Headaches, Motor Disorders, And Amyotrophies

ACOI Internal Medicine Board Review Course 2014
Westin Savannah Harbor Golf Resort and Spa
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• General Classification of Headaches

• Migraine
• Tension
• Cluster
• Coital
• Post-Traumatic
• Temporal Arteritis
• Pseudotumor Cerebri
• Thalamic
Migraines

* Unilateral, intermittent, throbbing
* Lasts 4 hours-3 days
* Light sensitive/sound sensitive
* Associated with prodrome
* Aura- scintillating scotomas
* Triggers
* Acephalic- abnormal transient transient dysfunction No pain
Treatment

Acute

- Serotonin agonists (Triptans)
- NSAIDS
- Ergotamine
- Dopamine antagonists
- Narcotics - rarely recommended
- DHE IV - severe
Prophylactic

Beta blockers

Tricyclic Antidepressants

Divalproex

Topiramate
Cluster Headaches

Occur daily for weeks then stop
Ice pick like
Associated with REM or early AM
“Worst Pain” known
Pain peaks in 5-10 min then throbs 2 hours
Ipsilateral Horner’s syndrome
Male
Drinkers and Smokers
Tall and THIN and Hazel eye color
Headaches, Motor Disorders, Amyotrophies

Treatment

5-HT1 Receptor agonists
Triptans/Ergot Alkaloids
Oxygen 8-10 L/min
Lidocaine intranasal drops
Corticosteroids
Prophylactic = Calcium Channel Blockers
Headaches, Motor Disorders, Amyotrophies

- **Tension**
  - Chronic muscle contraction
  - Can have vascular component
  - Daily
  - Bilateral
  - Tight band feeling
  - Non throbbing
Headaches, Motor Disorders, Amyotrophies

Treatment

- NSAIDS
- Muscle Relaxants
- Tricyclics
- Beta Blockers
Other Headaches:

Coital
- Benign TX: Propanolol / Indomethacin

Post-Traumatic
- Vascular TX: same as migraine

Temporal Arteritis
- >55 yr old
- Sudden onset
- Temporal artery tenderness
- Elevated ESR Tx: Biopsy/Steroids

Pseudotumor Cerebri
- Obese premenopausal women
- Diplopia/headache visual field loss papilledema
- CSF=>250 mm H2O Tx: Diuretic/Steroids

Thalamic
- Severe/debilitating after infarct usually has hemianesthesia
Headaches, Motor Disorders, Amyotrophies

**Motor Disorders:**
- Parkinsons Disease
- Progressive Supranuclear Palsy
- Huntingtons Chorea
- Essential Tremors
- Tardive Dyskinesia
- Neuroleptic Malignant Syndrome
- Tic Douloureux
- Giles de la Tourette
- Torticollis
- Meige Syndrome
- Creutzfeldt-Jakob disease
Parkinson's Disease

Clinical Diagnosis
Decrease dopamine producing cells in the substantia nigra

Signs/Symptoms:
- Resting Tremor
- Rigidity
- Retarded movement
- Loss of postural reflexes
<table>
<thead>
<tr>
<th>Presentation</th>
<th>Parkinsonism</th>
<th>Differential Diagnosis</th>
<th>Distinguishing Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tremor</td>
<td>Asymmetric rest tremor</td>
<td>Essential and other tremors</td>
<td>Symmetric postural and action tremor</td>
</tr>
<tr>
<td>Clumsy or weak limb</td>
<td>Bradykinesia</td>
<td>Carpal tunnel syndrome, radiculopathies, and stroke</td>
<td>Altered reflexes, sensation, and strength</td>
</tr>
<tr>
<td>Stiff or uncomfortable limb</td>
<td>Rigidity</td>
<td>Musculoskeletal syndromes</td>
<td>Pain and limitation of movement</td>
</tr>
<tr>
<td>Gait disorder</td>
<td>Asymmetric slowness, shuffling, reduced arm swing, minimal or no imbalance</td>
<td>Multiple ischemic lesions in the brain, hydrocephalus, and musculoskeletal disorders</td>
<td>Symmetric shuffling, retained arm swing, wide-based gait, prominent imbalance, limited movement at knee and hip</td>
</tr>
</tbody>
</table>
• **Treatment**
  
  • **Increase the Dopamine**
  Decrease the Acetylcholine
  **Dopaminergic is most successful**
  levodopa/carbidopa (Sinemet® or Atamet®)
  Anticholinergics-Artane
  Parlodel/Eldepryl/Mirapex/
  Ropinirole (Requip, Requip XL)
  Rasagiline (Azilect)
  Apomorphine (Apokyn)
  Amantadine
  Toicapone –COMT
  Entacapone–COMT
  Deep Brain Stimulation
  Palliodotomoy
### Table 2. Initial Therapy for Symptoms in Parkinson’s Disease.

