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RESEARCH ARTICLE

MISDIAGNOSED TREATMENT RESISTANT ADHD MASKING UNDERLYING INTELLECTUAL DISABILITY AND LEARNING DISABILITY

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ABSTRACT

Attention deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental disorder in children aged 6-12 years, characterized by a persistent pattern of inattention and/or hyperactivity and impulsivity that interferes with day-to-day functioning in more than or equal to two different settings. Intellectual disability refers to a highly heterogeneous group of childhood-onset disorders characterized by below-average intellectual functioning (IQ <70) and significant limitations in adaptive functioning, which covers many everyday social and practical skills. Learning disabilities (LD) refer to several disorders that may affect the acquisition, organization, retention, comprehension, or application of verbal and/or nonverbal information. Here, we present the case of a twelve-year old boy with symptoms of school refusal and avoidance. He was initially diagnosed with ADHD. Still neuropsychiatric evaluation showed that the boy has an underlying intellectual disability and learning disability. He was misdiagnosed as ADHD initially and treated with multiple ADHD medications. Without a multilayered assessment, clinicians may end up increasing stimulant doses or prescribing different treatments for ADHD while overlooking the actual cause of impairment in the child.

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INTRODUCTION

Attention deficit/hyperactivity disorder (ADHD) is a neuro developmental disorder characterized by a persistent pattern of inattention and/or hyperactivity and impulsivity that interferes with functioning and development.[1] The prevalence rate of ADHD is 5.9% in youth and 2.5% in adults.[2] ADHD is classified into three presentations: impulsivity, inattentiveness, and hyperactivity. Inattention in ADHD presents as difficulty paying attention, staying on the task at hand, or staying organized. Hyperactivity presents as moving around (including during inappropriate times), feeling restless, or talking excessively. Impulsivity presents as interrupting, intruding on others, and having trouble waiting one's turn. It is also seen as engaging in actions that may seem appropriate or harmless in the moment, only to later experience regret upon reflecting on the consequences.[1] Intellectual disability refers to a highly heterogeneous group of childhood-onset disorders characterized by below-average intellectual functioning (IQ <70) and significant limitations in adaptive functioning, which covers many everyday social and practical skills.[3] Intellectual disability (ID) is a neuro developmental deficit characterized by limitations in intellectual functioning and adaptive behavior.[4] The prevalence of any diagnosed developmental disability in children aged 3-17 years in the United States is 8.56%.[6] The deficits include reasoning, planning, solving problems, thinking abstractly, comprehending complex ideas, learning efficiently, and learning from experience.[5] ID is assessed using standardized IQ testing and classified by severity: mild ID corresponds to an IQ range of 50-70, moderate ID an IQ of 35-49, severe ID an IQ of 20-34, and profound ID an IQ below 20.[7] Learning disabilities (LD) refer to several disorders that may affect the acquisition, organization, retention, comprehension, or application of verbal and/or nonverbal information.[8] Prevalence of diagnosed learning disability for children aged 6-17 years is 8.76%.[9] According to the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), LD is characterized by learning and academic skills difficulties. These difficulties must last for at least six months despite the provision of interventions targeting those difficulties. These difficulties include (1) inaccurate or slow and effortful word reading; (2) difficulty in the comprehension of the meaning of what is read; (3) difficulties with spelling; (4) difficulties with written expression; (5) difficulties mastering number sense, number facts, or calculation; (6) difficulties with mathematical reasoning.[10] In the last 20 years, there have been

seven randomized controlled trials that have evaluated pharmacotherapies for people with ID who have been misdiagnosed with ADHD. Five out of these seven trials evaluated methylphenidate. These trials were underpowered with three out of those five trials having fewer than 25 participants. Common ADHD medications, methylphenidate and atomoxetine, particularly at higher doses, have shown more prominent benefits in people with ID. In the trials, most participants with ID tolerated ADHD medications well. Benefits were seen in behavioral and/or cognitive domains. The evidence base is limited, although promising, for dexamphetamine, clonidine, and guanfacine.[11]

