Tic Disorders
PROJECT ECHO

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Tic Disorders

Tics are:

- Sudden
- Brief
- Repetitive
- Stereotypical
- Non-Rhythmic
- Movements, gestures or phonic productions
- Usually mimic some aspect of normal behavior
## Tic Disorders Common Tics:

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<th>Motor Tics</th>
<th>Phonic (Vocal) Tics</th>
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<td>• Eye blinking</td>
<td>• Sniffing</td>
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<td>• Grimacing</td>
<td>• Grunting</td>
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<tr>
<td>• Neck/Shoulder/Limb Movements</td>
<td>• Chirping</td>
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<td>• Throat Clearing</td>
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Tic Disorders

Motor Tics:

• Can be simple – eye blinking, nose twitching, head/arm jerks, shoulder shrugs

• Can be complex – facial or hand gestures or sustained looks/gazing
Tic Disorders

Phonic (Vocal) Tics:

• Can be simple – sudden/meaningless sounds such as throat clearing, coughing, sniffing, spitting or grunting

• Can be complex – protracted, meaningful utterances such as syllables, words or phrases or repeating one’s own words (palilalia), those of others (echolalia) or obscenities (coprolalia)
Tic Disorders

Characterized by:

• Brief duration (rarely longer than 1 second)

• Occur in bouts with brief inter-tic intervals

• Vary in intensity
Tic Disorders

Tics are sensitive to a number of factors:

- Stress
- Anxiety
- Fatigue

Activities requiring focused attention & fine motor control (reading aloud, playing sports or musical instrument) may result in transient decrease in Tic activity

Tics can occur during sleep
Transient Motor or Vocal Tic Disorder

A. Single or multiple motor and/or vocal tics (i.e., sudden, rapid, recurrent, nonrhythmic, stereotyped motor movements or vocalizations)

B. The tics occur many times a day, nearly every day for at least 4 weeks, but for no longer than 12 consecutive months.

C. The disturbance causes marked distress or significant impairment in social, occupational, or other important areas of functioning.

D. The onset is before age 18 years.

E. The disturbance is not due to the direct physiological effects of a substance (e.g., stimulants) or a general medical condition (e.g., Huntington's disease or post viral encephalitis).

F. Criteria have never been met for Tourette's Disorder or Chronic Motor or Vocal Tic Disorder.
Chronic Motor or Vocal Tic Disorder

A. Single or multiple motor or vocal tics (i.e., sudden, rapid, recurrent, nonrhythmic, stereotyped motor movements or vocalizations), but not both, have been present at some time during the illness.

B. The tics occur many times a day nearly every day or intermittently throughout a period of more than 1 year, and during this period there was never a tic-free period of more than 3 consecutive months.

C. The disturbance causes marked distress or significant impairment in social, occupational, or other important areas of functioning.

D. The onset is before age 18 years.

E. The disturbance is not due to the direct physiological effects of a substance or a general medical condition.

F. Criteria have never been met for Tourette’s Disorder.
Tourette’s Syndrome

• TS is a developmental Neuropsychiatric Disorder with onset in childhood

• Both multiple motor tics and one or more vocal tics must be present at the same time, although not necessarily concurrently

• The tics must occur many times a day (usually in bouts) nearly every day or intermittently over more than 1 year, during which time there must not have been a tic-free period of more than 3 consecutive months

• Age at onset must be less than 18 years
Tourette’s Syndrome

Characteristics:

• Age 5-7: transient motor tics in face/eyes (blinking)

• Tics spread rostrocaudally to face, head, neck, arms – rarely legs

• Ages 8-15: vocal tics appear – several years after onset of motor tic

• Complexity of tics increases with age

• Severity of tics waxes and wanes throughout course and are exacerbated by stress, fatigue, extremes of temperature and external stimuli
Tourette’s Syndrome

Characteristics:

• Tic severity peaks between ages 8-12

• Tic severity decreases with onset of puberty (typically)

• 1/3 to ½ of patients have marked reduction in symptoms by late teens/early 20’s

