TICS AND TOURETTE SYNDROME
NON-MEDICAL, ALTERNATIVE THERAPY

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Cincinnati Children's Hospital Medical Center
I have the following financial relationships with the manufacturers of commercial products and/or providers of commercial services:

Ecopipam Pharmaceuticals, EryDel Pharmaceuticals, and Neurocrine Pharmaceuticals - Research Grant

(Please note: Clinical trial site investigator);

Elsevier – Royalties for books

I have been site investigator for a Phase 2 study of a new medication for Tourette Syndrome, which I will not discuss.

I do not intend to discuss an unapproved/investigative use of a commercial products (drugs, devices) related to these relationships.
Learning objectives

1. Distinguish between tics and complex motor stereotypies
2. Recognize that children with tics and Tourette Syndrome often have co-occurring ADHD, OCD, and other developmental or psychiatric symptoms
3. Recognize common areas of impairment in TS in home, school, and social domains
4. Apply individualized treatment strategies for impairing symptoms in children with tics/ Tourette Syndrome
As a result of attending this lecture at the 2017 Practical Pediatrics CME course, I encourage you to make the following change in your practice

1. Educate parents and kids about impairment and outcomes in tic disorders.

2. When tics are impairing, offer opportunities for behavioral/non-medical interventions.

3. Consider tics but also comorbidities in treatment decisions.
Involuntary Movements?
TICS

WHAT is the movement?

1. Tics
2. Myoclonus
3. Stereotypy
Tics

- Patterned, discrete, countable (usually)
- Repetitive but Non-rhythmic
- Increase with stress
- Decrease with focused activity

- Semi-voluntary: “I have to do it”
- Semi-suppressible
- Sensory Urge
- Onset usually after age 3
- Upper body > lower body
Recognizing Tics

Which one of these children has tics?
Compare

A

B
TICS

A. Myoclonus – in this child it overflows into Action
B. Tics - Urge, suppression, suppression by action
Which one is NOT ticcing?

A  B  C  D
# Key Distinguishing Features of tics versus stereotypies

<table>
<thead>
<tr>
<th>Feature</th>
<th>TICS</th>
<th>STEREOTYPIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age of onset</strong></td>
<td>Usually after age 3 years</td>
<td>Usually before age 3 years</td>
</tr>
<tr>
<td><strong>Evolution over time</strong></td>
<td>Over weeks to months, waxing, waning, migrating location. Peak age 9-14 years.</td>
<td>Remain relatively unchanged from onset, last for years; may persist into adulthood but frequency diminishes in adolescence in non-autistic kids.</td>
</tr>
<tr>
<td><strong>Exacerbating factors or situations</strong></td>
<td>Stress, excitement, relaxation after a busy period</td>
<td>Occur in certain emotional states: happiness - excitement, boredom, anxiety, sensory overloaded/socially overwhelmed</td>
</tr>
</tbody>
</table>
Clinical Criteria for diagnosis of Tourette Syndrome

• 2 or more motor tics, 1 or more *phonic* tics
• Duration > 1 year
• Anatomic location, number, frequency, complexity, severity changes over time
• Onset before age 21
• Not iatrogenic or a symptom of another Diagnosis
• Prevalence is 3-6 per 1000
Diagnostic workup for TS
IMPACT OF TICS IN TS – PARENT AND KID PERSPECTIVES

Preliminary evaluation of child self-rating using the Child Tourette Syndrome Impairment Scale

KELLY ISAACS CLOES¹ | KARA S FRANCIS BARFELL² | PAUL S HORN² | STEVE W WU² | SARAH E JACOBSON² | KATHLEEN J HART¹ | DONALD L GILBERT²

¹ Department of Psychology, Xavier University, Cincinnati, OH; ² Department of Neurology, Cincinnati Children’s Hospital Medical Center Division of Neurology, University of Cincinnati, Cincinnati, OH, USA.
TOP TIC IMPAIRMENT - CHILD

- Concentrating on work
- Oral reports/ reading out loud
- Taking Tests
- Doing homework
- Being with strangers
- Sleeping
TOP TIC IMPAIRMENT - PARENT

• Teasing by peers
• Concentrating on work
• Taking tests
• Oral reports/reading out loud
• Being with strangers
• Making new friends

*Children ranked this 8th!!
TOP NON-TIC IMPAIRMENT - CHILD

• Concentrating on work
• Doing homework
• Oral reports/ reading out loud
• Taking Tests
• Preparing for class
• Writing in class
TOP NON-TIC IMPAIRMENT - PARENT

- Concentrating on work
- Preparing for class
- Doing homework
- Taking Tests
- Writing in class
- Getting along with parents
TIC IMPAIRMENT

NON-TIC IMPAIRMENT
A 7 year old boy, diagnosed at age 5 with ADHD and treated for past 1.5 years with methylphenidate presents with throat clearing and blinking tics. Is it caused by methylphenidate?
A 11 year old boy, diagnosed at age 8 with Tourette Syndrome based on greater than one year of motor and phonic tics, comes to your office due to worsening tics.
Why are these kids more ticcy?

