ADHD: Early Detection, Evaluation and Management

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All Children’s Hospital/Johns Hopkins Medicine

Overview

- ADHD
  - Symptoms/Presentation
  - Impact of ADHD
  - Evaluation
  - Treatment

ADHD: Historical Timeline

1902 - ADHD-like syndrome first described by Still
1930 - “Mad Idiots” “Impulsive Insanity”
1968 - Hyperkinetic Reaction of Childhood (DSM-II)
1980 - Attention Deficit Hyperactivity Disorder (DSM-III)
1987 - Attention Deficit Disorder + or - Hyperactivity (DSM-III-R)
1994 - Attention-Deficit/Hyperactivity Disorder (DSM-IV)

Current Approaches to Diagnosis and Treatment of ADHD Dealing with Common Issues and Comorbidities in ADHD Pharmacotherapy
ADHD: Epidemiology

- Prevalence of 3-10% of school aged children
- Boys to girls ratio ranges from 4:1 to 9:1
- Boys are diagnosed 3-4 times more than girls
- Girls with ADHD are less likely to be identified and receive treatment
- ADHD is present in 30-50% of referrals made to child mental health services
- Age of onset of symptoms: 2.8 years
- Age at diagnosis: 7.8 years

ADHD: Diagnosis

- For 6 months, a maladaptive pattern of either or both:
  - Inattention (6 symptoms) (5 symptoms >17 yrs)
  - Hyperactivity-Impulsivity (6 symptoms) (5 symptoms >17 yrs)
- Impairment occurs by age 12
- Impairment occurs in at least 2 different settings
- Impairment must be clinically significant in social, academic, or occupational functioning
- Not better accounted for by a different disorder

ADHD: DSM-5 Presentations

- Combined Presentation (most common)
- Predominantly Inattentive Presentation
- Predominantly Hyperactive-Impulsive Presentation
- Other Specified Attention-Deficit/Hyperactivity Disorder
- Unspecified Attention Deficit/Hyperactivity Disorder
Inattention/Distractibility Symptoms
- Poor attention to details/careless mistakes
- Difficulty sustaining attention, easily distracted
- Does not seem to listen
- Does not follow through with instructions/ fails to finish
- Difficulty with organization, loses things, forgets things
- Avoids/dislikes tasks of sustained mental effort

Hyperactivity/Impulsivity Symptoms
- Fidgety, squirmy, restless
- Can’t stay seated
- Runs or climbs excessively and inappropriately
- Often “on the go” or “driven by a motor”
- Excessive talking or interrupting
- Cannot wait turn, blurts out answers

Childhood ADHD: Common Comorbid Diagnoses
Prevalence in Children with ADHD
- Conduct Disorder and/or Oppositional Defiant Disorder: ~ 40%
- Mood Disorders: ~ 25%
- Anxiety Disorders: ~ 20%
- Learning Disorders: At least 30% to 50%
- ADHD: 9% to 10%
ADHD is a Neurodevelopmental Disorder which changes in expression with age.

ADHD: Presentation in Preschool Age
- Many “symptoms” are normal at this age
- Symptoms must be excessive in degree and duration
  - Extreme hyperactivity/curiosity
  - Destructive play
  - Excessive tantrums, low compliance
  - Demanding of attention
  - Decreased and/or restless sleep
  - Developmental delays

ADHD: Presentation in School Age (6-12)
- Most referrals during this time
- Easily distracted, off task
- Impulsive, can’t wait turn, “class clown”
- Aggressive
- Problems with peer relationships, or may be popular
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**Age-Dependent Decline of ADHD Symptoms**

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>&lt;6</th>
<th>6–8</th>
<th>9–11</th>
<th>12–14</th>
<th>15–17</th>
<th>18–20</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADHD Symptoms</td>
<td>4.0</td>
<td>3.5</td>
<td>3.0</td>
<td>2.5</td>
<td>2.0</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Inattention
- Does not listen
- Cannot organize

Hyperactivity
- Squirms and fidgets
- Runs or climbs excessively

Impulsivity
- Blurts out answers
- Cannot wait his or her turn

**Symptom Migration From Childhood to Adult ADHD**

**Childhood DSM-IV-TR**
- Inattention
  - Easily distracted and forgetful
  - Poor time management
- Hyperactivity
  - Inner restlessness
  - Overwhelmed
- Impulsivity
  - Impulsive job changes
  - Drives too fast, has traffic accidents