• 1/3 to ½ are asymptomatic as adults
Tic Disorders - Prevalence

- Transient Tics in school age children ages 5-12 in range of 6%-20%

- Bimodal age of onset: Ages 3 - 5 and 9 - 12

- Chronic Tics in school age children ages 5-12 in range of .4%-4.5%

- Males to female ratio is 2:1

- Tourette’s Syndrome prevalence: 4 – 6/1000 children

- Vocal Tics alone (without motor tics) is rare – 5% of patients with Tics
Tic Disorders – Coexisting Disorders

• ADHD – 50% - 70% of Tourette's Syndrome patients – precedes onset of Tics by average of 2 years

• Obsessive Compulsive Disorder (OCD) – 50% of Tourette's Syndrome patients – presents later around ages 12-13 after Tics have reached peak severity

• “Tic Related OCD” – Obsessions of symmetry & exactness; Compulsions of do and redoing

• 65% of Tourette’s patients have disinhibited speech and behavior per self report
Tic Disorders – Coexisting Disorders

- 65% of Tourette’s patients have disinhibited speech and behavior per self report
- Patients with TS have 4X risk of migraine headaches
- Autism risk factor for TS – 6%
Tic Disorders – Etiology

**Genetic Factors**
- Parent with TS – offspring with 10-15% risk of TS; any tic disorder 25%; OCD 15-30%
- Concordance rates: MZ Twins 50%; DZ Twins 10%
- Candidate Gene – SLITRK1 and multiple genes

**Neuroanatomical Factors**
- Basal Ganglia (decreased R Caudate volume)
- Corticostriatal Thalamacocortical loop abnormalities (Activation of R frontal Cortex and Caudate in functional imaging during Tic Suppression)
Tic Disorders – Etiology

Epigenetic Factors:

• Psychosocial Stress (TS with increase in CRF)
• Gestational and Perinatal Insults (Smoking/Ischemia)
• Androgen exposure
• Heat
• Psychological Factors - TS youth report increases in psychosocial stress; fatigue, sleeplessness exacerbate TS
• Post Infectious Autoimmune Mechanisms
Tic Disorders – Etiology

Post-Infectious Autoimmune Mechanisms

• GABHS implicated in Rheumatic Fever and Sydenham’s chorea (SC)

• SC associated with motor and vocal tics, OCD and ADHD

• PANDAS includes some cases of OCD, SC and TS

• Odds ratio of or GABHS infection in 3 months prior to new onset of TS in children 3.1 (12.1 for multiple infections in previous 12-months)
Tic Disorders – Treatment

1. Educational and Supportive Interventions

2. Psychological Interventions

3. Pharmacological Interventions

4. Neurosurgical Interventions
Tic Disorders – Treatment

Educational and Supportive Interventions

• Family/teachers misconstrue tics as intentionally provocative

• Worse-case TS in frequently highlighted in press and internet

• Patient/family comforted in course and improvement for most patients

• School – short breaks for tics; tests in private; educate peers
Tic Disorders – Treatment

**Psychological**

Habit Reversal Training

1. Awareness training
   - Response description
   - Response detection
   - Early warning – aura
   - Situational awareness training

2. Competing Response Practice
   - Produce incompatible physical response
Tic Disorders – Treatment

Pharmacology

• Treat coexisting ADHD, OCD, Mood disorders 1\textsuperscript{st}

• D\textsubscript{2} receptor antagonism is most predictable/effective

• Pimozide & Haloperidol FDA approved for TS

• Risperidone, Olanzapine & ziprasidone supported by RCT

• Goal is to reduce tics to “tolerable”
Tic Disorders – Treatment

Pharmacology

• Alpha$_2$ Receptor agonists – Guanfacine & Clonidine

• Decrease CNS noradrenergic activity

• Guanfacine preferred – less sedation, more frontal lobe effects and minimal rebound hypertension

• 25-35% decrease in tic activity; Motor > Phonic

• Treatment choice for TS plus ADHD
Tic Disorders – Treatment

Pharmacology

Comorbid ADHD:

• Stimulants might improve, worsen or no change tics
• Non-stimulant options – Guanfacine, Clonidine, Atomoxetine, bupropion, Nortriptyline

Comorbid OCD:

• In general less responsive to CBT (exposure and RP)
• May respond better to SSRI with antipsychotic augmentation (both FGA or SGA)
Tic Disorders – Treatment

Pharmacology

- Botulinum Toxin – decreases tics and premonitory urges in injected sites

Neurosurgical Interventions

DBS – bilateral palladium stimulation