# Tic Disorders

## PROJECT ECHO

David A. Graeber, MD

March 20, 2013

# 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:

**Motor Tics**

- Eye blinking
- Grimacing
- Neck/Shoulder/Limb Movements

**Phonic (Vocal) Tics**

- Sniffing
- Grunting
- Chirping
- Throat Clearing

# 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)
- Corticostriatial 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 1st
- $D_2$ 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

<u>Pharmacology</u>

- 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