Dr. Robles-Ramamurthy will review the diagnostic process for ADHD with emphasis on recognizing associated symptoms such as oppositional behavior, depression and learning difficulties. She will discuss the various types of medication treatments for ADHD in terms of their benefits and risks. Behavior therapy for ADHD will be reviewed. Finally, she will present recent neuroimaging and genetic data that may shed light on the brain mechanism of ADHD.

To download this handout go to: www.winston-sa.org/symposium/
Diagnosis and Treatment of ADHD

Barbara Robles-Ramamurthy, M.D.
Assistant Professor
Department of Psychiatry

Making the Diagnosis

- Done by interview of parent and child, obtaining school information.
- No neuroimaging or laboratory test is available for diagnosis of ADHD.
- ADHD symptoms can show up on a psychological evaluation, but they may not.
- Psychological evaluation is best for detecting learning disabilities.

Interviewing the parent

- Review the rating scales from home and school. Look at report card, behavior chart if scales not available
- “I see there are a lot of sxx of inattention and/or impulsivity”
  - When did they start? (DSM-5 allows onset by age 12)
  - Nearly every day?
  - Impairment school and home?
  - Re-direct extensive “Story telling”
Interviewing the parent

- Academics
  - Grades may not be impaired in early grades
- Learning disability vs. ADHD
  - Psychological evaluation is NOT required for a diagnosis of ADHD
  - Inconsistent with Learning disability
    - "He can do it (school work) when he wants to"
    - Able to do work when one on one
- LD does not masquerade as ADHD (particularly impulsivity)
- Only when ADHD is treated can true cognitive ability be assessed

Ruling out MAJOR mental illnesses

- Minor depression/anxiety are common in ADHD and are NOT a contradiction to stimulant treatment
- Many ADHD children discouraged about their lives, this gets better with treatment
- Questions to ask about depression/anxiety
  - How often does it occur, (daily, weekly rarely)?
  - How long does it last?
  - What does he/she talk about?
  - Self esteem issues?

Depression vs. Frustration

Major depressive disorder
- Sad/Irritable/Depression 3-5 times per week for at least an hour
- Chronic low self esteem
- Suicidal ideation/plan outside of anger outbursts
- Neurovegetative signs

Demoralization/Emotional lability
- Intermittent sadness or anger
- Tied to frustration
- Brief threats of self harm that resolve when calm
- No neurovegetative signs except difficulty falling asleep.
Interview with child

- In young child, focus on depression and anxiety rather than the ADHD
- Ask concrete questions, quantify
- Sad/Happy: Like self/don't like self; hurt self; wish dead; suicide
- Rules: how parent's punish; fair/unfair; corporal punishment; abuse
- Psychosis screen

Anger issues

- Anger/aggression in ADHD most often improve when ADHD is treated
- Aggression a rare side effect and is often related to rebound
- Anger/aggression not a contraindication to ADHD treatment unless:
  - Severe, prolong rage attacks
  - Psychotic symptoms co-occurring with anger
  - Self injurious behavior (beyond dropping or head banging, ie cutting, suicidal ideation)

Methylphenidate (MPH)
Methylphenidate (MPH)

- Apatensio XR:
  - 40% released immediately, 60% as extended release

Amphetamine-1

Amphetamine-2
Side Effects with Methylphenidate and Amphetamine Therapy

Many side effects are characteristic of ADHD and improve with stimulant treatment.

- *P < .01 vs placebo, †P < .01 vs methylphenidate.

Choosing stimulant

- On average MPH and AMP have equal efficacy and degree of adverse events
- Wide individual variation in how patients respond to stimulant class/formulations
- No clinical predictors of stimulant response exist
- Careful individual trials are needed

Stages of Medication RX for ADHD

1. Trial of a single stimulant, try different formulations for duration action
2. Trial of stimulant in alternate class
   - MPH fail → AMP
   - AMP fail → MPH
3. Trial of atomoxetine or alpha agonist XR
4. Combination of stimulant and alpha agonist
Alpha Agonist Summary

Clonidine
- Increasingly used in single dose in PM for insomnia secondary to stimulants (0.05 to 0.1 mg q HS)
- Declining role for treatment of daytime ADHD due to efficacy issues as well as sedation

Guanfacine
- Both immediate release and XR used more for ADHD itself
- Non-responders to stimulants and atomoxetine
- Patients with stimulant-induced tics whose ADHD responds only to stimulants

