Wait, what did you say?
Adult ADHD

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Disclosure
Heather Huang, MD
With respect to the following presentation, there has been no relevant (direct or indirect) financial relationship between the party listed above (and/or spouse/partner) and any for-profit company which could be considered a conflict of interest.

ADHD
- ADHD is a developmental disorder of executive dysfunction
- Onset in childhood
- Abnormal development of brain circuits resulting in symptoms of:
  - Inattention
  - Hyperactivity
  - Impulsivity

Executive Functions
- Memory
- Attention
- Language
- Reasoning
- Decision-making
- Task execution (praxia)

Prevalence of ADHD Across Ages
- 6-9% of children worldwide have ADHD
- By age 25:
  - 15% have persistent symptoms, meeting full diagnostic criteria
  - 50% meet subthreshold criteria (partial remission), and demonstrate impairment
- 2-4% of the adult population
Adult ADHD

- Adult ADHD is the persistence of childhood ADHD symptoms into adulthood
- Late onset ADHD – Controversial
  - Onset in adolescence, adulthood
  - Are these late onset, vs missed diagnosis, vs mis-diagnosis of another condition (e.g. medical – OSA, TBI; psychiatric – depression, anxiety)

Diagnosis is CLINICAL. There is no test (blood, imaging, or psychological) that can make the dx.

DSM-V: ADHD Behavioral Criteria

- A persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development.
- 9 possible symptoms for inattention and 9 possible symptoms for hyperactivity-impulsivity

Adolescents and adults (≥17): Five or more symptoms have been present for at least 6 months, and are inappropriate for developmental level.

Current symptoms
- Previous / Childhood symptoms
- Medical & psychiatric history
- Family history
- Social history

Clinical Interview

DSM-V

Clinical Interview

Family History

Neuropsych Testing

Behavioral Rating Scales
Inattention

• Often fails to give close attention to details or makes careless mistakes in schoolwork, at work, or with other activities.
• Often has trouble holding attention on tasks or play activities.
• Often does not seem to listen when spoken to directly.
• Often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (e.g., loses focus, side-tracked).
• Often has trouble organizing tasks and activities.
• Often avoids, dislikes, or is reluctant to do tasks that require mental effort over a long period of time (such as schoolwork or homework).
• Often loses things necessary for tasks and activities (e.g. school materials, pencil, books, keys, paperwork, eyeglasses, mobile telephones).
• Is often easily distracted.
• Is often forgetful in daily activities.

Hyperactivity and Impulsivity

• Often fidgets with or taps hands or feet, or squirms in seat.
• Often leaves seat in situations when remaining seated is expected.
• Often unable to play or take part in leisure activities quietly.
• Often runs about or climbs in situations where it is not appropriate (adolescents or adults may be limited to feeling restless).
• Is often “on the go” acting as if “driven by a motor”.
• Often talks excessively.
• Often butts out an answer before a question has been completed.
• Often interrupts or intrudes on others (e.g., butts into conversations or games)
• Often has trouble waiting turns.

DSM-V: ADHD Subtypes

• ADHD-inattentive type
• ADHD-hyperactive/impulsive type
• ADHD-combined type

DSM-V: ADHD Functional Criteria

Before the age of 12
More than 1 setting
Clear evidence that symptoms cause impairment
Not be caused by other mental disorders

School/work, home, relationships (friends or relatives), social situations
E.g. mood, anxiety, schizophrenia, psychosis, pervasive developmental disorder
Symptoms:
- Inattention,
- Hyperactivity/Impulsivity
Multiple Settings
Impairment

Age of onset before 12
Not caused by another psychiatric disorder
ADHD

Current Symptoms - Impairment
- Occupational and educational settings
  - Do you have problems getting along with bosses or co-workers?
  - How are your performance reviews?
  - Have you changed jobs a lot? Why were you changing jobs so often?
- Relationships
  - Ask about divorce, marriages, problems in relationships.
  - Do you have problems with parental responsibilities (e.g., getting kids ready for school, homework, meals)?
- Driving
  - Do you feel you’re a good driver? Do others think you’re a good driver?
  - Have you had your license revoked? Or repeatedly gotten pulled over for speeding?