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Example</th>
<th>Initial Dose</th>
<th>Used Dose</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-line dopaminergic agents</td>
<td></td>
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<td></td>
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<tr>
<td>Carbidopa plus levodopa</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Immediate release</td>
<td>25 mg carbidopa, 100 mg levodopa</td>
<td>1/2 tablet three times daily</td>
<td>1 to 2 tablets three times daily</td>
<td>At initiation: anorexia, nausea, vomiting, dizziness, hypotension (a 1:4 ratio of carbidopa:levodopa reduces gastrointestinal symptoms), long-term therapy: motor fluctuations, dyskinesias, confusion, hallucinations</td>
</tr>
<tr>
<td>Controlled release</td>
<td>25 mg carbidopa, 100 mg levodopa</td>
<td>1 tablet three times daily</td>
<td>—</td>
<td>Same as for immediate-release preparations</td>
</tr>
<tr>
<td>Carbidopa plus levodopa plus entacapone</td>
<td>12.5 mg carbidopa, 50 mg levodopa, 200 mg entacapone</td>
<td>1 tablet three times daily</td>
<td>—</td>
<td>Same as with preparations above, plus diarrhea</td>
</tr>
<tr>
<td></td>
<td>25 mg carbidopa, 100 mg levodopa, 200 mg entacapone</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td></td>
<td>37.5 mg carbidopa, 150 mg levodopa, 200 mg entacapone</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Dopamine agonists</td>
<td></td>
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<tr>
<td>Nonergot</td>
<td>Pramipexole (Mirapex)</td>
<td>0.125 mg three times daily</td>
<td>0.5–1.5 mg three times daily</td>
<td>Nausea, vomiting, hypotension, ankle edema, excessive daytime sleepiness, compulsive behavior, confusion, and hallucinations</td>
</tr>
<tr>
<td>Ropinirole</td>
<td>Requip</td>
<td>0.25 mg three times daily</td>
<td>3–8 mg three times daily</td>
<td>Same as for pramipexole</td>
</tr>
<tr>
<td>Ergot</td>
<td>Pergolide (Permax)</td>
<td>0.05 mg three times daily</td>
<td>1 mg three times daily</td>
<td>Same as for nonergot drugs plus retroperitoneal, pulmonary, and cardiac fibrosis</td>
</tr>
<tr>
<td>Second-line alternatives</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Anticholinergic agents</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Trihexyphenidyl (Artane)</td>
<td>1 mg three times daily</td>
<td>2 mg three times daily</td>
<td>Impaired memory, confusion, constipation, blurred vision, urinary retention, xerostomia, and angle-closure glaucoma</td>
<td></td>
</tr>
<tr>
<td>Benztrpine (Cogentin)</td>
<td>0.5 mg twice daily</td>
<td>1 mg twice daily</td>
<td>Same as for trihexyphenidyl</td>
<td></td>
</tr>
<tr>
<td>Selective MAO-B inhibitors</td>
<td>Selegiline (Eldepryl)</td>
<td>5 mg daily</td>
<td>5 mg twice daily</td>
<td>Insomnia, nausea, anorexia, hallucinations, potential for interactions with SSRIs and meperidine</td>
</tr>
<tr>
<td>NMDA antagonist</td>
<td>Amantadine (Symmetrel)</td>
<td>100 mg twice daily</td>
<td>100 mg twice daily</td>
<td>Dizziness, insomnia, nervousness, livedo reticularis, hallucinations, confusion</td>
</tr>
</tbody>
</table>

* All antiparkinsonian drugs are started at low doses and increased slowly to reduce adverse effects. Likewise, slow withdrawal of these drugs after long-term treatment is prudent to avoid a marked worsening of parkinsonism or even the neuroleptic malignant syndrome (discussed by Keyser and Rodnitzky). MAO-B denotes monoamine oxidase B, SSRI selective serotonin-reuptake inhibitor, and NMDA N-methyl-D-aspartate.
Progressive Supranuclear Palsy

Similar to Parkinson's

Erect Posture

Hyperextension Neck

No tremor

Vertical Ophthalmoplegia - can't look up or down

Over 2 yrs unable to walk

No treatment
Huntingtons Chorea

Inherited
Autosomal Dominant
Hemiballismus
Facial twitching
Rigidity/Dystonia
Lab:
  H-D Gene
  Decreased GABA
  CT/MRI= Bulge of Caudate Nucleus/ enlarged ventricles

Treatment
  Tetrabenazine
  Amantadine or Riluzole
Benign Tremor (Essential)

