MOVEMENT DISORDERS (DRUG-INDUCED)
Distinguish among the findings associated with various movement disorders, and manage appropriately.
VIDEO!!
CHOREA

“Frequent, brief, unpredictable, purposeless movements that tend to flow from body part to body part chaotically and unpredictably”

• Less sustained than dystonia
• More sustained than myoclonus

Low amplitude chorea: “Fidgety”
High amplitude chorea: “Ballismus”
QUESTION 6

The parents of a 9-year-old girl bring her to the office because of two days of increasing restlessness and clumsiness. She previously was healthy but now has irregular, continuous involuntary movements that are present at rest, worsen with purposeful action, and disappear with sleep.

Of the following, the diagnostic test that is MOST likely to confirm the diagnosis is:

A. Anti-double-stranded DNA test
B. Anti-phospholipid antibody test  
C. Anti-streptolysin O antibody test
D. Erythrocyte sedimentation rate
E. Throat swab for rapid streptococcal antigen

Know the common causes of chorea
QUESTION 12

You are evaluating a 10-year-old girl who had a group A beta-hemolytic streptococcal infection 1 month ago.

Among the following, the finding MOST consistent with the diagnosis of Sydenham chorea is

A. Asymmetric chaotic-appearing involuntary movements
B. Catatonia
C. Diminished deep tendon reflexes
D. Hypertonia and dysphagia
E. Muscle fasiculations

Know the etiology, clinical features, prognosis and treatment of Sydenham chorea.
CHOREA

Primary

Benign Familial Chorea
Huntington disease

Secondary

Metabolic (sodium/glucose/calcium abnormalities…)
Perinatal HIE
Paraneoplastic
Infections/Post-infectious (ARF)
Cardiac Surgery (“post-pump chorea”)
Vascular (Stoke, SLE…)
Psychogenic
Toxins
Heredodegenerative diseases (Niemann Pick, Lesch-Nyhan …)
JONES CRITERIA

Acute Rheumatic Fever:
- 1 major + 2 minor
- 2 major
- In setting of recent GAS infection

- Polyarthritus
- Carditis
- Subcutaneous Nodules
- Erythema marginatum
- Sydenham’s chorea

Arthralgia
Fever
ESR/CRP elevation
Leukocytosis
PR interval prolongation

Diagnosis?
Prognosis?
Treatment?

➔ Evaluate for rheumatic heart disease!
QUESTION 2

A 10-year-old boy presents to the emergency department with a 2-day history of progressive difficulty with speech and coordination. On physical examination, the restless but otherwise quiet child has a normal mental status and eye movements. His speech is slurred, and he cannot maintain tongue protrusion without an in-and-out darting movement. Continuous flowing and jerky movements occur when he holds his hands outstretched or overhead. Although his grip is strong, he cannot maintain it well because of irregular hand and arm movements. He had a sore throat and fever 2 months ago. You diagnose chorea.

Of the following, the MOST effective treatment for suppressing the chorea for this boy is

A. Carbamazepine
B. Clonazepam
C. Haloperidol
D. Penicillin
E. Trihexyphenidyl

Treatment considerations:
- Haloperidol
- Carbamazepine
- Valproate
- Phenothiazine
- Butyrophenones
- Benzodiazepines
- Immunotherapy

Know the effective drugs for controlling chorea
QUESTION 10

You are called to see a hospitalized 9-year-old girl who suddenly has become dystonic with her neck hyperextended and is unable to move her eyes now superiorly deviated. The nurses relate that this girl has Non-Hodgkin lymphoma and has been receiving highly emetogenic chemotherapy.

Of the following, the drug MOST likely to have caused this girl’s symptoms and signs is:

A. Aprepitant
B. Diphenhydramine
C. Lorazepam
D. Metaclopramide
E. Ondansetron

Know which drugs can cause movement disorders
DYSTONIA

Sustained muscle contraction \(\Rightarrow\) often leads to abnormal postures

Ex: Focal dystonia
  - Torticollis
  - Writer’s cramp

Fluctuate overtime, exacerbated by attempted voluntary mvmt

Can sometimes be overcome, sensory trick or “geste antagoniste”
PRIMARY DYSTONIAS

Dopa-responsive dystonia (DRD)
Hereditary, progressive
Diurnal fluctuations
Often affects feet first
Responds to levodopa

Idiopathic torsion dystonia (DYT1 mutation)
“Dystoia musculorum deformans”
Hereditary, progressive
Arms → legs → generalized
DYSTONIA

Treatment options:
- Levadopa!
- Trihexyphenidyl
- Baclofen
- Benzodiazepines
- Botulinum toxin
- Deep brain stimulation
A mother brings her 16-year-old daughter to you because every morning upon waking the girl unexpectedly tosses her toothbrush or a teacup. You worry that these shock-like movements represent myoclonus.

Of the following, the MOST appropriate first step to evaluate this girl is:

A. Antistreptolysin O titers
B. Electroencephalography
C. Psychiatry consultation
D. Serum lactate measurement
E. Urine toxicology screen
MYOCLONUS

“Brief, abrupt, involuntary, nonsuppressible, jerky contractions involving a single muscle or muscle group”

Ex:
- Hiccups, hypneic jerks, infant startle

Shock-like or tremor-like

Must rule out ____________

Epilepsy
Essential myoclonus is a diagnosis of exclusion!

