Tics in Childhood

Rationale

- Tics are the most common movement disorder seen in childhood.
- Primary care providers are often reluctant to diagnose Tourette’s without neurologic consultation.
- Proper evaluation and recognition of the true tic burden and any associated co-morbidities is essential for proper treatment.
- Counseling and treatment discussions are critical in the management of these patients and families.

Objectives

- Recognize and classify the common variety of tics seen in children
- Be comfortable with making the diagnosis of Tourette Syndrome
- Be able to properly discuss both the natural history of tics and Tourette as well as pharmacologic and non-pharmocologic treatment options.
Tics in Childhood

Features

- **Common**: 4% to 24% of all children
  - Most common movement disorder
- **Involuntary stereotypic repetitive movements or vocalizations**
- **May be transient or chronic**

Characteristics

- **Wax and Wane**
- Exacerbated by stress, excitement, anxiety, fatigue
- Improve with rest, relaxation, concentration
- Usually absent during sleep but may be present on polysomnograms
- Briefly suppressible; build up of “inner tension”
- Often preceded by a premonitory urge or “sensory tic”

Tic Classification

<table>
<thead>
<tr>
<th>Simple</th>
<th>Complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>Vocal</td>
</tr>
<tr>
<td>Eye blinking</td>
<td>Sniffling</td>
</tr>
<tr>
<td>Head twitching</td>
<td>Snorting</td>
</tr>
<tr>
<td>Head thrusting</td>
<td>Coughing</td>
</tr>
<tr>
<td>Shoulder shrugging</td>
<td>Throat clearing</td>
</tr>
<tr>
<td>Mouth opening</td>
<td>Grunting</td>
</tr>
<tr>
<td>Echokinesis</td>
<td>Barking</td>
</tr>
<tr>
<td>Copropraxia</td>
<td>Echolalia</td>
</tr>
<tr>
<td>Facial grimacing</td>
<td>Palilalia</td>
</tr>
<tr>
<td>Touching</td>
<td>Coprolalia</td>
</tr>
</tbody>
</table>
Tic Syndromes in Children

- **Provisional Tic Disorder (DSM V)**
  - Chronic Tic Disorder
    - Chronic Motor or Vocal Tics
    - Tourette Syndrome
  - **Nonspecific Tic Disorder**
    - Secondary to Drugs (Stimulants)
    - Assoc with Autistic Spectrum
  - PANDAS ?

- **Chronic Tic Disorders (>1yr)**
  - Chronic Multiple Motor or Vocal Tics
  - **Tourette Syndrome**

  In 1885, George Gilles de la Tourette reported nine patients with chronic tic disorders characterised by involuntary motor and phonic tics.

Tourette Syndrome

**Criteria (DSM V)**

- Onset < 18 yrs of age
- Multiple motor tics
- One or more vocal tic
- A waxing and waning course
- Duration > 1 yr
- Absence of medical explanation for tics

DMS V, 2013
### Diagnostic Criteria

<table>
<thead>
<tr>
<th><strong>Tourette syndrome</strong>&lt;sup&gt;1&lt;/sup&gt;</th>
<th><strong>Tourette disorder</strong>&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Onset:</strong></td>
<td>By age 21</td>
</tr>
<tr>
<td>Motor tics:</td>
<td>multiple</td>
</tr>
<tr>
<td>Vocal tic:</td>
<td>at least one</td>
</tr>
<tr>
<td>Course:</td>
<td>gradual; wax &amp; wane</td>
</tr>
<tr>
<td><strong>Duration:</strong></td>
<td>&gt; 1 year</td>
</tr>
<tr>
<td>Medications:</td>
<td>no tic provoking medications</td>
</tr>
<tr>
<td>Other:</td>
<td>not due to other disease</td>
</tr>
<tr>
<td>Witnessed:</td>
<td>Observed</td>
</tr>
</tbody>
</table>

1. TS Classification Group 1993
2. DSM V

### Tourette Syndrome

#### Clinical Facts
- Worldwide distribution
- Prevalence: 1 per 1000 up to 3.5% of school age
- Inherited but probably more than one gene
- 3:1 male > female
- Onset: 6-7 yrs (mean)
  - Usually before adolescence
- Usually begins with simple motor tic
- Increase with stress and anxiety
- Examination
  - Tics
  - "Soft signs"

