ADHD
Getting the Diagnosis Right & Management of Complex Cases

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ADHD: AAP Diagnostic Guideline
Evidenced-based recommendations: 6-12 yo

- Inattention, hyperactivity, impulsivity, academic underachievement, behavior problems---initiate an ADHD evaluation
- DSM-IV criteria---gold standard
- Evidence of behaviors from parents and classroom teacher (duration, intensity and functional impairment)
- Co-existing conditions (learning disabilities and mental health conditions)
- Other diagnostic tests not routinely indicated

ADHD: Diagnostic Criteria
DSM-IV (1994)

- Inattention: 9 behaviors
- Hyperactivity/Impulsivity: 9 behaviors
- 6/9 behaviors occurring often, >6 months, and present before 7 years of age
- Behaviors documented at home and school
- Evidence or impairment in academic and/or social function

ADHD: Inattention
Behaviors that occur OFTEN

- Makes careless mistakes in schoolwork or other activities
- Difficulty sustaining attention in tasks or play activities
- Not seem to listen when spoken to directly
- Not follow through on instructions; fails to finish schoolwork, chores
- Difficulty organizing tasks and activities
- Avoids tasks that require sustained mental effort
- Loses things necessary for tasks or activities
- Easily distracted by extraneous stimuli
- Forgetful in daily activities

Hyperactivity/Impulsivity
Behaviors that occur OFTEN

Hyperactivity
- Fidgets with hands or feet or squirms in seat
- Leaves seat in classroom or in other situations
- Runs about or climbs excessively in situations in which it is inappropriate
- Difficulty playing or engaging in leisure activities quietly
- “On the go” or often acts as if “driven by a motor”
- Talks excessively

Impulsivity
- Blurts out answers before questions completed
- Difficulty awaiting turn
- Interrupts or intrudes on others

Disclosure
I have the following financial relationship with the manufacture of a commercial product discussed in this CME activity: Eli Lilly Co. (unrestricted educational grant and pediatric advisory board).
ADHD: AAP Treatment Guideline

Treatment Strategies

- Education (parents and child)
- Setting target outcomes
- Behavioral management
- Classroom and home accommodations
- Medication
- Systematic follow-up plan

Getting the diagnosis right

- Interview parents and child and/or ADHD specific behavioral checklist
- Teacher narrative or behavior checklist
  “Tell me about Joey in class… about his behavior and learning style”
- Screen for mental health disease and LD
- Knowledge about the family

Educating Parents about ADHD

- Goal: to empower parents toward the belief that their participation in treatment can make a difference
- ADHD is a chronic condition
- Reframing of pediatrician’s mind-set from acute illness to chronic condition
- Helping family set goals (child specific)
- Coordination of services
- Monitoring treatment and course
- Linking families who have kids with ADHD

Parent Education: A Critical Part of the Diagnostic Process

- AAP Brochure: “Understanding ADHD”
  For clinicians and parents
  Diagnostic process
  Treatment (behavioral modification, environmental accommodations, working with school, adolescents)
- AAP: (800) 433-9016

Treatment Goals

- Improve organizational skills and executive functions
- Enhance self-esteem
- Prepare child with ADHD to successfully function and competently manage strengths and weaknesses with ADHD as an adult

Ref: Gephart H, Leslie L. ADHD Pharmacotherapy

Setting Target Outcomes

- Improve social relationships with parents, siblings, teachers and peers
- Improve academic performance (work efficiency, completion and accuracy)
- Independence in self-care and homework
- Improve self-esteem
- Enhance safety in community
**Individualizing Target Outcomes**

- Improve core symptoms of ADHD
- Reduce associated symptoms
  - Anxiety, depression, oppositional behaviors, conduct disturbance
- Improve functioning in education
- Verbal or written communication skills
- Completing assignments/homework
- Reduce supervision at school or in community
- Improve social relationships

**ADHD: Selecting an initial medication**

- Effectiveness (RCTs)
- Side effect profile
- Duration of action
- Child-friendly formulation
- Co-existing behavioral conditions
- Cost
- Risk for diversion and abuse
- Family history of ADHD medication
- History of substance abuse
- History of cardiac disease (pt/family)

**Medications for ADHD: A History**

<table>
<thead>
<tr>
<th>FDA Approval</th>
<th>RTCs</th>
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<tr>
<td>Amphetamine</td>
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<td>Methylphenidate</td>
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<td>Atomoxetine</td>
<td>2003</td>
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<td>Tricyclics</td>
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<tr>
<td>Bupropion</td>
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<td>Clonidine</td>
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<tr>
<td>Guanfacine</td>
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<td>Lisdexamphetamine</td>
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**Stimulant Medication**

**Methylphenidate and Amphetamines (Regulation of dopamine)**

- Equivalent head-to-head responses in reducing core symptoms of ADHD
- >200 RCT’s of stimulants
- 70% of children respond to 1 stimulant
- Half who fail 1st stimulant or who have intolerable side effects, respond to 2nd stimulant
- Short-acting, intermediate-acting and extended release preparations