Educational Hx & Surrogate Assessment of Childhood Sxs and Impairment
- Higher rates of:
  - Poor performance (lower GPA and class ranking)
  - Grade retention
  - Tutoring, special ed classes/IEP
  - Reading disability
  - Disciplinary actions (being suspended or expelled)
  - Dropping out
- Fewer enter college
  - Those who do have a lower graduation rate

Educational history
- What were your grades like in elementary, middle, and high school?
- Were you ever diagnosed with a learning disability, or had to take special ed classes?
- Were you ever held back?
- Did you ever have any disciplinary problems, or been suspended?
- Psychosocial stressors

Children that can mimic ADHD symptoms
- Thyroid, obesity, metabolic syndrome, chronic illness, OSA
- Hearing/Vision impairment
- Learning disorders
- Cognitive impairment (TBI, dementia, CVA)

Medications
- Sedatives (e.g., benzodiazepines, narcotics)

References:
Psychiatric History

• Poor concentration is a symptom of many psychiatric disorders
  – Screen using PHQ9, GAD7
• >50-75% of adults w ADHD have at least 1 psychiatric disorder:
  – Up to 20-30% - Anxiety disorder
  – Up to 33% - Depression
  – Alcohol (17-45%) and drug (18-30%) dependency
  – 30-70% have a learning disability
  – Up to 20% - Antisocial personality disorder

Family & Social History

• ADHD has a high heritability rate
  – Fx of ADHD is a strong predictor for ADHD (Parent, sibling, child with ADHD)
• Social/Environmental
  – Stressful home/work environment
  – Abuse, family dysfunction
• Substances
  – Alcohol, illegal drugs
  – Excessive caffeine, sugar, nicotine
  – Repeat assessment 2-3 months after abstaining

Supplemental Information: Collateral

• Collateral history from partner, family members, friends, employer/co-workers
  – Current or childhood symptoms

Supplemental Information: Rating Scales

• Assess current or childhood symptoms
• Screening tools. Not diagnostic.
  – Helpful to rule out ADHD if negative
• Adult ADHD Self-Report Scale (ASRS).
  – Assesses current symptoms
  – High NPV – 98%
• Wender-Utah
  – Assesses past symptoms (retrospectively assess childhood ADHD)
  – Recall bias can be a problem
Neuropsychological Testing

- Not necessary for routine dx of ADHD
- Purpose is to objectively assess the individual’s cognitive functions and identify areas of impairment
- Does NOT diagnose ADHD
  - No unique cognitive profile for patients w ADHD
- Support conclusions based on history
  - Can be helpful if the clinical assessment is inconclusive
- Expensive

Physical Exam

- Very low-quality evidence to support any of the following:
  - Baseline vitals: weight, BP, pulse
  - EKG screening prior to initiating stimulants
  - Routine laboratory testing (e.g. thyroid studies, LFTs)

Treatment

- First: Treat comorbid psychiatric dx
- Goal: Improve symptoms, optimize functional performance
- Psychotherapeutic strategies
- Medication
- Accommodations: Educational, Vocational

Psychotherapeutic Strategies

- Psychoeducation
- Cognitive behavioral therapy
  - Time management, organization, planning
  - Use of lists
  - Environmental restructuring
  - Keeping distractions to a minimum
  - Setting small, reachable goals
  - Limiting choices
- Books: Mastering Your Adult ADHD, Driven to Distraction

Vocational/Educational Accommodations

- Wisconsin Department of Workforce Development (DVR)
- Illinois Department of Human Services – Vocational Rehabilitation
- UW-Madison McBurney Disability Resource Center
- Suggest new students go to the university website and search “disability services”
- U.S Department of Education
  - Students with ADHD and Section 504: A Resource Guide (2016)
  - Know Your Rights: Students with ADHD (2016)