**Common adult symptoms**
- Inattention
- Easily distracted and forgetful
- Poor time management
- Hyperactivity
- Inner restlessness
- Overwhelmed
- Impulsivity
- Impulsive job changes
- Drives too fast, has traffic accidents

**ADHD in Adolescence**

- Used to be thought of as "outgrown" by adolescence until 1970’s
- 70% continue with symptoms into adolescence
  - Half with conduct disorder
  - Two-thirds with substance abuse
- One-third still have full syndrome at 18 yo
- 25% drop out of high school
- Higher risk of comorbidities – drugs, depression, Conduct Disorder


**Percentage of ADHD Symptoms in Adolescence**
- 70% continue with symptoms into adolescence
- Half with conduct disorder
- Two-thirds with substance abuse
- One-third still have full syndrome at 18 yo
- 25% drop out of high school
- Higher risk of comorbidities – drugs, depression, Conduct Disorder
ADHD: Presentation in Adolescents

- Hyperactivity and physical impulsivity may decrease
- Inner restlessness, cognitive and verbal impulsivity often present
- Risky behavior - More likely to have automobile crashes, bodily injuries, and speeding tickets
- Work is more inconsistent,
- Cannot keep up with greater demands of school – more likely to drop out, be suspended, or held back
- Increased discipline problems, conflict with authority and family
- Poor self-esteem, hopelessness, lack of motivation

ADHD in Adults

- Up to 65% of childhood ADHD cases persist into adulthood
- Prevalence of adult ADHD estimated to be 3% to 5% in the US
- Also higher rates of:
  - Comorbid psychiatric disorders
  - Substance abuse
  - Antisocial/criminal behavior
  - Suicide attempts
  - Lowered self-esteem, poorer social skills
  - Lower educational achievement, work record

ADHD: Presentation In Adults

- Core attention symptoms are more common
  - Poor attention and concentration, easily distractible, day dreaming, forgetfulness
- Hyperactive / impulsive symptoms less common
  - Impulsivity, impatience, boredom, fidgetiness, intrusiveness
- Underachievement in career and academic arenas
- More conflicts in social and marital relations

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### Current Approaches to Diagnosis and Treatment of ADHD

#### Dealing with Common Issues and Comorbidities in ADHD

**Pharmacotherapy**

#### Impact and Costs of ADHD

<table>
<thead>
<tr>
<th><strong>Childhood</strong></th>
<th><strong>Adolescence</strong></th>
<th><strong>Adulthood</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Impaired family and peer relationships</td>
<td>Injuries</td>
<td>Occupational difficulties</td>
</tr>
<tr>
<td>Low self-esteem</td>
<td>Motor vehicle accidents</td>
<td></td>
</tr>
<tr>
<td>Academic limitations</td>
<td>Smoking and substance abuse</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Legal problems</td>
<td></td>
</tr>
</tbody>
</table>

#### Academic Impairment

- Very well documented
  - Failure to perform academically is the single most common reason for referral of children and adolescents
  - Children with ADHD
    - Perform poorly on achievement tests, and fail courses and grades significantly more often than children without ADHD
    - Complete 3 fewer years of education than matched controls
    - Are more likely not to graduate from high school
- Academic impairment more profound when learning disabilities are present

#### ADHD May Lead to Educational Impairment in High School

<table>
<thead>
<tr>
<th>Percentage of High School Attendees Who &quot;Strongly Agree&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was able to handle a large workload</td>
</tr>
<tr>
<td>It was easy for me to concentrate on my schoolwork</td>
</tr>
<tr>
<td>I was organized with my schoolwork</td>
</tr>
<tr>
<td>Unless very interesting to me, I was unable to pay attention to things for long periods of time</td>
</tr>
<tr>
<td>I sometimes had difficulty following instructions from my teachers</td>
</tr>
<tr>
<td>I made careless errors on my schoolwork</td>
</tr>
</tbody>
</table>

#### References

- Faraone SV, Biederman J. Poster presented at the 17th CHADD Annual International Conference; October 27, 2005; Dallas, TX.
ADHD Resulted in Educational Impairment in High School

Percentage of High School Attendees Who “Strongly Agree”

- It was easy for me to concentrate on my schoolwork
  - Self-reported ADHD Diagnosis (n=464)
  - Controls (n=487)
  - 8%
  - 6%
  - 40%*
  - 83%*

- Unless very interesting to me, I was unable to pay attention to things for long periods of time
  - 24%*
  - 7%
  - 36%*

- I sometimes had difficulty following instructions from my teachers
  - *P≤0.001.