### Tourette Syndrome

#### Clinical Course of Tics
- Wax and Wane
- Maximum severity between 8-12 yrs
- Early severity < Later severity
- **Prognosis:** Most improve
  - 26% resolved
  - 46% diminished
  - 14% stable
  - 14% increased

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Tourette Syndrome

**Comorbidity**

- Obsessive Compulsive Disorders – 20-89%
- Attention Deficit Hyperactive Disorder – 50%
- Anxiety – 19-80%
- Mood Disorders - Depression – 30-40%
- Learning Difficulties – 20-30%
- Other
  - Impulsivity and aggression
  - Substance Abuse

**Obsessive-Compulsive Behaviors**

- 20-89% of TS patients
- Usually emerge after tics
- Usually obsessions or compulsions
- Associated with:
  - Impulsivity / Aggression
  - Depression / Anxiety

**Attention Deficit-Hyperactive Disorder**

- 50-60% of TS patients (21-90%)
- Generally begins before tics by 2-3 yrs
- Not associated with the tic severity
- Characterized by:
  - Impulsivity / Hyperactivity
  - Poor attention

**Genetic Epidemiology**

- Overall risk of TS in relatives is 10.7%
  - Male relatives – 17.7%
  - Female relatives – 5.2%
- Concordance rate for TS
  - MZ twins – 86%
  - DZ twins - 20%
Tourette’s and the SLITRK1 gene

- SLITRK1 is a Tourette gene
  - Only accounts for < 2% of TS patients
- Other candidate genes:
  - Chromosome 17
  - Chromosome 8
  - Chromosome 2
  - Chromosome 11


What is the risk to my children if I have Tourette?

- Risk for TS – 10%
- Risk for a tic disorder – 30%
- Risk for OCD – 30%
- Risk for ADHD – 40%
- Risk for any of the three – 60%
- Higher risk if both parents have TS
  - 75% for a tic disorder
  - 50% for Tourette
  - 95% for any of above

Tourette’s Syndromes

Neurobiology

- Cortico-striatal-thalamocortical pathway
- Neurotransmitters
  - Dopamine
  - GABA
  - Glutamate
  - Noradrenergic
  - Serotonin
  - Cholinergic
  - Opioid

Tourette’s Syndromes

How to Rx – What to Rx

Tics

ADHD

OCD
Tic Treatments
Options

- Education ***
- Behavioral approaches
- Pharmacotherapy
- Deep brain stimulation

Tic Treatment
Non-pharmacologic Therapy

- Relaxation therapy
- Habit reversal training
- Acupuncture
- Biofeedback
- Hypnosis

Habit Reversal Therapy

- Habit reversal training consists of two main components. These are:
  - Tic-awareness training, which teaches patients to recognize early signs that precede the onset of a tic
  - Competing-response training, which teaches patients to perform a voluntary movement that is incompatible with the particular type of tic

Behavior therapy for children with Tourette disorder: a randomized controlled trial.

Results: Behavioral intervention led to a significantly greater decrease on the Yale Global Tic Severity Scale (24.7 [95% confidence interval, 23.1-26.3] to 17.1 [95% CI, 15.1-19.1]) from baseline to end point compared with the control treatment (24.6 [95% CI, 23.2-26.0] to 21.1 [95% CI, 19.2-23.0]) (P < .001; difference between groups, 4.1; 95% CI, 2.0-6.2). Significantly more children receiving behavioral intervention compared with those in the control group were rated as being very much improved or much improved on the Clinical Global Impressions–Improvement scale (52.5% vs 18.5%, respectively; P < .001; number needed to treat = 3). Attrition was low (12/126, or 9.5%); tic worsening was reported by 4% of children (5/126). Treatment gains were durable, with 87% of available responders to behavior therapy exhibiting continued benefit 6 months following treatment.
### Tic Treatment
**Pharmaco therapy – Non-neuroleptics**