• Natural history most likely
• Acute/subacute psychosocial stressors may play a role
INTERVENTIONS FOR TICS

• Not supported by good evidence — various vitamins and supplements, other non-validated therapies
• Behavioral Therapy — CBIT
• Medications
Behavior Therapy for Children With Tourette Disorder
A Randomized Controlled Trial


**Design, Setting, and Participants** Randomized, observer-blind, controlled trial of 126 children recruited from December 2004 through May 2007 and aged 9 through 17 years, with impairing Tourette or chronic tic disorder as a primary diagnosis, randomly assigned to 8 sessions during 10 weeks of behavior therapy (n=61) or a control treatment consisting of supportive therapy and education (n=65). Responders received 3 monthly booster treatment sessions and were reassessed at 3 and 6 months following treatment.
<table>
<thead>
<tr>
<th>Table 2. Baseline, Week 5, and Week 10 Scores on Key Outcome Measures (^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (95% CI)</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Yale Global Tic Severity Scale Total tic score</td>
</tr>
<tr>
<td>Baseline</td>
</tr>
<tr>
<td>Week 5</td>
</tr>
<tr>
<td>Week 10</td>
</tr>
<tr>
<td>Total motor</td>
</tr>
<tr>
<td>Baseline</td>
</tr>
<tr>
<td>Week 5</td>
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<tr>
<td>Week 10</td>
</tr>
<tr>
<td>Total vocal</td>
</tr>
<tr>
<td>Baseline</td>
</tr>
<tr>
<td>Week 5</td>
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<tr>
<td>Week 10</td>
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<tr>
<td>Impairment</td>
</tr>
<tr>
<td>Baseline</td>
</tr>
<tr>
<td>Week 5</td>
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<tr>
<td>Week 10</td>
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</tbody>
</table>
TREATMENT OF ADHD IN CHILDREN WITH TICS

NEUROLOGY 2002; 58:527-536

The Tourette’s Syndrome Study Group
Changes in tics and ADHD

<table>
<thead>
<tr>
<th></th>
<th>YGTSS (total tics)</th>
<th>ASQ Teacher (ADHD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>38</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>41</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>13</td>
</tr>
</tbody>
</table>

- Placebo
- MPH
- Clon
- MPH + clon
ATOMOXETINE TREATMENT IN CHILDREN AND ADOLESCENTS WITH ADHD AND COMORBID TIC DISORDERS.

ALLEN AJ, KURLAN RM, GILBERT DL, COFFEY BJ, LINDER SL, LEWIS DW, ET AL.

NEUROLOGY. 2005;65:1941-9
Yale Global Tic Severity Scale

All Patients n=146; 18 wks

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Motor</th>
<th>Phonic</th>
<th>Overall Impairment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>21.7</td>
<td>13.2</td>
<td>8.5</td>
<td>21.6</td>
</tr>
<tr>
<td>Atomoxetine</td>
<td>22.2</td>
<td>12.8</td>
<td>9.4</td>
<td>19.9</td>
</tr>
<tr>
<td>Placebo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean Change from Baseline

- Total: \( p = 0.063 \)
- Motor: \( p = 0.119 \)
- Phonic: \( p = 0.168 \)
- Overall Impairment: **\( p = 0.004 \)**
ADHD Rating Scale (ADHD-RS)
All Patients n=146; 18 wks

Mean Change from Baseline

<table>
<thead>
<tr>
<th></th>
<th>Total Score</th>
<th>Inattentive Subscale</th>
<th>Hyperactive/Impulsive Subscale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline:</td>
<td>38.9 35.0</td>
<td>21.6 20.5</td>
<td>17.2 14.6</td>
</tr>
<tr>
<td><strong>Atomoxetine</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Placebo</strong></td>
<td></td>
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$p = .008$  $p < .001$  $p < .001$
WHAT TO DO WHEN TICS BEGIN ON STIMULANTS?

• If the tics are very mild and the stimulants are clearly beneficial, stay on the stimulants and wait it out.
• Try reducing the dose (I rarely exceed 1 mg/kg/day).
• Stop stimulant, try an alternative medication for a while (clonidine, guanfacine).
FIRST-LINE TREATMENT OF TICS – CLASS B EVIDENCE

- Alpha 2 adrenergic agonists: clonidine (Catapres), guanfacine (Tenex, Intuniv) -- fight or flight
  - Probably harmless long-term
  - 20-50% effective for tics
  - May not work for 2-6 weeks
  - Also help with ADHD and aggression
  - Side effects mainly sedation (25-50% with clonidine)
INTERMEDIATE OPTIONS – SECOND LINE CLASS B TO C

• Topiramate
• Dopamine agonists
• Baclofen, a muscle relaxant
• Botox
• Anti-anxiety medications
THIRD LINE TREATMENT FOR TICS – CLASS A

• Neuroleptics / dopamine antagonists: haloperidol (Haldol), pimozide (Orap), fluphenazine (Prolixin), risperidone (Risperdal), aripiprazole (Abilify)
  • Highest efficacy
  • Multiple short-term side effects
    • weight gain, sedation, anxiety, depression...
  • Need to monitor for neuroleptic-induced movement disorders
SUMMARY OF TREATMENT INDICATIONS FOR TICS

• Base treatment decisions on impairment
• Rank tic vs. non-tic impairment and get perspective of child and parent
• Most individuals with tics do not need medication for tics
• Consider medications for persistent tics if they cause:
  • Functional impairment (uncommon)
  • Social impairment or classroom/workplace disruption
  • Pain
LONGTERM OUTCOMES FOR TICS?

• Brain seems to develop compensatory functions – tics most often diminish in adulthood

• Create resilience!
As a result of attending this lecture at the 2017 Practical Pediatrics CME course, I encourage you to make the following change in your practice

1. Educate parents and kids about impairment and outcomes in tic disorders.

2. When tics are impairing, offer opportunities for behavioral/non-medical interventions. CBIT is a proven therapy.

3. Rank and target – comorbid symptoms may cause more impairment. It is OK to treat ADHD pharmacologically with stimulants despite presence of tics.
REFERENCES


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THANK YOU FOR YOUR ATTENTION