Not to be confused with Normal tremor

7 Hz

Autosomal Dominant

Treatment

Beta Blockers

Primidone

Headaches, Motor Disorders, Amyotrophies
Tardive Dyskinesia

Effect of Long term antipsychotics
Involves Lips, tongue, face, and neck
Can affect limbs

Treatment
  Exchanging the dopamine antagonist antipsychotic
Neuroleptic Malignant Syndrome

Response to antipsychotics
Dopamine Receptor Blockade
Fever - can be as high as 106
Rigidity
Increased CPK
Altered mental status
Treatment:
  - Remove drugs
  - Supportive therapy
  - Dantrolene/Bromocriptine/Amantadine
Tic Douloureux

Hemifacial spasm
Pain
Trigeminal neuralgia
80% have basilar artery affecting the facial n.
Treatment: Carbamamazine/Surgery
Other:

Giles de la Tourette- Neuroleptics-Risperdal/Geodon
Torticollis-Botulinum toxin
Meige Syndrome:
  Bilateral blepharospasm with lip/mouth involvement
Creutzfeldt-Jakob disease
  Myoclonus with dementia/brain biopsy/no tx
Sudden onset
Seizures

Excessive abnormal discharges of electrical activity in CNS

Epilepsy is a syndrome of recurrent episodes of seizure activity

Two Types:
- Partial-
- Generalized-
Partial Seizures
Also known as Focal or Local Seizures
Seizure activity occurs in a specific area
Sensory Phenomena
Autonomic manifestations
Psychic manifestations
Generalized Seizures

**Absence:**
- Sudden
- Brief motor activity
- Blank Stare
- Unconsciousness

**Myoclonic:**
- Sudden
- Uncontrollable
- Jerking of single or multiple muscle groups
- Unconsciousness
- Confusion postictally
Tonic Clonic Seizure - *Grand Mal*

May or may not have an Aura

Sudden loss of consciousness

**Tonic Phase**

abrupt increase in muscle tone and contraction

**Clonic Phase**

Rhythmic muscular contraction and relaxation
Status Epilepticus

Continuous seizures

Complex Partial Seizure

Purposeless repetitive activities

Evolves to secondary generalized
**Table 1. Principal Types of Seizures.**

<table>
<thead>
<tr>
<th>Type of Seizure</th>
<th>Clinical Features</th>
<th>Electroencephalographic Features*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial</td>
<td></td>
<td></td>
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</tbody>
</table>
| Simple partial seizures (focal)               | Signs and symptoms may be motor, sensory, autonomic, or psychic, depending on the location of the electrical discharge; consciousness is not impaired.  
                                                                                           | Focal slowing or sharp-wave activity, or both                                      |
| Complex partial seizures (temporal lobe or psychomotor) | Seizure may begin with no warning or with motor, sensory, autonomic, or psychic signs or symptoms; consciousness is impaired; automatisms (automatic acts of which the patient has no recollection) may occur; seizure is often followed by a period of confusion | Focal slowing or sharp-wave activity, or both                                      |
| Secondarily generalized partial seizures (tonic–clonic, or grand mal) | Seizures may begin with motor, sensory, autonomic, or psychic signs or symptoms; consciousness is lost, with tonic increase in muscle tone; subsequent rhythmic (clonic) jerks subside slowly; patient is comatose after seizure and recovers slowly; tongue biting or incontinence, or both, may occur. | Focal slowing or sharp-wave activity, or both                                      |
| Generalized                                   |                                                                                                                                                                                                               |                                   |
| Absence seizures (petit mal)                  | Seizure begins rapidly, with a brief period of unresponsiveness (average, 10 seconds) and rapid recovery; there may be increased or decreased muscle tone, automatisms, or mild clonic movements. Seizure can be precipitated by hyperventilation; age at first seizure, 3–20 yr | Spike–wave pattern (3 Hz)                                                     |
| Primarily generalized tonic–clonic seizures (grand mal) | Loss of consciousness occurs without warning or is preceded by myoclonic jerks; clinical features are similar to those of a secondarily generalized partial seizure   | Spike–wave pattern (3–5 Hz)                                                     |

*The electroencephalographic features listed are those observed on routine electroencephalography during which a seizure does not occur.*
The Normal Thalamocortical Circuit and EEG Patterns during Wakefulness, Non-Rapid-Eye-Movement (Non-REM) Sleep, and Absence Seizures

MYOPATHIES

Hereditary/Congenital

Metabolic

Inflammatory

Toxic
Headaches, Motor Disorders, Amyotrophies

**Work up for Myopathy**

- CK with isoenzymes
- Electrolytes, calcium, magnesium
- Serum myoglobin
- Serum creatinine and BUN