CASE PRESENTATION

A twelve-year-old boy (seventh grade) came to the psychiatric care facility with a history of school refusal and avoidance. He does not have the patience to sit and execute daily tasks. He mentions feeling on and off in terms of mood for the past two months. His parents stated he was expressing, "I am so upset at everybody that I want to rip everybody apart," when he is upset. He even hits and bangs the wall in more severe cases of anger, frustration, and sadness. When he was in first grade, there were no issues to report, but when he got into second grade, teachers and staff reported his disruptive behaviors in class and poor performance on assessments. An educational consultant evaluated the patient three years ago. As a result, the family wanted to send him to a special education program, and his current school is providing such services. He is able to conduct activities of daily living (ADLs). He is not struggling with focusing, concentration, or attention. He gets overwhelmed with multiple commands. He likes to finish the task. He does not struggle with time management or organization. Procrastination begins with school refusal. He is fidgety and restless. He had an angry outburst and said, "I am running away from this house." Over the last few months, he has been more evasive. There has been no history reported of mania or psychosis. He feels that he wants to punch or pinch someone very hard. He is sleeping and eating okay. The patient endorsed that learning was not easy for him. The patient reported that maintaining friendships has always been harder for him. Learning became harder starting in sixth grade. He cries and gets agitated easily. He experiences a lack of energy and drive, feelings of helplessness, hopelessness, and worthlessness. When he gets stressed out, his body becomes rigid. During one of his episodes, his dad asked him why he was crying, and he said someone inside him was making him feel upset. When his dad inquired more, concerned about his son experiencing hallucinations, he said no, and he said he felt upset within and could not explain it. He told his father, "You think I don't want to be happy like everybody else?" and started crying because he could not help feeling that way and did not know what to do.

The patient was diagnosed with ADHD by his previous psychiatrist and was started on guanfacine and amphetamine for 6 months, but symptoms were not improving. After that, he was given clonidine 0.1 mg three times a day, but there was minimal symptom improvement. On the mental status examination (MSE), he was alert and restless, frequently shifting in his seat and interacting with items on the desk. He had a normal rate and volume of speech, but verbal comprehension was lacking. He was mildly irritable with congruent affect. There was no reported history of delusions, hallucinations, or obsessions. He has low self-esteem now. His thought process is logical and goal-directed. He is easily distracted with poor impulse control. He interrupted frequently, and he had difficulty waiting for his turn. We performed the NICHQ Vanderbilt Assessment Scale for the child and parents, which was not significant for ADHD. Then, we performed the Screen for Child Anxiety Related Disorders (SCARED) for the child and parents; the score on the scale came out to be 9 out of 25, which is suggestive of generalized anxiety disorder (GAD). Then, we conducted the Columbia DISC Depression scale, which was significant for "moderately likely" depression. A neurologist evaluated the patient using the Wechsler Intelligence Scale for Children - Fifth Edition (WISC-V) and revealed that the patient has an overall low IQ. This Low IQ could be seen in many areas of cognition, including verbal comprehension, fluid reasoning, working memory, and processing speed. Having scored within a very low range suggests significant challenges in understanding language, problem-solving, memory, and task efficiency. In contrast, the patient scored in the average range for visual-spatial skills, indicating better performance on visual organizational and construction tasks. These findings suggest an ID. He was diagnosed with Major depressive disorder (MDD). He was prescribed Bupropion SR 100 mg and desvenlafaxine 25 mg, and increased clonidine 0.1 mg extended release oral tablet from 3 times a day to 3 tablets at bedtime, for his ADHD.

