

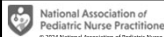
In-person
March 13-16, 2024

Virtual
May - July 31, 2024

45th National Conference on Pediatric Health Care

A Case Study Approach to Examining a Multifaceted Psychopharmacology Scenario

Kellie Bishop, DNP, APRN, CPNP-PC, PMHS



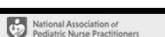
National Association of
Pediatric Nurse Practitioners
© 2014 National Association of Pediatric Nurse Practitioners

Experts in pediatrics, Advocates for children.

1

Speaker Disclosure

- Coordinate and present NAPNAP's Pediatric Primary Care Mental Health Specialist (PMHS) board review course.
- Present NAPNAP's Primary Care Certified Pediatric Nurse Practitioner (CPNP-PC) board review course.
- Developed and presented 3 CE modules for NAPNAP Cares- Substance Use & Addictive Disorders, Health Promotion & Anticipatory Guidance, and Bipolar & Related Disorders.




National Association of
Pediatric Nurse Practitioners

2

Learning Objectives

- Identify clinical manifestations of both ADHD and depression.
- Recognize similarities in symptoms of ADHD and depression, as well as their comorbid relationship.
- Identify psychopharmacological management strategies for comorbid ADHD and depression.
- Identify strategies to educate and empower the patient and family to actively participate in strategies to mitigate long-term effects of ADHD and depression.




National Association of
Pediatric Nurse Practitioners

3

Brain Anatomy Review

- Prefrontal cortex
 - Orbitofrontal cortex- impulsivity
 - Dorsolateral prefrontal cortex (DLPFC)- sustained attention, executive function
 - Ventrolateral prefrontal cortex (VLPFC)- emotional regulation, memory processing
 - Ventromedial prefrontal cortex (VMPFC)- emotional processing, risk assessment
- Amygdala- regulates emotional response/memory
 - Increased activity- aggression, fear
 - Decreased activity- aggression/fear blunting
- Hippocampus- memory formation, early storage for long-term memories, transition to permanent memories
- Medial temporal lobe (MTL)- long-term memory



National Association of
Pediatric Nurse Practitioners

4

Brain Anatomy Review

- Anterior cingulate cortex (ACC)- hub of emotional processing, executive control, working memory, learning
 - Works in circuit with striatum and thalamus- attention, error detection
- Midbrain- major dopaminergic area
 - Ventral tegmental area (VTA)- processing of rewards and motivational salience; associated learning
 - Substantia nigra- processing of motions (with basal ganglia)
- Basal ganglia (Striatum)
 - Dorsal- voluntary movement, movement control, executive function
 - Ventral- rewards, anticipation, aversion
- Thalamus- relay and filtering center for sensory and motor signals; sends to cerebral cortex (consciousness, sleep, alertness)
- Locus coeruleus- stress management, attentiveness, pain, norepinephrine

5

Amino Acid Neurotransmitters

- Glutamate- excitatory; most abundant in the brain; cognitive function, learning, memory
 - Imbalances- Alzheimer's, dementia, Parkinson's, seizures
- Gamma-aminobutyric acid (GABA)- most common inhibitory neurotransmitter
 - Regulation prevents anxiety, irritability, concentration, sleep, seizures, depression
- Glycine- inhibitory; hearing processing, pain transmission, metabolism

6

Monoamine Neurotransmitters

- Serotonin- tryptophan, B vitamin deficiencies, mood, located in brain and GI tract
 - Autoreceptors- 5HT1A, 5HT2
- Norepinephrine- from metabolism of dopamine; pain, mood, arousal, cognition, sympathetic stimulation
 - Alters serotonin based on receptor
- Dopamine- mood, pleasure/rewards, motor/coordination, impulse control, sleep, memory/cognition/attention/learning, prolactin, sympathetic stimulation
 - Multiple pathways

7

Cortico-Striatal-Thalamo-Cortical (CSTC) Loop

- Chain of neurons connecting prefrontal cortex, basal ganglia, and thalamus
- Behavioral, motor, cognitive function
- Several pathways included
- Involves all neurotransmitters
- Receptor and neurotransmitter imbalance- behavioral, motor, cognitive dysfunction