**Titrating Stimulant Medications**

- Not weight dependent
- Begin low and titrate upward
- Variability in dose response
- **Initial positive response may not be optimal dose to improve function**
- Goal: optimal effects with minimal SE’s
- Schedule depends on target outcomes
  - (5 or 7 days/week; holidays; afternoon dose)

**Choosing medication: methylphenidate**

<table>
<thead>
<tr>
<th></th>
<th>Concerta</th>
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<td>10-12 hrs</td>
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<td>Dosing</td>
<td>Once</td>
<td>Once</td>
<td>Once (BID)</td>
<td>Once (BID)</td>
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<tr>
<td>Onset</td>
<td>IR over-coat/22%</td>
<td>IR bead</td>
<td>IR bead</td>
<td>IR bead 50%</td>
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<td>Ease of use</td>
<td>Capsule</td>
<td>Capsule</td>
<td>Sprinkle</td>
<td>Sprinkle</td>
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Choosing Medication: amphetamine

<table>
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<th>Adderall XR</th>
<th>Adderall</th>
<th>Dexedrine Spansules</th>
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<tr>
<td>Duration</td>
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<td>6-8 hrs</td>
<td>6 hrs</td>
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<tr>
<td>Dosing</td>
<td>Once</td>
<td>BID</td>
<td>BID</td>
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<tr>
<td>Abuse Risk</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
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<tr>
<td>Onset</td>
<td>Slower at lower dose</td>
<td>Later Cmax</td>
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<tr>
<td>Ease of use</td>
<td>Sprinkle</td>
<td>Grind</td>
<td>Sprinkle</td>
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Novel MPH ER Technologies: DOT Matrix™

- Evenly dispersed, concentrated drug cells within adhesive layer
- Concentration gradient between drug and skin allows efficient diffusion
- Precise content ratios control rate of delivery
- Patch size conversion to MPH dose delivered over 9 hours:
  - 12.5 cm² = 10 mg
  - 18.75 cm² = 15 mg
  - 25 cm² = 20 mg
  - 37.5 cm² = 30 mg


MTA Study
Multimodal Treatment Study of Children w/ADHD

Study of long term treatment for ADHD
6 sites/579 children ages 7-9

Randomly assigned groups
- Medication management
- Behavior treatment
- Combined (medication and behavior)
- Standard community care


MTA Study
Multimodal Treatment Study of Children w/ADHD

- Started with methylphenidate
- Non-responders: amphetamine or non-stimulant
- Short-acting dosing (TID)
- Behavior treatments:
  - Parent training
  - Intensive summer school program
  - Teacher training w/ aid in classroom
  - Daily home/school behavior report cards

MTA Study
Multimodal Treatment Study of Children w/ADHD

- Combined treatment did not yield significantly greater benefits than medication-only management for core ADHD symptoms
- Combined treatment outcomes were achieved with lower medication doses than medication alone (mean dose: 37 vs. 31 mg/day MPH)

MTA Study
Multimodal Treatment Study of Children w/ADHD

In several non-ADHD domains of functioning, combined treatment was superior to MTA medication management, behavioral treatments and community care
- Oppositional defiant disorder
- Symptoms of depression and anxiety
- Teacher rated social skill deficits
- Parent-child relationships
- Reading achievement
Recent experiences with look-alike cases of ADHD

- Obstructive sleep apnea
- Moderate to severe allergic rhinitis: poorly controlled due to under treatment
- Adrenoleukodystrophy
- Marfan Syndrome
- Velocardiofacial syndrome (22 q deletion)

Anxiety Disorders

- Generalized anxiety disorder
- Phobias
- Separation anxiety
- Social anxiety
- Selective mutism
- Obsessive-compulsive disorder

ASK ABOUT FAMILY HISTORY

ADHD: Co-existing Conditions

- Oppositional Defiant Disorder 25%
- Anxiety Disorder 15-20%
- Conduct Disorder 10%
- Depressive Disorder 5-10%
- Learning disorders 12% ?
- OCD, PTSD Tourette’s Syndrome
- Environmental stressors

ADHD (I) + Anxiety

- Stimulant alone (MTA study)
- Stimulant w/ cognitive-behavioral therapy (CBT)
- Atomoxetine alone
- Atomoxetine and CBT
- Stimulant or atomoxetine w / SSRI

ADHD: Co-existing Conditions

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<thead>
<tr>
<th>Medical / Neurologic</th>
<th>Behavioral / Emotional Disorders</th>
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<tbody>
<tr>
<td>Prenatal drug and alcohol exposure</td>
<td>Attentional Disorders (ADHD)</td>
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<tr>
<td>Exposure to toxins (including lead)</td>
<td>Learning Challenges / Disorders</td>
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<td>Sensory impairment (hearing/vision)</td>
<td>Cognitive-Adaptive Disability (Mental Retardation)</td>
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<td>Chronic illness</td>
<td>Pervasive Developmental Disorders</td>
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<td>“Functional” disorders</td>
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<td>Neurodegenerative diseases</td>
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<td>Static and tonic encephalopathies</td>
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<td>Post-traumatic disorders</td>
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<td>Medication induced cognitive changes</td>
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<td>Teenage pregnancy</td>
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Poor School Performance

