BG | Common; Cerebrovascular dz is ++ prevalent |
| ***Essential Tremor*** | FHx - multiple members<br>Minimal progression | Tremor - action-based, bilateral, lessens w EtOH; No EPS; No levodopa response | None | N dopaminergic system (SPECT) | Common |
| ***Normal Pressure Hydrocephalus*** | Ataxia, Dementia, Urinary Incontinence | Ataxic gait; Mental status change | | Hydrocephalus | Distinct clinical features |
| ***Progressive Supranuclear Palsy*** | Onset >40y/o; Frequent falls | Vertical gaze paralysis (dec vertical saccades); ++ postural instability; Resting tremor; Nuchal dystonia; N olfaction | | Brainstem atrophy (MRI) | |
| ***Multiple System Atrophy*** | Autonomic & urinary dysfunction; Parkinsonism w poor levodopa response; Cerebellar dysfunction | Resting tremor; Mild olfactory impairment | Transient Response (25%) | Findings of degeneration (MRI) | Eg: Shy Drager syndrome, olivopontocerebellar atrophy, nigrostriatal degeneration<br>Dec sphincter EMG; urodynamic changes; altered CV responses |
| ***Corticobasal Degeneration*** | Cortical & cognitive impairment w involuntary mvmts | Apraxia; Aphasia; Sensory d/o's; Positive Babinski; Asymmetrical parkinsonism; Myoclonus; Dystonia | | Asymmetric atrophy of frontal/parietal areas (MRI)<br>Dec glucose metabolism (PET) | Heterogeneous presentation; Commonly underdiagnosed |
| ***Dementia with Lewy Bodies*** | Cognitive impairment; Hallucinations; Delirium episodes; Parkinsonism | Attention & visuospatial abilities - impaired; inc falls; syncopal episodes | | Dec glucose metabolism (PET) | ++ Intolerance to neuroleptic drugs |

N - normal; BG - basal ganglia; SPECT - single photon emission CT;
Source: Shobha SR et al. Parkinson's Disease: Diagnosis and Treatment. *Am Fam Physician.* 2006 Dec 15;74(12):2046-2054

## Investigations

- Physical Examination of Tremor
  - Resting Tremor - seen w hand resting in lap
  - Need to distinguish from Kinetic Tremor (occurs w mvmts) & Postural Tremor (limb is held against gravity)
  - LOOK: Observe (1) Hands in lap/arms at sides, (2) Extend arms to do finger-to-nose test, (3) Perform tasks (drink from glass, write/draw)
    - Classify: Involved body part (arms, head), When tremor present (rest, intention), Frequency (fast/slow), Amplitude (fine/coarse)
    - (4) Stand & Walk - difficulty initiating mvmt, dec arm swing, shuffling gate
  - FEEL/MOVE: Rigidty & Bradykinesia - flex/ext arms, cogwheeling?

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CCFP Priority Topics

| | Occurrence | Examples |
|---|---|---|
| **Rest Tremor** | Dec w target-directed mvmt; Limb supported against gravity; Muscles not activated | PD; Drug-induced Parkinsonism (neuroleptics, metoclopramide) |
| **Action Tremor** | Any voluntary muscle contraction | |
| ***Postural*** | Inc w voluntary mvmt; Limb maintains position against gravity; Extending arms in front of body | Physiologic Tremor; Essential Tremor; Metabolic disturbance; Drug/EtOH withdrawal |
| ***Kinetic - Simple*** | Not change w target-directed mvmt; Mvmt of extremities - **supination/pronation, flex/ext** | --- |
| ***- Intention*** | Inc w target-directed mvmt; Visually guided mvmt - eg **finger-to-nose testing** | Cerebellar Lesion (stroke, MS, tumour); drug-induced (Li, EtOH) |
| ***Isometric*** | Muscle contraction against stationary objects | Holding a heavy object in hand |
| ***Task-Specific*** | Occurs w specific action | Handwriting tremor; Musician's tremor. |

Source: Smaga S.Tremor. *Am Fam Physician.* 2003 Oct 15;68(8):1545-1552.

- CT or MRI - if diagnosis of idiopathic PD is uncertain and other diagnoses are being considered

## Management

- Goal: maximize ptnt autonomy & QOL; Initiate therapy at onset of functional impairment
- ***United Parkinson's Disease Rating Scale (UPDRS)*** - standardized assessment tool; Measures (1) mental effects, (2) ADL limitations, (3) motor impairment, (4) treatment/disease complications (see below).
- Assessing Functional Status

***Non-Motor Symptoms***

| Symptom | Management Strategies |
|---|---|
| ***Cognitive Impairment *COMMON**** | R/O medical etiology (infection, metabolic d/o, dehydration); Occurs in 20-40% of PD ptnts; Dec or D/C anticholinergics, DOPA agonists, MAO-B inhibitor, NMDA receptor inhibitor; Rx: cholinesterase inhibitor |
| ***Constipation*** | Inc fluid & fiber intake; Inc PA; D/C anticholinergics; Use bowel protocol PRN |
| ***Depression *COMMON**** | Counselling; Meds - SSRIs, TCAs (w caution due to s/e) |
| ***Dysphagia*** | Swallowing assessment by OT; Inc "On" time, ie time of dec symptoms, & tell ptnts to eat during this time; soft foods; ? gastrostomy |
| ***Orthostatic Hypotension*** | D/C antiHTN meds; Elevate HOB; Get up slowly; Consider fludrocortisone or midodrine |
| ***Psychosis, Hallucinations, or Delirium *COMMON**** | Usually drug induced :. dec or D/C anticholinergics, DOPA agonists, MAO-B inhibitor, NMDA receptor inhibitor; Severe hallucinations - onsider low-dose clozapine (monitor CBC for agranulocytosis) or quetiapine |
| ***Sleep Disturbance***<br>Daytime Somnolence<br>Nighttime Awakenings<br>REM Sleep Behaviour D/O | <br>• D/C DOPA agonists<br>• Due to bradykinesia; Consider qhs dose of sustained-release Levodopa or an adjuvant (COMT-I, DOPA agonist)<br>• Dec or D/C qhs dose of anti-PD drugs; Consider clonazepam |
| ***Urinary Urgency*** | Dec qhs fluid intake; Consider tolterodine or oxybutynin; Urology referral |

