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Neurological Insights Into Disruptive Mood Dysregulation Disorder: A Case Of Demyelination

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ABSTRACT

Disruptive Mood Dysregulation Disorder (DMDD) is a pediatric mood disorder marked by persistent irritability and severe temper outbursts disproportionate to the situation, typically emerging before age 10. It is differentiated from pediatric bipolar disorder, preventing misdiagnosis and inappropriate treatment. DMDD involves recurrent behavioral dyscontrol disrupting daily functioning and shares symptoms with conditions like oppositional defiant disorder (ODD) and ADHD. However, its defining features include pervasive mood dysregulation and prolonged emotional reactions, highlighting the importance of recognizing irritability as a core symptom in children. Here we present a case of a 10 year old female, Hindu from Greater Noida, studying in 2 nd class in a private school with no past history of head trauma or developmental delay was brought to the Psychiatry OPD by parents with complaints of crying spells, unprovoked persistent irritable behavior grossly out of proportion to the situation associated with recurrent outbursts/tantrums 3-4 days/week along with physical aggression towards people in school as well as at home with inter episode mood being irritable for most of the day and reduced scholastic performance since past 1 year which has increased since 6 months. On MSE, patient was kempt, tidy, restless, partially cooperative, crying, reduced rate and tone of speech, irritable affect, easy distractibility, reduced concentration, average intelligence and grade 1 insight. Patient qualifies the criteria of DMDD. After treatment with Escitalopram 5 mg and Risperidone 0.5 mg. Patients' irritability, crying spells and behavioral symptoms have improved. Patient is currently maintaining well. Despite progress in understanding Disruptive Mood Dysregulation Disorder (DMDD), several gaps remain, including the lack of longitudinal data on its development and limited evidence on pharmacological treatments. Cross-cultural applicability and neurobiological mechanisms, particularly in amygdala-prefrontal circuitry, need further exploration. Additionally, DMDD's comorbidity with ADHD, anxiety, and ODD complicates diagnosis. Future research should address these areas to improve diagnosis, treatment, and outcomes for affected children.

1. INTRODUCTION

DMDD is characterized by persistent irritability and frequent, severe temper outbursts that are disproportionate to the situation and inconsistent with the child's developmental level [1]. The disorder primarily affects children and adolescents, with symptoms typically emerging before the age of 10 and a formal diagnosis limited to individuals between 6 and 18 years old [2]. This disorder serves as a critical differentiation from pediatric bipolar disorder, reducing misdiagnosis and the unwarranted use of mood stabilizers and antipsychotics. DMDD is characterized by persistent irritability and recurrent episodes of behavioral dyscontrol that disrupt daily functioning across multiple settings [1, 2]. The recognition of DMDD highlights significant gaps in understanding irritability as a core symptom in pediatric populations. [1] While it shares overlapping symptoms with other conditions such as oppositional defiant disorder (ODD) and attention-deficit/hyperactivity

disorder (ADHD), DMDD's defining features include pervasive mood dysregulation and disproportionate emotional reactions that persist over an extended period.[3]

DMDD is defined by the following criteria:

- Severe recurrent temper outbursts (verbal or behavioral) grossly disproportionate in intensity or duration to the situation [3].
- Outbursts occur three or more times per week and are inconsistent with the child's developmental level [4].
- Mood between outbursts is persistently irritable or angry most of the day, nearly every day, and observable by others.
- Symptoms persist for at least 12 months, with no symptom-free interval longer than three months.
- The diagnosis is limited to children aged 6–18 years, with symptom onset before age 10 [5].

2. CASE DETAIL

A 10-year-old female from a Hindu family in Greater Noida, studying in the second grade of a private school, was brought to the Psychiatry Outpatient Department (OPD) by her parents due to concerns about her worsening emotional and behavioral issues. Over the past year, she had been experiencing frequent episodes of unprovoked crying, persistent irritability grossly disproportionate to any situation, and recurrent tantrums or outbursts occurring 3–4 times per week. Her behavior was also marked by episodes of physical aggression toward peers at school and family members at home. These symptoms were accompanied by a continuous irritable mood between episodes and a noticeable decline in her academic performance, attributed to reduced concentration and easy distractibility. The symptoms had escalated over the last six months, causing significant distress to both the child and her family.