Health and Injury

- Without treatment, adolescents with ADHD have 4 times as many serious injuries and 3 times as many motor vehicle accidents than those without ADHD or those with ADHD who consistently take medication.
- 9-year study of medical utilization shows that persons with ADHD have more than double the cost of care as compared to controls.

Medical Costs Are Greater in Children With ADHD

*P<0.001


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### Annual Costs of Healthcare for Children and Adolescents With ADHD

- Population-based study in North Dakota (n=7745)
- Annual costs of healthcare were 31% higher for children and adolescents with ADHD than for those without
- ADHD care accounted for >5% of all pediatric health expenditures in the state
- Extrapolated nationwide annual cost of caring for children and adolescents with ADHD was $2.15 billion
- ADHD through the life span may cost as much as $100 billion/yr due to under employment/disability


### Life Impairment Survey Demographics

<table>
<thead>
<tr>
<th>Education*</th>
<th>Self-reported ADHD Diagnosis (n=500)</th>
<th>Control (n=501)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not a high school graduate</td>
<td>17%</td>
<td>7%</td>
</tr>
<tr>
<td>College graduate or higher</td>
<td>29%</td>
<td>26%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Self-reported ADHD Diagnosis (n=500)</th>
<th>Control (n=501)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>37%</td>
<td>39%</td>
</tr>
<tr>
<td>Suburban</td>
<td>30%</td>
<td>33%</td>
</tr>
<tr>
<td>Rural</td>
<td>31%</td>
<td>26%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income ($)†</th>
<th>Self-reported ADHD Diagnosis (n=500)</th>
<th>Control (n=501)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25K</td>
<td>39%</td>
<td>20%</td>
</tr>
<tr>
<td>25K to &lt;50K</td>
<td>26%</td>
<td>34%</td>
</tr>
<tr>
<td>50K to &lt;75K</td>
<td>15%</td>
<td>23%</td>
</tr>
<tr>
<td>75K to &lt;100K</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>≥100K</td>
<td>6%</td>
<td>7%</td>
</tr>
</tbody>
</table>

*P < .0001; †P < .001.


### Adults With ADHD May Have Lower Household Income

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>ADHD</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>70%</td>
<td>70%</td>
</tr>
<tr>
<td>25-34</td>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>35-49</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>50-64</td>
<td>40%</td>
<td>40%</td>
</tr>
</tbody>
</table>

*P<.05 NS = not significant.

Biederman J, Faraone SV. Presented at the 158th Annual APA Meeting; May 23, 2005; Atlanta, GA.
Driving-related Outcomes in Adolescents and Young Adults

<table>
<thead>
<tr>
<th></th>
<th>Nonmedicated ADHD (N=35)</th>
<th>Control (N=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficient Driving Skills*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drove Without a License</td>
<td></td>
<td></td>
</tr>
<tr>
<td>License Revoked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traffic Citations (&gt;3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple Crashes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At Fault for Crash</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*As rated by parents.

Young Adults With ADHD Have Increased Risk for Traffic Violations and Accidents

Subjects Responding Yes (%)

<table>
<thead>
<tr>
<th></th>
<th>ADHD (n=105)</th>
<th>Control (n=64)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drove before licensed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 or more traffic citations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 or more speeding citations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>License suspended or revoked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 or more vehicular crashes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Sexual Behavior

- Longitudinal follow-up at young adulthood of a cohort of children (ongoing Milwaukee follow-up study) with ADHD compared to controls
  - Sexual intercourse at earlier age (15 vs 16 years)
  - More sexual partners (19 vs 7)
  - More pregnancies (38% vs 4%)
  - More sexually transmitted diseases (17% vs 4%)
  - Tested for HIV (54% vs 21%)

**Criminality**

- ADHD has high comorbidity with ODD and CD
  - Coupled with an impulsive, high-risk lifestyle — increases risk for legal problems
- Long-term study reports that persons with ADHD more likely to be:
  - Arrested (39% vs 20%)
  - Arrested more than once (23% vs 8%)
  - Convicted (28% vs 11%)
  - Jailed (9% vs 1%)


**Social Functioning and Self-Esteem**

- Children are stigmatized by their behavior
  - Disruptive behavior
    - Troublemakers
    - Excessive talking
    - Unfocused, not responsive to others
  - Immaturity and impulsiveness
    - Center of attention
    - Blunting out answers
- Adolescents continue to demonstrate social problems
  - Poor participation in group activities
  - Few friends, lower self-esteem assessment scores
  - Vulnerable to antisocial groups, drug abuse