8

Case Presentation

- 14-year-old male, 92 lbs (42 kg)
- Diagnosed with ADHD at age 8 years
 - Started on Adderall (mixed amphetamine salts)
- Current medication
 - Strattera (atomoxetine) 80 mg (40 mg BID)
- ADHD medication follow-up today

9

Attention Deficit Hyperactivity Disorder

- Neurodevelopmental disorder
- Standardized assessment scales
- Core symptoms
 - Inattention
 - Hyperactivity
 - Impulsivity
- Types
 - Combined type
 - Predominantly inattentive
 - Predominantly hyperactive/impulsive
- Risk factors

10

Depression

- Universal screening recommended beginning at 12 years- PHQ-9/A
- 3 childhood categories
 - Major depressive disorder (MDD)
 - Dysthymic disorder
 - Adjustment disorder with depressed mood
- Symptoms in adolescents
 - Impulsivity, aggression, restlessness or psychomotor slowing
 - Fatigue, memory issues, decreased energy
 - Hopelessness/suicidality, antisocial behavior, withdrawal, lack of interest
 - Substance use, hypersexuality
 - Changes in appetite/weight
 - Concentration problems, executive dysfunction

11

ADHD + Depression

- Depression more common in youth with ADHD than those without it
- More severe course of psychopathology → higher risk of long-term impairment and suicide than with each individually
- Depressive disorders typically emerge several years after ADHD

12

Case Revisited

- PHQ-A score of 12 with transient suicidal thoughts, never had a plan
 - Has not felt depressed or sad most days in the past year- "comes in waves"
 - Symptoms have made life very difficult
 - No serious suicidal thoughts in the past month
 - Never tried to kill himself or made an attempt
- No firearms in the home
- Not in counseling- mother resistant to the idea
- What do you think is going on with Jackson?
- How would you proceed with his evaluation?

13

DSM-V-TR Criteria for Major Depressive Episode

- 5 or more of the following present during the same 2-week period with a change from previous functioning (at least 1 symptom is depressed mood or loss of interest/pleasure)
 - Depressed mood most of the day, nearly every day (sad, empty, irritable, etc.)
 - Markedly diminished interest or pleasure in (almost) all activities most of the day, nearly every day
 - Significant weight loss (more than 5% of body weight in a month) or decrease/increase in appetite nearly every day
 - Insomnia or hypersomnia nearly every day
 - Psychomotor agitation or retardation nearly every day
 - Fatigue or loss of energy nearly every day
 - Feelings of worthlessness or excessive guilt nearly every day
 - Difficulty thinking and concentrating, or indecisiveness nearly every day
 - Recurrent thoughts of death, suicidal ideation with or without a plan

14

Nonpharmacological Management

ADHD

- Focus on environmental management and areas of functional impairment
- Behavioral therapy
- Set 3 specific, measurable short-term target goals at a time
- Set reasonable expectations
- Academic resources- 504 plan with accommodations, IEP, behavior report cards, study training, brain breaks

Depression

- Determine suicidality and safety
- Establish a safe environment
- Cognitive behavioral therapy
- Exercise, lifestyle modifications
- Environmental/family interventions
- Guidelines for Adolescent Depression in Primary Care (GLAD-PC)- AAP

15

Pharmacological Management- Depression

- Selective Serotonin Reuptake Inhibitors (SSRIs)
 - Block serotonin transporter
 - FDA approved to treat depression in pediatrics
 - Escitalopram (Lexapro)- 12-17 years for MDD; 5-10 mg daily, max. 20 mg
 - Sertraline (Zoloft)- 6-17 years for OCD; 25 mg daily ages 6-12 years, 50 mg daily ages 13-17 years, max. 200 mg
 - Citalopram (Celexa)- recommended in GLAD-PC but not FDA approved for MDD in pediatrics; 10 mg daily, max. 60 mg
 - Fluoxetine (Prozac)- 8-17 years for MDD; 10-20 mg daily, max. 60 mg
 - Black box warning- suicidal thoughts and behaviors
 - Monitor for Serotonin Syndrome

16

Pharmacological Management- Depression

- Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs)
 - Blocks serotonin and norepinephrine transporter
 - FDA approved in pediatrics
 - Duloxetine (Cymbalta)- 7+ years for anxiety
- Norepinephrine Dopamine Reuptake Inhibitors (NDRIs)
 - Blocks norepinephrine and dopamine reuptake
 - Not FDA approved in pediatrics- off label use only
 - Bupropion (Wellbutrin)- approved 18+ years for MDD