Medication

### Stimulants

- Methylphenidate
- Amphetamine
- Combination

### Non-Stimulants

- Atomoxetine

#### Methylphenidates

<table>
<thead>
<tr>
<th>Immediate</th>
<th>IR</th>
<th>Focalin IR</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 hrs</td>
<td></td>
<td>2-3x/day, 4 hr apart Not impacted by food</td>
</tr>
<tr>
<td>Intermediate</td>
<td>Ritalin SR Metadate ER Methylin ER</td>
<td>Focalin XR</td>
</tr>
<tr>
<td>6-8 hrs</td>
<td></td>
<td>2x/day dosing OR 1x/day + IR dosing</td>
</tr>
<tr>
<td>Long acting</td>
<td>Ritalin LA Metadate CD Aptensio XR Daytrana (patch) Concerta (10-12 hrs)</td>
<td>1x/day</td>
</tr>
<tr>
<td>8-10 hrs</td>
<td></td>
<td>Daytrana – 9 hrs on, rotate site daily to prevent rash.</td>
</tr>
</tbody>
</table>

Stimulants

- First-line medication for the treatment of ADHD
- Increase catecholamines (NE, DA) in the brain
- Similar efficacy between all of them
  - 70% of pts respond to the 1st stimulant tried
  - 90-95% respond to the 2nd one tried
- Similar side effect profile
- Different pharmacokinetic and pharmacodynamic profiles
Notes on Long-acting Methylphenidate

- Peak concentration is slowed down by a high-fat meal
- Ritalin LA and Focalin XR have 2 peaks in concentration, mimicking IR BID dosing
  - 50% of the drug is released immediately, 50% released 4 hrs later.
- Metadate CD releases 30% immediately and 70% over the remaining time
- Focalin XR, Metadate CD, Ritalin LA: Capsules that can be opened and sprinkled onto food. Do not chew beads.
- Concerta: Longest acting, 22% of the drug is released immediately, and the rest is released at a controlled rate. Cannot be crushed/broken

Amphetamine

- Adderall, Dexedrine, Vyvanse
  - Dexedrine (Dextroamphetamine) – IR and XR (4-6; 6-8 hrs)
  - Adderall (Dextroamphetamine + amphetamine) – IR and XR (4-6; 8-10 hrs)
  - Vyvanse (Lisdexamphetamine) – 10 hrs
- Can be opened and placed on food
- Delay in absorption of ~2.5 hrs if taken w a high-fat meal

General Strategies for Stimulant Use

<table>
<thead>
<tr>
<th>Duration of coverage desired</th>
<th>Formulation required</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start w the smallest effective dose and titrate up (weekly)</td>
<td>Monthly initial follow-up. Then every 3, 6 months</td>
<td>Medications should be taken daily for complete clinical benefit</td>
</tr>
</tbody>
</table>

Titration Examples

| Week 1 | Adderall XR 10-20mg daily | Ritalin 5-10mg daily | Focalin XR 10-20mg daily | Vyvanse 30mg daily |
| Week 2 | Adderall XR 30mg daily | Ritalin 20mg daily | Focalin XR 30mg daily | Vyvanse 40mg daily |
| Week 3 | Adderall XR 40mg daily | Ritalin 30mg daily | Focalin XR 40mg daily | Vyvanse 50mg daily |

I continue to titrate if needed to a max dose of...

| 60mg daily | 60mg daily | 40mg daily | 70mg daily |

Stimulants: Adverse Effects

• Generally dose dependent
• Most common
  – Appetite suppression +/- weight loss
  – Sleep disturbances
• Other
  – Abdominal discomfort
  – Headaches, irritability, anxiety
  – Conflicting data on growth impact
  • 1-2 cm height loss that is sustained, but dependent on dose/duration of tx
  • Stimulants may worsen tics
• Other
  – Absent of tics is not a contraindication for stimulant use

Stimulants: Adverse CV Effects

• Small increases in HR and BP; significant elevations are rare.
  – Initial titration phase
  – Responsive to dosing/timing adjustments
  – SBP 3.5 ± 11.8mmHg, DBP 4 ± 8.5mmHg
  – HR 4.5 ± 10.5bpm
• No association b/wn stimulant use (at prescribed doses to tx ADHD) and serious CV events
  – QTc prolongation
  – Torsades
  – Sudden cardiac death
  – MI or stroke

All pts should be screened for BP, HR, CV problems
• Use caution in patients with a h/o, Fhx, or RF for CVD
• Do NOT use stimulants or atomoxetine in patients with serious heart problems or in which ↑ in HR/BP would be problematic
• No evidence to support EKG screening prior to stimulant use
• Monitor BP and HR only if underlying medical condition that would be compromised by increases in BP or HR
• Investigate any abnormalities immediately

Non-Stimulants: Atomoxetine

General
• Selective NE reuptake inhibitor
• Results in increased DA and NE in PFC
• As effective or less effective than stimulants in RCT (depending on the stimulant/formulation)

Dosing
• Starting dose: 40mg daily.
• Max dose: 100mg daily (1-2x/day dosing).
• Can be stopped abruptly. No need to taper.