**ADHD May Lead to Relationship Problems in High School**

Percentage of High School Attendees Who "Strongly Agree"

<table>
<thead>
<tr>
<th></th>
<th>ADHD (n=466)</th>
<th>No ADHD (n=467)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I fit in with my peers</td>
<td><em>27%</em></td>
<td>60%*</td>
</tr>
<tr>
<td>I was popular in school</td>
<td>19%</td>
<td><em>36%</em></td>
</tr>
<tr>
<td>I got along with my teachers</td>
<td><em>44%</em></td>
<td>63%*</td>
</tr>
<tr>
<td>I was liked by adults</td>
<td><em>46%</em></td>
<td>67%*</td>
</tr>
<tr>
<td>I had a good relationship with my parents</td>
<td>35%</td>
<td><em>64%</em></td>
</tr>
</tbody>
</table>

*P<.001.
Faraone SV, Biederman J. Poster presented at the 17th CHADD Annual International Conference; October 27, 2001; Dallas, TX.
Satisfaction With Key Aspects of Life Among Adults With ADHD

Percentage “Completely Satisfied” With Each Aspect

<table>
<thead>
<tr>
<th>Aspect</th>
<th>ADHD (n=464)</th>
<th>Controls (n=487)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family life</td>
<td>47%</td>
<td>68%*</td>
</tr>
<tr>
<td>Social life</td>
<td>38%</td>
<td>58%*</td>
</tr>
<tr>
<td>Professional life and career track</td>
<td>22%</td>
<td>40%*</td>
</tr>
</tbody>
</table>

*P < .001.  

Substance Abuse

- Many people with untreated ADHD try to self-medicate to improve functioning
- Smoking
  - ADHD adults smoke more and have more difficulty quitting
  - Children with ADHD start younger and smoke more
- Substance use disorders (SUDs)
  - Myth: stimulant therapy may lead to substance abuse
  - Fact: untreated ADHD is a significant risk factor for substance abuse in adolescence and adulthood

Substance Abuse

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How ADHD Affects Parents

- Increased stress
  - Worry
  - Frustration
- Lower self-esteem
  - Self-blame
  - Social isolation
- Increased employment disruption
- Increased marital disruption
- Increased alcohol/substance abuse


Milberger et al. JACAP 1997;38:36.
Evaluation

Histories: prenatal including tobacco/substances, birth, developmental; family
Labs: anemia, thyroid, substance, lead, genetics?
Screening and Rating Scales- Parents, Teachers, Individual
  - Child Behavior Checklist
  - Vanderbilt Diagnostic Rating Scales
  - Conners Rating Scales
  - SNAP–IV Rating Scale
  - BASC

ADHD Treatment

- Education
- Psychosocial interventions
- Pharmacotherapy

Education of Patients and Family

- Understanding the disorder
  - Medical cause
  - Not due to poor parenting
- Environmental restructuring
  - Classroom changes
  - ADHD-friendly modifications in family, work, leisure activities
  - Structure, lists, delegating
- Parent support groups: for example, www.chadd.org, www.add.org
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**Psychosocial Interventions in ADHD Treatment**
- Parent training
  - Use naturally occurring consequences to teach social skills
  - Reinforce positive behaviors and correct negative behaviors
  - Establish and maintain house rules
- Family therapy
- Peer group interventions including social skills training
- Individual psychotherapy not useful unless comorbid mood or anxiety symptoms

**ADHD: MTA Results**
All treatment arms effective on an absolute basis

- Medication management alone
- Medication management + behavioral treatment*

* Nearly equal efficacy and superior to both:
  - Behavioral treatment alone
  - Community-based treatment

**Evolution of ADHD Pharmacotherapy**
- Bradley: Benzedrine
- Dexedrine®
- Adderall®
- Adderall XR®
- Metadate®ER
- Methylin ER®
- Concerta®
- Metadate®CD
- Focalin™
- Strattera®
- Ritalin® LA
- Focalin XR™
- Vyvanse™
- Daytrana™

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ADHD Medication Lineup

Stimulants
- methylphenidate
- amphetamine
- dextroamphetamine
- modafinil
- atomoxetine
- other

Nonstimulants
- tricyclics
- alpha-2 agonists
- buproprion
- vyvanse
- others

Stimulants Are First Line
- Of the pharmacologic options available for ADHD, stimulant medications are the most studied.
- They are the most commonly used.
- They are most effective.
- Over 40 years of experience.