17

Pharmacological Management- ADHD

- First-line- stimulants
 - Block the transporters that remove dopamine and norepinephrine in key areas of the brain → increased availability of neurotransmitters → more purposeful, goal-oriented behavior, focus, less impulsive, decreased motor activity
 - Amphetamines- 0.3-1 mg/kg/day (max. 1.5 mg/kg/day or 40 mg, except Vyvanse at 70 mg/day)
 - Methylphenidates- 0.3-2 mg/kg/day (max. 2 mg/kg/day or 60 mg, except Concerta at 72 mg/day and dexamylphenidate at 30 mg/day)
 - Dexamylphenidates- about ½ the dose, max. dose of 20 mg for Focalin and 30 mg for Focalin XR

18

Pharmacological Management- ADHD

- Nonstimulants
 - Alpha-2 adrenergic agonists- Guanfacine, Clonidine
 - Decreases hyperactivity and impulsivity, not as effective on attention
 - Response rate is about 50%, less than with stimulants
 - First line for tics/Tourette's Disorder
 - Sedation, dizziness, irritability, headache, GI symptoms, hallucinations/mania
 - Hypotension and bradycardia- must wean off (rebound hypertension)
 - Selective norepinephrine reuptake inhibitor (SNRI)- Atomoxetine (Strattera)
 - 1-2 weeks for initial effect, 4-6 weeks for full effect
 - GI symptoms, dry mouth, dizziness, sedation, hypertension, irritability, mood swings, **suicidal ideation** (particularly in children with ADHD)

19

Case Revisited

- Initiated Fluoxetine 20 mg daily
- Titrated off Strattera
- Initiated Adderall 10 mg Qam, 5 mg Q afternoon PRN
- CBT going well, still going weekly
- PHQ score 12 initially, 6 after fluoxetine, 4 after Adderall
 - No suicidal thoughts
- Sleeping well
- Improving grades
- Parents notice a difference in mood
- Jackson verbalizes feeling better

20

Long-Term Management

- Know your state's laws on stimulants
- Follow-up every 3-6 months for chronic psychological issues
 - PHQ-A
 - Vanderbilt
- CBT + medication
- Family resources
- Environmental management
- Health supervision, preventive care

21

References

- Garzon, D. L., Starr, N. B., Brady, M. A., Blosser, C. G., & Gaylord, N. M. (2019). *Burns' pediatric primary care* (7th ed.). Elsevier Saunders. ISBN: 9780323581967
- Hagan, J. F., Shaw, J. S., & Duncan, P. M. (2017). *Bright futures: guidelines for health supervision of infants, children, and adolescents* (4th ed.). American Academy of Pediatrics: ISBN: 9781610020220
- Mayer, J. S., Brandt, G. A., Medda, J., Basten, U., Grimm, O., Reif, A., & Freitag, C. M. (2022). Depressive symptoms in youth with ADHD: the role of impairments in cognitive emotional regulation. *European Archives of Psychiatry and Clinical Neuroscience*, 272(5), 793-806. doi: 10.1007/s00406-022-01382-z
- Wolraich, M. L., Hagan, J. F., Allan, C., Chan, E., Davison, D., Earls, M., Evans, S. W., Flinn, S. K., Froehlich, T., Frost, J., Holbrook, J. R., Lehmann, C. U., Lessin, H. R., Okechukwu, K., Pierce, K. L., Winner, J. D., & Zurhellen, W. (2019). Clinical practice guideline for the diagnosis, evaluation, and treatment of attention-deficit/hyperactivity disorder in children and adolescents. *Pediatrics*, 144(4). <https://doi.org/10.1542/peds.2019-2528>
- Zuckerbrot, R. A., Cheung, A., Jensen, P. S., Stein, R. E. K., Laraque, D., Levitt, A., Birmaher, B., Campo, J., Clarke, G., Emslie, G., Kaufman, M., Kelleher, K. J., Kutcher, S., Malus, M., Sacks, D., Waslick, B., & Sarvet, B. (2018). Guidelines for adolescent depression in primary care (GLAD-PC): part I practice preparation, identification, assessment, and initial management. *Pediatrics*, 141(3). <https://doi.org/10.1542/peds.2017-4081>

22

Questions?

23