**Urinalysis:** *Myoglobinuria is indicated by positive urinalysis* with few RBCs on microscopic evaluation.

- Complete blood count
- Erythrocyte sedimentation rate
- Thyroid function tests
- Liver Functions
- EMG
- Age appropriate cancer screening
- Specific Genetic testing- Cadisil, MELAS, etc
<table>
<thead>
<tr>
<th>Metabolic defect</th>
<th><strong>McArdle Disease</strong> <em>(glycogenosis V)</em></th>
<th><strong>CPT Deficiency</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Glycogen storage</td>
<td>Lipid storage</td>
</tr>
<tr>
<td>Exercise</td>
<td>Usually cramps with short strenuous exercise</td>
<td>Usually myalgia and tenderness (without cramps) with prolonged exercise, worse with fasting</td>
</tr>
<tr>
<td>Second-wind phenomenon</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Recurrent myoglobinuria</td>
<td>Less frequent (50% of patients)</td>
<td>Common</td>
</tr>
<tr>
<td>CK at rest</td>
<td>Increased</td>
<td>Normal</td>
</tr>
<tr>
<td>Ischemic forearm exercise test</td>
<td>Absence of normal increase in lactate level</td>
<td>Normal</td>
</tr>
<tr>
<td>Muscle biopsy</td>
<td>Usually shows glycogen accumulation</td>
<td>May be normal</td>
</tr>
<tr>
<td>Gene location</td>
<td>Band 11q13</td>
<td>Band 1p32 <em>(CPT II)</em></td>
</tr>
</tbody>
</table>
Duchenne Muscular Dystrophy

- X linked
- Progressive weakness
- Begins at 2 until young adult
- Weakness proximal > distal
- Elevated CPK
- No treatment
Myotonic Dystrophy
Inherited neuromuscular disorder
Autosomal dominant
Symptoms
  Weakness
  Sleep apnea
  Cardiac conduction defects
  Mitral valve prolapse
  Testicular atrophy

Headaches, Motor Disorders, Amyotrophies
Mitochondrially Inherited Defect of the Mitochondria
Lactic acidosis
Muscle weakness/ptosis/neurological
Cardiomyopathy - arrhythmias
Liver/Kidney problems
Stroke before 40
Red ragged fibers on biopsy

Mitochondrial myopathy (MELAS)
Metabolic

Addison disease, particularly when fluid and electrolyte problems are present
Cushing disease
Hypothyroidism (CK may be mildly elevated)
Hyperthyroidism (CK may be normal)
Hyperparathyroidism
Conn Syndrome
Acute periodic paralysis may be classified as hypokalemic, hyperkalemic, or normokalemic.

Normokalemic paralysis causes the most severe and prolonged attacks.

Patients usually feel well between attacks, but some have myotonia or residual weakness after repeated episodes.

Acute hypokalemic periodic paralysis may be primary (ie, familial) or secondary to excessive renal or GI losses or endocrinopathy.

Intracellular shift of potassium depolarizes the cell membrane rendering it inexcitable and no muscle contraction can occur.

Familial periodic paralysis usually occurs in Caucasian males, is autosomal dominant, and may last as long as 36 hours.

Attacks usually occur at night or in early morning upon awakening and can be precipitated by a diet high in carbohydrates, rest following exercise, or glucose and insulin given intravenously.
Inflammatory

- Dermatomyositis / Polymyositis
  - Proximal muscle weakness
  - EMG- myopathic changes consistent with inflammation
  - MRI- shows inflammatory component
- Responds to glucocorticoids
- Inclusion Body Myositis
  - Does NOT respond to steroids
  - BX shows vacuolar inclusions with eosinophils
Infections

**Spiroceete**
- Lyme

**Bacterial**
- Staphylococcal, Tuberculosis, Clostridium

**Viral**
- HIV, Influenza, EBV, CMV, Coxsackie, Adenovirus
Toxic

ETOH
Statins/Fenofibrates
Steroids
AZT
Cocaine
Diuretics
Amiodarone
Colchicine
**Myasthenia Gravis**

Autoimmune- motor end plate disorder

Associated with thymomas

Diplopia and ptosis is common

Symptoms worsen as day progresses

Diagnosis:

- Anti-Acetylcholine receptor antibodies

**Tensilon test** (while ptosis present)

Treatment:

- Anti-cholinesterase agents (mestinon)/ thymectomy

In crisis- Plasma exchange/IVIG
Lambert-Eaton

Associated with Oat cell carcinoma

Autoimmune

Presynaptic peripheral nerves antibodies that cause acetylcholine release to decrease

Proximal muscle weakness

Dry mouth

Hyporeflexia- esp lower extremities

Treatment: Anti-cholinesterase agents