R/O rule out; d/o disorder; D/C discontinue; PA physical activity
Source: Shobha SR et al. Parkinson's Disease: Diagnosis and Treatment. *Am Fam Physician.* 2006 Dec 15;74(12):2046-2054

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## *Early-Stage Treatment* (PD duration <5y; no motor complications from levodopa)

| | Adverse Effects (AEs) | Indications | Comments |
|---|---|---|---|
| ***Anticholinergics***<br>Benztropine (*Cogentin*)<br>Trihexyphenidyl (*Artane*) | Dry mouth & eyes; constipation; hypotension; cognitive impairment; urinary retention | Symptomatic Control<br>(mild - moderate benefit)<br>Ptnts <70y/o w disabling resting tremor & N cognition | More AEs than other drugs (GI, neuropsych)<br>Low effectiveness |
| ***Carbidopa/Levodopa***<br>Immediate<br>Sustained-Release (*Sinemet*) | Nausea - more likely at <70-100g/d<br>Somnolence; Dyskinesia;<br>Hypotension; Hallucinations | ****Primary tx for symptomatic PD****<br>Older ptnts w severe motor s's | Most effective.<br>Less effect on speech, posture, gait.<br>Combined w carbidopa to prevent peripheral conversion of levodopa to dopamine. |
| ***MAO-B Inhibitors***<br>Selegiline (*Eldepryl*)<br>Rasagaline (*Azilect*) | DI w other MAO inhibitors<br>S - nausea, insomnia<br>R - wt loss, hypotension, dry mouth | Symptomatic Control (mild - moderate benefit); Adjuvant therapy for motor fluctuations | |
| ***NMDA Receptor Inhibitor***<br>Amantadine (*Symmetrel*) | Nausea; Hypotension; Hallucinations; Confusion; Edema | Akinesia, rigidity, tremor, dyskinesia | |

## *Late-Stage Treatment* (Ptnts on Carbi/Levodopa w motor complications, >5y of treatment)

| Motor Complications | Medications | Surgery |
|---|---|---|
| • Occurs in ~40% of ptnts after 5yrs of treatment<br>• ***Dyskinesia -*** involuntary stereotyped mvmts of head, trunk, limbs, occ resp muscles<br>• ***"Wearing-Off" Effect -*** therapeutic effects of Levodopa wear off sooner :. Parkinsonism s's reappear; ie ***"On/Off Effect"*** | • Treat resurgence of motor complications by adding (1) DOPA agonist, (2) MAO-B inhibitor, (3) COMT inhibitor | • Deep Brain Stimulation - subthalamic nucleus<br>• Inc motor function<br>• Dec motor fluctuations, dyskinesia, antiPD meds |

| | Adverse Effects (AEs) | Indications | Comments |
|---|---|---|---|
| ***COMT Inhibitors***<br>Entacapone (*Comtan*)<br>Tolcapone (*Tasmar*) | Diarrhea; inc Levodopa AEs<br>E - bright orange urine<br>R - liver failure (rare; monitor LFTs) | Treats "wearing-off" effect (motor fluctuations) of Levodopa. | Dec Levo metabolism, :. inc 1/2 life<br>May need to dec Levodopa dose if inc dyskinesia. |
| ***Dopamine Agonists***<br>Bromocriptine (*Parlodel*)<br>Pergolide (*Permax*)<br><br>Pramipexole (*Mirapex*)<br>Ropinirole (*Requip*) | Nausea, Hallucinations, Dyskinesias<br>B - h/a, dizziness<br>Per - somnolence, hallucinations, edema, fibrosis of lung/cardiac/retroperitoneum<br>Pr, R - somnolence, edema, hallucinations, hypotension | May be early tx in ptnts w mild disease at younger ages.<br>B - Early & advanced disease<br>Per - Initial; Adjunct therapy to levodopa<br><br>Pr, R - Early; motor fluctuations | |

Source: Shobha SR et al. Parkinson's Disease: Diagnosis and Treatment. *Am Fam Physician*. 2006 Dec 15;74(12):2046-2054

## *Allied Health Resources*

| Occupational Therapy | Physical Therapy | Speech Therapy | Nutritional Support | Counseling | Parkinson Society Canada |
|---|---|---|---|---|---|
| • Improved ADL performance | • Exercises - stretching, strengthening, balance training<br>• Improved gait, balance, ADL performance | • Voice training<br>• Improved voice & speech | • High-fiber diet - dec constipation<br>• PRO restriction - for ptnts w dec Levodopa response b/c amino acids interfere | • Support for ptnt, partner & family | • Support & ptnt education<br>• Improved QOL |

**Resources**

- American Family Physician
  - Tremor (http://www.aafp.org/afp/2003/1015/p1545.html)
  - Parkinson's Disease: Diagnosis & Treatment (http://www.aafp.org/afp/2006/1215/p2046.html)
- Unified Parkinson's Disease Rating Scale (UPDRS)