Treatment options:
- Valproate
- Levetiracetam
- Clonazepam
A father brings his 9-year-old son to your clinic for evaluation of a bilateral tremor. The child has a history of epilepsy.

Among the following, the drug MOST likely to be responsible for the tremor is

A. Carbamazepine
B. Clonazepam
C. Levetiracetam
D. Primidone
E. Valproate
TREMOR

Rhythmic oscillation about a central point or body position

Classifications:
- Rest, intention, action

Causes:
- Essential (Familial) tremor
- Physiologic tremor
- Tremor-enhancing medication!
  - Valproate, Theophylline, beta-agonists, corticosteroids, stimulants

Treatments:
- Betablockers
- Primidone
- Clonazepam
OTHER CONSIDERATIONS

Neurolpetic malignant syndrome
Tardive dyskinesia
Extrapyramidal effects
**Table 6. Common Drug-induced Movement Disorders**

<table>
<thead>
<tr>
<th>Medications*</th>
<th>Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dopamine antagonists (antipsychotics)</td>
<td>Acute dystonic reaction</td>
</tr>
<tr>
<td>- Haloperidol</td>
<td>Tardive dyskinesia</td>
</tr>
<tr>
<td>- Pimozide</td>
<td>Withdrawal dyskinesia</td>
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<tr>
<td>- Chlorpromazine</td>
<td>Parkinsonism</td>
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<tr>
<td>- Metoclopramide</td>
<td>Neuroleptic malignant syndrome</td>
</tr>
<tr>
<td>- Prochlorperazine</td>
<td></td>
</tr>
<tr>
<td>- Risperidone</td>
<td></td>
</tr>
<tr>
<td>Antiepileptic agents</td>
<td></td>
</tr>
<tr>
<td>- Phenytoin</td>
<td>Chorea</td>
</tr>
<tr>
<td>- Carbamazepine</td>
<td>Dystonia</td>
</tr>
<tr>
<td>- Sodium valproate</td>
<td>Tremor</td>
</tr>
<tr>
<td>Beta-adrenergic agonists</td>
<td></td>
</tr>
<tr>
<td>- Albuterol</td>
<td>Tremor</td>
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<tr>
<td>- Metaproterenol</td>
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<tr>
<td>Amphetamines</td>
<td></td>
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<tr>
<td>- Chorea</td>
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<tr>
<td>- Tremor</td>
<td></td>
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<tr>
<td>Cocaine</td>
<td></td>
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<tr>
<td>- Chorea</td>
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<tr>
<td>Lithium</td>
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<td>- Chorea</td>
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*Common examples are listed, but the list is not intended to be comprehensive.
TREATMENT OF MOVEMENT DISORDERS

Chorea
- Haloperidol
- Carbamazepine
- Valproate
- Phenothiazine
- Butyrophenones
- Benzodiazepines
- Immunotherapy

Dystonias
- DRD → levodopa
- Tihexyphenidyl./
  - anticholinergics
- Baclofen
- Benzodiazepines
- Botulinum toxin Injections
- Deep brain stimulation

Myoclonus
- Valproate
- Levetiracetam
- Clonazepam

Tremor
- Beta-blockers
- Primidone
- Clonazepam
KNOW WHICH DRUGS REVERSE THE SYMPTOMS OF DRUG-INDUCED MOVEMENT DISORDERS

Anticholinergics! (diphenhydramine, benztropine)
Dantrolene to treat NMS
RECOGNIZE CLINICAL FINDINGS ASSOCIATED WITH TOURETTE SYNDROME, AND MANAGE APPROPRIATELY

Movement disorders I is Tics and Stereotypies

<table>
<thead>
<tr>
<th>Movement Disorder</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tics</td>
<td>Stereotyped, intermittent, sudden, discrete, repetitive, nonrhythmic movements, most frequently involving head and upper body.</td>
</tr>
<tr>
<td>Stereotypy</td>
<td>Patterned, episodic, repetitive, purposeless, rhythmic movements.</td>
</tr>
</tbody>
</table>

Tourette’s syndrome: Chronic (lasting >12 months) presence of motor and vocal tics in someone less <18 years of age
RECOGNIZE CLINICAL FINDINGS ASSOCIATED WITH TOURETTE SYNDROME, AND MANAGE APPROPRIATELY

**Treatment strategies:**

Address comorbidities
(tic, ADHD, anxiety)

**Treatment:**

Cognitive behavioral therapy

Tics: Alpha-2 agonists, typical and atypical neuroleptics, benzos

ADHD: Stimulants, Alpha-2 agonists

Anxiety/OCD: SSRI’s

**Table 3. Comorbid Conditions of Tourette Syndrome**

- Attention-deficit/hyperactivity disorder
- Obsessive-compulsive disorder and obsessive-compulsive behaviors
- Learning disabilities/learning difficulties
- Anxiety disorders
- Mood disorders
- Oppositional defiant disorder
- Self-injurious behaviors
- Speech and language disorders (eg, hesitations, disfluency)
- Intermittent explosive disorder/anger dysregulation
VIDEO!!