Dosing of alpha agonists

<table>
<thead>
<tr>
<th>Week</th>
<th>Dosage (mg) of Alpha Agonist (Weight &lt; 45 kg)</th>
<th>Dosage (mg) of Alpha Agonist (Weight &gt; 45 kg)</th>
<th>All weights</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clonidine</td>
<td>Guanfacine</td>
<td>Clonidine</td>
</tr>
<tr>
<td>1-2</td>
<td>0.05 q.h.s.</td>
<td>0.5 q.h.s.</td>
<td>0.1 q.h.s.</td>
</tr>
<tr>
<td>2-4</td>
<td>0.05 b.i.d.</td>
<td>0.5 b.i.d.</td>
<td>0.1 b.i.d.</td>
</tr>
<tr>
<td>3-6</td>
<td>0.05 t.i.d.</td>
<td>0.5 t.i.d.</td>
<td>0.1 t.i.d.</td>
</tr>
</tbody>
</table>

Rebound

- When medication wears off, possible that behaviors not only return to baseline, but are worse.
- Evening behavior— is it “just the same” or “worse”? Is it associated with irritability/outbursts not present before meds (or much worse after meds)?
- If school behavior much improved, but evening behavior worse, that is rebound.
- If irritability is worse during the peak time of the stimulant during the day, that is a mood side effect (rare)
How to handle rebound

- If rebound occurs at 4 PM or symptoms do not controlled after 4 PM in spite of long acting:
  - If room for improvement in daytime ADHD, increase AM dose of long acting stimulant
  - If perfect at school but sx rebound at 4 PM, add short acting stimulant in pm
- If rebound occurs later in night or is associated with severe predominately irritable mood add alpha agonist.

Sculpting the stimulant dose

<table>
<thead>
<tr>
<th>Day time dose</th>
<th>Afternoon dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concerta 18 mg Q AM</td>
<td>MPH 5-10 q 4 pm</td>
</tr>
<tr>
<td>Concerta 36-72</td>
<td>MPH 10-20* mg q 4 PM</td>
</tr>
<tr>
<td>Vyvanse 30-50 mg Q AM</td>
<td>DEX/MSA 5-15 mg q 4 PM</td>
</tr>
<tr>
<td>Vyvanse 60-70 mg Q AM</td>
<td>DEX/MSA 5-15 mg q 4 PM</td>
</tr>
<tr>
<td>Focalin XR 5 mg Q AM</td>
<td>D-MPH 2.5 mg q 4 PM</td>
</tr>
<tr>
<td>Focalin XR 10 mg Q AM</td>
<td>D-MPH 5 mg Q 4 PM</td>
</tr>
<tr>
<td>Focalin XR 15-30 mg Q AM</td>
<td>D-MPH 7.5-10* mg q 4 PM</td>
</tr>
</tbody>
</table>

*Caution regarding sleep and appetite

Adding alpha agonist

- Add for:
  - "Hyperarousal", either baseline or stimulant induced- irritable, crying, can't settle
  - Partial response of ADHD symptoms when stimulant has been maximized
  - Sleep issues
  - Tics (as discussed)
**Adding alpha agonist**

<table>
<thead>
<tr>
<th>Sleeps Problems Only</th>
<th>Irritability PM only</th>
<th>All day irritability partial response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clonidine 0.1-0.2 mg q hs</td>
<td>Guanfacine ER 1-2 mg q 4 PM</td>
<td>Intuniv 1-4 mg q AM</td>
</tr>
<tr>
<td>Avoid doses above 0.2 mg</td>
<td>Can be added to pm stimulant dose</td>
<td>Can give Intuniv q hs</td>
</tr>
<tr>
<td>Clonidine ER helpful in severe hyperarousal, watch for sedation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Behavior management**

The Psychology of ADHD
- There is no “Why”?
- Everything is short term
- Parental ADHD/ADHD traits a problem
- ADHD children do not process rewards and punishments similar to typically developing children:
  - Always go for immediate reward
  - Cannot delay gratification
  - Social rewards not “salient” i.e. reinforcing

**Behavioral Approaches**

<table>
<thead>
<tr>
<th></th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t hit sister</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Do things 1st time asked</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Homework</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Recent Research on ADHD

Cortical Surface Area

Figure 2: Region where age of attaining peak surface area was evaluated in order to figure out how the differences between high activity disorder and typically developing participants.

Meta-analysis of fMRI data

JAMA Psychiatry 70(10):1859-1863, 2013
Questions?