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Dose Starting (mg/d)</th>
<th>Dose Usual (mg/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clonidine</td>
<td>Catapres</td>
<td>0.025-0.05</td>
<td>0.1-0.3</td>
</tr>
<tr>
<td>Guanfacine</td>
<td>Tenex</td>
<td>0.25-0.5</td>
<td>0.5-3.0</td>
</tr>
<tr>
<td>Baclofen</td>
<td>Lioresal</td>
<td>10-15</td>
<td>20-60</td>
</tr>
<tr>
<td>Clonazepam</td>
<td>Klonopin</td>
<td>0.025-0.5</td>
<td>0.5-3.0</td>
</tr>
<tr>
<td>Topiramate</td>
<td>Topamax</td>
<td>15-25</td>
<td>100</td>
</tr>
</tbody>
</table>

### Tic Treatment
**Pharmaco therapy – Neuroleptics**

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Dose Starting (mg/d)</th>
<th>Dose Usual (mg/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pimozide</td>
<td>Orap</td>
<td>0.5-1</td>
<td>1-10</td>
</tr>
<tr>
<td>Risperidone</td>
<td>Risperdal</td>
<td>0.25-0.5</td>
<td>0.5-3.0</td>
</tr>
<tr>
<td>Fluphenazine</td>
<td>Prolixin</td>
<td>0.25-1.0</td>
<td>0.5-6</td>
</tr>
<tr>
<td>Olanzapine</td>
<td>Zyprexa</td>
<td>2.5</td>
<td>2.5-10</td>
</tr>
<tr>
<td>Haloperidol</td>
<td>Haldol</td>
<td>0.25-0.5</td>
<td>1-5</td>
</tr>
</tbody>
</table>

### Tic Treatment
**Pharmaco therapy – Others**

- Botulinum toxin
- delta-9-tetrahydrocannabinol
- Nicotine patch
- Tetrabenazine
- Ropinirole

### Practical Points
- Chronic tics are common
- Do not assume tics are cause of disability
- Ascertain comorbidities, and identify impairment/disability
- Pharmacologic therapy for tics should not be the default
  - Relatively low impact strategies are often sufficient
    - Education, stress reduction
    - Cognitive/behavioral intervention
  - Beware the early institution of neuroleptics
- Therapy for comorbidities may help to ameliorate tics
Tics in Childhood
Suggested Changes:

As a result of participating in this conference, I plan to apply the following changes in my practice:

- Recognize and diagnose common motor and vocal tics in children
- Be comfortable in diagnosing Tourette Syndrome
- Be able to properly discuss both the natural history of tics and Tourette as well as pharmacologic and non-pharmacologic treatment options.

References

6. www.tourettesyndrome.net

Addendum

Supplemental Material

Tourette Syndrome - DSM-V

- Both multiple motor and one or more vocal tics
- Tics occur for over one year
- Onset before 18 years
- No other medical / neurologic condition

Changes with DSM-V

- Tic-free intervals
- Distress / Impairment
- No more Transient Tic Disorder - now Provisional Tic Disorder
Tourette’s Syndromes
How to Rx – What to Rx

**Tics**
- Clonidine
- Pimozide
- Risperdal
- Clonidine
- Guanfacine
- Clomipramine

**ADHD**
- Stimulants
- Strattera

**OCD**
- SSRIs
- Clomipramine

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**Attention Deficit-Hyperactive Disorder**
- Behavioral and educational approaches
- Pharmacologic Treatment
  - alpha-Adrenergic agonists
  - Central Stimulants (Ritalin, Dexedrine, Adderall)
  - Atomoxetine (Strattera)
  - Tricyclics

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### OCD Treatment

<table>
<thead>
<tr>
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<th>Dose Starting (mg/d)</th>
<th>Dose Usual (mg/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoxetine</td>
<td>Prozac</td>
<td>5-10</td>
<td>20-40</td>
</tr>
<tr>
<td>Sertraline</td>
<td>Zoloft</td>
<td>25</td>
<td>75-200</td>
</tr>
<tr>
<td>Citalopram</td>
<td>Celexa</td>
<td>10-20</td>
<td>20-60</td>
</tr>
<tr>
<td>Clomipramine</td>
<td>Anafranil</td>
<td>25</td>
<td>50-200</td>
</tr>
</tbody>
</table>