Psychostimulant Side Effects
- Decreased appetite/weight loss
- Insomnia
- Irritability/rebound
- Anxiety
- Stomachache, headache
- Tachycardia, increased blood pressure (mild)
- Tics
- Psychosis
- Toxic effects are generally rare

Spencer et al., JACAP 1995;35:409
ADHD Practice Parameters, JACAP 1997;36:85S.
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**ADHD and Stimulant Medication**

In treatment of ADHD, stimulants improve:

**Core Symptoms**
- Inattention
- Impulsivity
- Hyperactivity

**AND**
- Noncompliance
- Impulsive aggression
- Social interactions
- Academic productivity and accuracy
- Family dynamics

**ADHD Stimulant Dosing**

<table>
<thead>
<tr>
<th>Medication</th>
<th>Starting Dose</th>
<th>Maximum Dose*</th>
<th>Usual Dosing (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ritalin®</td>
<td>5 mg QD/BID</td>
<td>2 mg/kg/day</td>
<td>TID (4 hr)</td>
</tr>
<tr>
<td>Focalin®</td>
<td>2.5 mg</td>
<td>1 mg/kg/day</td>
<td>BID (5-6h)</td>
</tr>
<tr>
<td>Concerta®</td>
<td>18 mg QD</td>
<td>2 mg/kg/day</td>
<td>Once (10-12h)</td>
</tr>
<tr>
<td>Metadate CD®</td>
<td>20 mg QD</td>
<td>2 mg/kg/day</td>
<td>Once (8-10h)</td>
</tr>
<tr>
<td>Ritalin LA®</td>
<td>10 mg QD</td>
<td>1 mg/kg/day</td>
<td>Once</td>
</tr>
<tr>
<td>Daytrana®</td>
<td>10 mg QD</td>
<td>1 mg/kg/day</td>
<td>Once (up to 12h)</td>
</tr>
<tr>
<td>Focalin XR®</td>
<td>5 mg QD</td>
<td>1 mg/kg/day</td>
<td>Once (8-12h)</td>
</tr>
<tr>
<td>Adderall®</td>
<td>2.5 to 5 mg QD</td>
<td>1.5 mg/kg/day</td>
<td>BID (6 h)</td>
</tr>
<tr>
<td>Adderall XR®</td>
<td>5-10 mg</td>
<td></td>
<td>QD (10-12 h)</td>
</tr>
<tr>
<td>Vyvanse®</td>
<td>30 mg</td>
<td>1.5 mg/kg/day</td>
<td>QD (10-13h)</td>
</tr>
<tr>
<td>Deseril®</td>
<td>2.5 to 5 mg QD</td>
<td>1.5 mg/kg/day</td>
<td>BID/10Q (4h)</td>
</tr>
<tr>
<td>Dex Spansule®</td>
<td>5 mg</td>
<td></td>
<td>BID (6 h)</td>
</tr>
</tbody>
</table>

*Exceeds FDA-approved limit in some cases


**Long-Acting Methylphenidates Differ In Release of Active Drug**

<table>
<thead>
<tr>
<th>Products</th>
<th>Concerta®</th>
<th>Metadate CD</th>
<th>Focalin XR®/Ritalin LA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formulation</td>
<td>OROS®</td>
<td>DHcaps®</td>
<td>SODAS®</td>
</tr>
<tr>
<td>Dose</td>
<td>18mg,27mg</td>
<td>10mg, 20mg, 30mg</td>
<td>FXR:5mg,10mg,15mg,20mg</td>
</tr>
<tr>
<td></td>
<td>36mg, 54mg</td>
<td>40mg, 50mg, 60mg</td>
<td>RLA:10mg,20mg,30mg,40mg</td>
</tr>
</tbody>
</table>

Immediate release: 22% 30% 50%

Sustained/2nd release: 78% 70% 50%

>Concerta has longest duration, but the lowest plasma levels in AM (first 4 hours) of all long-acting MPH stimulants. Ritalin LA has highest initial release.
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Benefits of Transdermal Methylphenidate
- Less invasive – no swallowing
- Avoids first-pass effect, GI environment
- Provides ascending plasma profile
- Flexible wear time allows varying duration
  - Individualized effect
  - Reduce side effects

Lisdexamphetamine
- Prodrug – not active until absorbed in gut
- More consistent plasma levels than other amphetamines
- Not affected by pH or GI transit time
- Longest studied duration of any ADHD medication
- Lower abuse potential