On mental state examination, the child presented as kempt and tidy but displayed restlessness, partial cooperation, and clear emotional distress, evidenced by crying during the session. Her speech was observed to be slow in rate and subdued in tone, while her affect was predominantly irritable. She exhibited difficulty sustaining attention, showed average intellectual abilities, and had a Grade 1 level of insight, indicating limited awareness or understanding of her condition. After a comprehensive evaluation, she was diagnosed with Disruptive Mood Dysregulation Disorder (DMDD), a condition characterized by chronic irritability, severe mood dysregulation, and frequent temper outbursts in children. Pediatric reference was also done to rule out any organicity.

Treatment was initiated with Escitalopram 5 mg, a selective serotonin reuptake inhibitor aimed at stabilizing mood, and Risperidone 0.5 mg, an atypical antipsychotic to manage her severe irritability and aggressive behaviors. Over the course of treatment, the child demonstrated significant improvement in her symptoms. The frequency and intensity of irritability episodes diminished, crying spells became rare, and physical aggression substantially decreased. She also began showing better emotional regulation and improved focus, contributing to gradual progress in her academic performance. With continued medication and parental support, the child is currently maintaining well and has resumed normal daily activities. This case highlights the importance of timely psychiatric evaluation and targeted interventions in managing childhood mood and behavioral disorders, ensuring improved outcomes for both the patient and their family.

3. INVESTIGATIONS

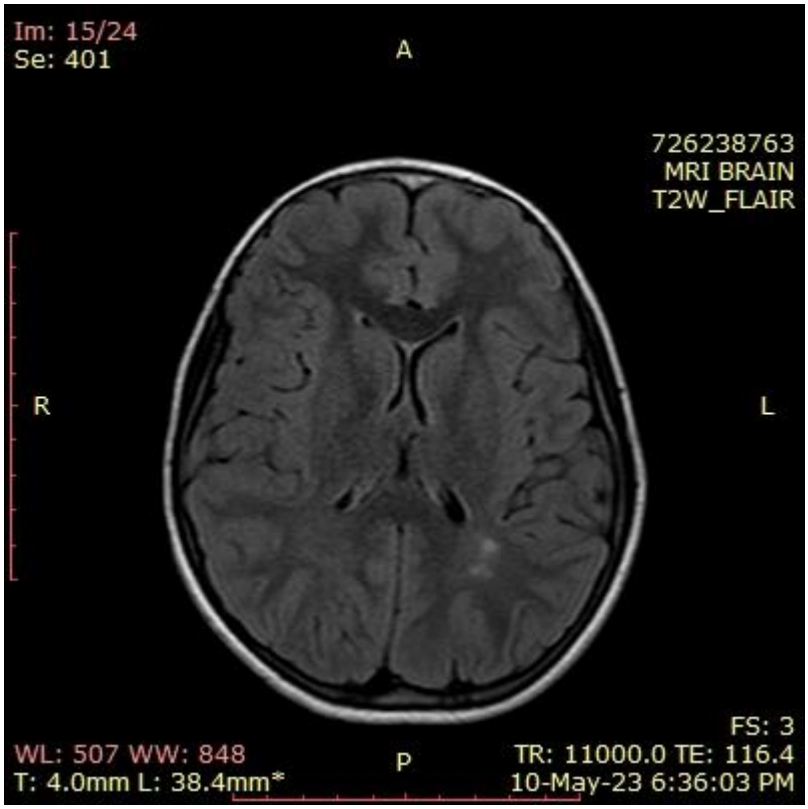
Basic investigations were conducted to assess the patient's overall health and exclude any underlying medical conditions. The patient's vital signs were stable, and routine blood tests, including a complete blood count (CBC), liver function tests (LFT), kidney function tests (KFT), blood sugar levels, lipid profile, and Tridot test, were performed. These tests helped rule out potential systemic issues that might contribute to the patient's symptoms. Additionally, an electrocardiogram (ECG) was done to evaluate cardiac health, and no significant abnormalities were noted in these initial investigations.