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% Normalized at 14 month endpoint across the four MTA groups

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<thead>
<tr>
<th>Controls</th>
<th>Comb</th>
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Titrating Atomoxetine

- Starting dose: 0.5 mg/kg/day (3-5 days)
- Increase to 1.2-1.5 mg/kg/day
- Side effects similar to stimulants
- Fatigue and nausea less with evening dosing
- Single daily dose or BID
- Often takes 3-6 weeks to have detectable effects

Atomoxetine: when to consider

- Treatment failure or intolerable side effects with stimulant
- Substance abuse potential for stimulant
- Parent against use of a “stimulant”
- Significant sleep disturbance
- Tic disorder
- Significant morning hyperactivity (?)
- Need for med effect in evening for homework (?)

Adolescent with ADHD and Depression

- Stimulants and atomoxetine are generally not effective with depression
- Bupropion (aminoketone)
  Dopamine and norepi reuptake inhibitor
  3 RTCs: effective with ADHD + depression
- Stimulant (or atomoxetine) + SSRI
- Don’t forget CBT

Screening for depression

"Over the past two weeks, have you felt down, depressed or hopeless?"

"Over the past two weeks, have you felt little interest or pleasure in doing things?"

Alternative screening for depression:
Pediatric Symptom Checklist
www.massgeneral.org/allpsyeh/Pediatric/SymptomChecklist/psc_english.PDF
Beck Depression Inventory II

Bipolar Disease in Children

- Age < 9 years
  - No discrete episodes
  - More irritability and crying
  - Psychomotor agitation
  - No paranoia
  - Coexisting hyperactivity (ADHD)

- Age > 9 years
  - Presence of episodes
  - Elated or depressed
  - Psychomotor agitation
  - Grandiosity with euphoria

Side effects: stimulants and non-stimulants

- Headache/abdominal pain
- Anorexia, weight loss, decrease stature
- Sleep problems
- Tics
- Emotional lability
- “Zombie” effect
10 yo girl: Rx long-acting stimulant (positive response re: ADHD symptoms)

- Emotional lability at 3-5 PM each day
- Weight loss (or not gaining weight)
- Tics
- Sleep problems
- Persistent hyperactivity

10 yo girl: Rx long-acting stimulant (positive response re: ADHD symptoms)

Emotional lability at 3-5 PM each day
- Review mental status history re: depression and anxiety; review new psychosocial stress
- Decrease AM dose
- Add short-acting stimulant after school
If mood change throughout day, may indicate poor response to med; if bipolar disease, stimulants may trigger irritability or sadness
“Zombie” effect (inertia) may indicate over-dose

10 yo girl: Rx long-acting stimulant (positive response re: ADHD symptoms)

Weight loss (or not gaining weight?)
- Ask about appetite prior to starting med
- Anorexia gradually decreases over time for most children
- Focus on meals when med has worn off (breakfast, afternoon snack, dinner, bedtime)
- Encourage grazing
- Encourage supplements (protein shakes, nutrition bars, instant breakfast

California cure for weight loss in children with ADHD: the peanut butter-banana-honey shake

- 1-1 ½ frozen bananas
- 2 large tablespoons of peanut butter
- Honey
- Milk
- Blend for a shake in a blender

Tics: Ask if tics present prior to medication?

1/3 boys and 1/6 girls with ADHD have tics; not an absolute contraindication to stimulant treatment
15-30% of children on stimulants experience motor tics, most of which are transient
When tics develop or exacerbate on stimulant medication and medication is continued:
1/3 resolve 1/3 stabilize 1/3 increase
Ask: Are there vocal and motor tics? (Tourette’s ?)
Do tics have an adverse effect on socialization?
Treatment options: d/c stimulant; add alpha-1 agonist; or change treatment to atomoxetine

Sleep problems
insomnia or sleep awaking

Ask about sleep pattern prior to med
With late afternoon or evening irritability, a small dose of short acting med may paradoxically organized sleep
Consider decreasing morning dose
Encourage sleep routine
Medication: benadryl, melatonin, clonidine,
Controversial/Uncommon Side Effects

- Stimulants
  - Sudden unexplained death (1/2 cardiac)
  - Tactile hallucinations
- Atomoxetine
  - Suicidal ideation (Black box warning): 0.4%
  - Liver failure?

ADHD: 2 special categories

- Preschool children
- Children and adolescents with developmental disabilities

ADHD Tool Kit
American Academy of Pediatrics and NICHQ

- Vanderbilt Parent and Teacher Assessment Scales
- Includes checklist of ADHD Behaviors and co-existing mental health and learning disabilities
- Parent Information
  - Understanding ADHD / the diagnostic process
  - Websites for parents and kids
  - Educational rights (IDEA, STT, IEP)

Available through AAP at (888) 227-1770 or www.aap.org/bookstore
Or http://www.nichq.org/resources/toolkit/

References: Diagnosis

5. eQUIP: a webbased interactive learning program to improve quality of care for children with ADHD <www.aap.org>

References: Treatment