Atomoxetine
- Specific noradrenergic reuptake inhibitor
  - Mostly norepinephrine effect, may be some Dopamine effect
  - Moderate effect size
  - Unscheduled, renewable
  - No abuse liability
  - Rare hepatitis reported
    - One case confirmed/3.4 million exposures
    - One case suspected/3.4 million exposures
    - Warnings about suicidality
    - 0.37% Atomoxetine vs. 0.0% placebo
    - One suicide attempt/1,357 cases; no suicides

References:
**Other Non-Stimulant Pharmacotherapy**

- Alpha-2 agonists
  - Guanfacine (Tenex/Intuniv), Clonidine (Catapres/Kapvay)
- Tricyclic Antidepressants
  - Nortriptyline (Pamelor), Desipramine (Norpramin), Imipramine (Tofranil)
- Bupropion (Wellbutrin SR/XL)
- Modafinil (Provigil) – FDA nonapprovable
- Venlafaxine (Effexor), Buspirone (Buspar) ?
- SSRI’s are generally not effective

**Durations Are Different...**

- Longest Duration:
  - Vyvanse (13 hrs)
  - Adderall XR (9-12)
  - Daytrana (up to 12)
  - Concerta (9-12)
- Medium Duration (7-9 hours):
  - Focalin XR
  - Ritalin LA
  - Metadate CD

**Here’s Another Difference...**

- Can sprinkle: (beaded system)
  - Metadate CD
  - Ritalin LA
  - Adderall XR
  - Focalin XR
  - Dissolves
  - Vyvanse
- Must swallow whole:
  - Concerta
  - Strattera
- Transdermal:
  - Daytrana

Current Approaches to Diagnosis and Treatment of ADHD Dealing with Common Issues and Comorbidities in ADHD Pharmacotherapy
Starting Doses

- Start low, titrate at weekly intervals
  - Adderall XR 5 mg or 10 mg q AM
  - Concerta 18 mg q AM
  - Ritalin LA 10 mg q Am
  - Focalin XR 5mg or 10mg q AM
  - Metadate CD 10 mg q AM
  - Vyvanse 20 to 30mg q AM
  - Daytrana 10mg q AM
  - Quillivant XR 25mg q am
  - Strattera 0.5mg/kg/day q AM

Common Myths That Lead to Drug Holidays

- “ADHD is just a school time disorder”
- “Their bodies need a rest”
- “I can handle him at home. He just needs it for school”
- “Drugs are just chemical restraint”
- “The meds will stunt their growth”
- “Stimulants lead to drug use”

Why Treat On the Weekends Or During Summer?

- Life still goes on...
  - Summer school/ tutoring
  - Summer camps
  - Sports
  - Social interactions
  - Family interactions
  - Work
  - Driving
  - Chores
- There may be exceptions...
**Summertime Opportunities**

- There may be reasons for medication holiday:
  - When weight is an issue
  - Predominantly Inattentive ADHD patients may not need it
- Summer is the best time to make changes
- Sometimes medication holidays remind parents just how much the medication is helping.

**Cardiac Risk Evaluation Prior to Psychostimulant RX**

- Take a careful history, ask about cardiac history or symptoms
- Ask about history of sudden death in the family
- EKGs are not recommended for patients without any risk factors
- Monitor vital signs, ask about chest pain, other cardiac symptoms

**Re-evaluate Treatment Efficacy at Each Visit**

- Reassess, consider alternative/comorbid diagnosis
  - Stimulants can exacerbate anxiety and mood disorders
  - Check adherence
  - Don't forget about rebound
  - Change stimulants
    - Kids may respond differently to each stimulant
  - Try non-stimulants
    - Atomoxetine, Bupropion, Tricyclics, Clonidine, Guanfacine
  - Augment a stimulant with a non-stimulant: Intuniv and Kapvay approved for adjunct rx
Other Medication Strategies

- Long-acting stimulants can sometimes be dosed BID
- You can use both MPH and AMP in same day
- Evening stimulant does not always cause insomnia
- Giving meds before kids wake up can make mornings much better
- Atomoxetine can be combined with stimulants
- Dosing Atomoxetine QHS or BID may help reduce side effects

Conclusions

- ADHD is a common disorder with significant consequences
- ADHD is more than a school-time disorder, starts during pre-school and extends to adulthood affecting many aspects of a patient’s life.
- Untreated ADHD can result in significant impairment in multiple domains.
- Psychosocial interventions are important and should be combined with pharmacotherapy for the most effective treatment for ADHD.
- Stimulants continue to be safe, first line treatments.

References

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