A psychological assessment was also carried out using various standardized tools, including the General Development Test (GDT), the Modified Instrument for Screening for Intellectual Competence (MISIC), and the Child Behavior Checklist (CBCL). The results from all three assessments indicated that the patient had average intellectual functioning, but there were signs of depressive mood, which aligned with her clinical presentation of irritability and emotional distress.

A fundus examination was performed to rule out any eye-related issues, and it showed no significant abnormalities. Further neuroimaging was done using an axial T2 FLAIR MRI scan of the brain, which revealed findings highly suggestive of a demyelinating disease, localized to the periventricular area around the left occipital horn. This raised concerns about a possible neurological condition affecting the brain's white matter.

Given the MRI findings, the patient was advised to undergo additional tests, including contrast-enhanced MRI (CE-MRI), anti-N-methyl-D-aspartate (NMDA) receptor antibodies, and Neuromyelitis Optica (NMO) antibodies, to further investigate the possibility of autoimmune or demyelinating diseases such as NMDA receptor encephalitis or multiple sclerosis. However,

due to financial constraints, these recommended tests were not performed at the time.



4. CONCLUSIONS

The inclusion of DMDD in the DSM-5 addresses the overdiagnosis of bipolar disorder and the resultant overuse of psychotropic medications in children. By delineating chronic irritability as a distinct diagnostic entity, DMDD ensures targeted treatment strategies such as behavioral interventions and parent training programs [6].

Persistent irritability is a strong predictor of later-life psychiatric disorders, including major depressive disorder and generalized anxiety disorder. Early identification and intervention in DMDD can mitigate the trajectory of emotional dysregulation, improving long-term psychosocial outcomes [7].

DMDD's recognition underscores the need for further research into the neurobiological underpinnings and developmental pathways of irritability. Current studies focus on neural correlates such as amygdala hyperactivity and prefrontal cortex dysregulation, providing insights into targeted therapies [8].

Knowledge Gaps

Despite advances, several gaps remain:

- **Longitudinal Course and Natural History**
- There is a lack of comprehensive longitudinal data on the developmental trajectory of DMDD. Understanding how DMDD evolves over time, including its persistence into adulthood or transition into other mood disorders, remains unclear [9].
- **Pharmacological Interventions**
    - Evidence regarding the efficacy and safety of medications specifically for DMDD is limited. While behavioral therapies are commonly recommended, there is a need for robust trials assessing pharmacological options tailored to DMDD's symptom profile [10]
- **Cross-Cultural Validity**
    - The applicability of DMDD diagnostic criteria across diverse cultural contexts is underexplored. Cultural differences in parenting styles, emotional expression, and interpretation of irritability may impact diagnosis and prevalence rates [11].

- **Neurobiological Mechanisms**
    - Although initial studies suggest abnormalities in the amygdala-prefrontal circuitry, more research is required to elucidate the precise neural mechanisms underlying chronic irritability in DMDD. This knowledge could pave the way for neurobiologically informed treatments [12].
- **Comorbidity and Differential Diagnosis**
    - DMDD often co-occurs with conditions such as ADHD, anxiety, and ODD, complicating diagnosis and treatment. There is a need for tools to better distinguish DMDD from these overlapping disorders [13].

Future studies should explore these areas to refine diagnostic accuracy and expand therapeutic options.

DMDD represents a critical addition to the psychiatric nomenclature, addressing a previously unmet need for diagnosing chronic irritability and emotional dysregulation in pediatric populations. Its diagnostic features provide clarity in distinguishing DMDD from related disorders, ensuring precise interventions. Continued research is essential to bridge knowledge gaps and enhance outcomes for affected children.

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