Response
• 1-2 wks for an initial response
• 4-6 wks for full therapeutic effect
• May continue to have improvement for up to 2 months

Side effects
• Relatively well tolerated.
• SE = somnolence, dry mouth, GI upset, nausea (esp if dose advanced too quickly), reduced appetite (tends to improve over time), increase in HR or BP
• Case reports of severe liver injury
• Black box warning – potential to increase SI
When to Refer?

- Your comfort levels
  - Making the diagnosis
  - Prescribing the medication
- Extreme dysfunction due to ADHD symptoms
- Previous treatment failures
- Psychiatric comorbidities
  - Suicidal or homicidal
  - Psychosis
  - Needing diagnosis clarification on other psychiatric disorders (e.g. PTSD, bipolar, personality disorders)
  - Substance abuse

Summary

- ADHD is a developmental disorder of executive dysfunction that can result in impairing symptoms of inattention and hyperactivity/impulsivity.
- Adult ADHD refers to the persistence of ADHD symptoms into adulthood.
  - Up to 2/3 of children with ADHD will have some ongoing symptoms as an adult.
- Psychiatric comorbidity is common

Summary

- Diagnosis is clinical and can be supported by rating scales and/or neuropsych testing
- ADHD is not the most common reason for poor concentration in adults
- Treatment options include:
  - Psychopharmacology – Stimulants, Atomoxetine
  - Psycho-education, psychotherapy, behavioral strategies
  - Education/vocational accommodations

Questions?
Peripartum Considerations

- Women with ADHD are more likely than those without to:
  - Experience problems with sleep and chronic pain
  - Have impairment in daily activities
  - Have substance/alcohol use disorders, MDD, GAD

- Two small studies suggest adverse effects of ADHD in women on their:
  - Parental self-esteem
  - Ability to parent effectively - problem-solve during child-rearing and monitor their child’s behavior


Supplemental Slides

Abuse Potential – Black Box Warning

- 1 out of 5 students w ADHD are asked to give, sell, or trade their medications
  - Stimulant misuse is seen in up to 9% of grade + high school students …
  - … and up to 35% of college-age individuals

- 6.6% of US adults (16 million) used prescription stimulants (2015-2016)
  - 68% (11 million) used these medications without misuse
  - One in three users (31.2%) reported misuse at least once
  - 2.7% had a prescription stimulant use disorder

- Most common source = friends and family members (56.9%)
- Most common reason for misuse = direct stimulant effect to improve performance (78%)
  - Nonmedical use of prescription stimulants is not associated with performance improvement

Controlled Substance Agreements

- Establishes clear expectations between the patient and provider
  - Lost/stolen prescriptions
  - Early refills
  - Excessive alcohol use
  - Illicit drug use
  - One prescribing provider/pharmacy
- Consider review every 1-3 yrs
- Random urine drug screen
  - At least yearly
  - Can also help assess compliance with medication

ADHD and Comorbid Substance Use Disorder

- Does pharmacologic tx of ADHD reduce the risk for substance abuse?
  - Tx of ADHD sxs may reduce the risk of developing SUDs
  - 85% reduction in risk of SUDs in youth w ADHD.
  - Those treated at a younger age less likely to use than those w delayed tx
  - Systematic review of meta-analysis: Pharmacological tx of ADHD in pts w comorbid SUDs:
    - ADHD sxs improve compared to placebo
    - No benefit on substance use outcomes:
    - 2 RCTs show that using robust dosing of stimulants (OROS-MPH up to 180mg daily, Adderall XR 80mg daily), having a larger effect on ADHD sxs, was a/w drug abstinence
- Decisions about the type of pharmacological intervention and when to begin tx should be based on safety