DISCUSSION

ADHD is a neurodevelopmental disorder characterized by persistent inattention, impulsivity, and hyperactivity.[1] The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), categorizes ADHD into three types: 1. Predominantly Inattentive, 2. Predominantly Hyperactive-Impulsive, 3.Combined.[1] Given these classifications, the patients' symptoms can vary. Some patients have primary deficits in attention and executive functioning, while others have motor restlessness and impulsivity. Many patients meet the criteria for the combined presentation of ADHD.[1] First-line treatment for ADHD usually begins with stimulant medications such as methylphenidate and amphetamines. The mechanism of action in stimulant medications is the release of dopamine and norepinephrine in the central nervous system. Other medications for ADHD include non-stimulants such as atomoxetine, antidepressants, clonidine, melatonin, and bupropion.[12] Intellectual disability is a neurodevelopmental disorder characterized by deficits in cognition deficits in adaptive function, and onset during the developmental period.[12] Individuals with ID can have deficits in either the conceptual domain, the social domain, or the practical domain.[13] The conceptual domain includes language, knowledge, and memory. The social domain consists of empathy, social judgment, and the ability to follow rules. The practical domain includes self-care, organization, and daily living skills.[13] Learning disabilities refer to several disorders that may affect the acquisition, organization, retention, comprehension, or application of verbal and/or nonverbal information.[14] Learning disabilities include various types of disabilities such as dyslexia (difficulty in reading), dyscalculia (difficulty with mathematics such as understanding numbers and problem solving) , dysgraphia (difficulty in writing), nonverbal learning disability (difficulty with non-verbal communication, spatial reasoning and visual-motor skills), etc.[14] The most common learning disability is dyslexia, which accounts for at least 80% of learning disabilities.[14] Learning disabilities often exist comorbidly with other disorders, such as oppositional defiant disorder, attention deficit hyperactivity disorder, anxiety, and obsessive-compulsive disorder.[14] This case highlights how the overlapping symptoms between ADHD and ID/LD can lead to false-positive ADHD diagnoses in children with ID and/or LD. Academic challenges in learning disabilities can trigger task avoidance, inattentiveness, difficulty initiating and maintaining a specific task, and failure to meet deadlines. These symptoms overlap between ADHD and ID/LD.[15] Restlessness, anger problems, inability to focus in school, and disruptions in the classroom in the presenting case were driven largely by anxiety and frustration associated with academic failure and comprehension difficulties, rather than a primary deficit in attention regulation.[16] About 20% of childhood ADHD cases also meet criteria for a learning disorder, complicating accurate differentiation between these psychiatric disorders [17] As the symptoms of ADHD and ID/LD overlap, a thorough medical and neuropsychological evaluation is essential before diagnosing ADHD to rule out or identify LDs and other ADHD-like conditions.[18] As seen in this case, the patient had tried various medications for ADHD prescribed by another psychiatrist, including guanfacine, amphetamine, and clonidine. However, these symptoms did not have a significant effect. Then, a neuropsychological evaluation was conducted, Wechsler Intelligence Scale for Children - Fifth edition (WISC-V), which revealed a low IQ in the patient. We also conducted the NICHQ Vanderbilt Assessment Scale for the child and parents,

which showed that the child is not having any difficulties with focus or attention, but rather has a low IQ to process the information. Without a multilayered assessment, clinicians may end up increasing stimulant doses or prescribing different treatments for ADHD while overlooking the true cause of impairment in the child.[18] Due to overlapping symptoms between ADHD and ID/LD, sometimes disorders such as ID/LD can be underdiagnosed, which can further lead children to miss out on Individualized education programs (IEPs) and tailored special education programs.[19] Treating misdiagnosed ADHD patients with ID/LD can improve the behavioral symptoms for a temporary period of time, but there would be no progress in academics and the underlying conditions would still be prevelant.[20] An academic gap over time can lead to poor grades, leading to failure in school and eventually dropping out.[21] Misdiagnosis of ADHD can lead to use of polypharmacy in patients; as seen in this patient, the patient was prescribed with multiple classes of medications for ADHD.[22]

CONCLUSION

In conclusion, the patient was misdiagnosed with ADHD and was treated accordingly, which yielded ineffective results, and upon a neuropsychiatric evaluation, it was determined that he has LD and ID. This case highlights the overlap between the symptoms of ADHD and LD and/or ID that can lead to misdiagnosis and improper treatment. The specific overlapping attributes include school refusal, mood dysregulation, and behavioral abnormalities. When being treated for ADHD, he had a minimal response to stimulant and non-stimulant medications, which led to seeking further evaluation. This case emphasizes the importance of differential diagnosis, multidisciplinary assessment, and tailored treatment for overlapping symptoms.

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