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Disruptive Mood Dysregulation Disorder (DMDD): A New Diagnostic Approach to Chronic Irritability in Youth

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Abstract

Disruptive mood dysregulation disorder (DMDD) is a newcomer to psychiatric nosology. This new DSM-5 diagnosis addresses the need for improved classification and treatment of children exhibiting non-episodic irritability and severe temper outbursts. Currently, many of these children are diagnosed with bipolar disorder, despite the lack of distinct mood episodes. This diagnostic practice has raised concerns, in part due to the escalating prescription of atypical antipsychotics. This article provides an overview of the limited literature on DMDD including its history, and relevant studies of assessment and treatment. We include a case study to illustrate key points, including diagnostic issues that clinicians may encounter when considering a DMDD diagnosis.

Severe, chronic, irritable mood in children has long presented a challenge to pediatric psychiatry due to its poor diagnostic specificity and inclusion in numerous mood, anxiety, and disruptive behavior disorders.(1) A concerning consequence has been the assignment of bipolar disorder to youth with chronically irritable mood, thus redefining bipolar disorder in early life as a non-episodic syndrome. It is likely that this diagnostic approach has contributed to the dramatic rise in the rate of pediatric visits with a diagnosis of bipolar disorder in the US, from an estimate of 25 per 100,000 in 1994–95, to 1,003 per 100,000 in 2002–2003.(2) Approximately 60% of medical visits with this diagnosis result in treatment with polypharmacy, with a large proportion receiving atypical neuroleptics (48%). While these medications have been shown to ameliorate symptoms of mania in bipolar disorder,(3) as well as aggression and irritability in autism,(4) they have not been tested in other children with chronic irritability and severe outbursts. Thus, this practice has caused concern about improper diagnosis and treatment, and has taken on urgent public health significance.

In the 1990's, efforts to better characterize adolescents with chronic impairing irritability resulted in the delineation of a broad phenotype, provisionally named severe mood dysregulation (SMD).(5) In contrast to bipolar disorder or hypomania, SMD is defined by chronic, non-episodic irritability, exaggerated emotional reactivity, and hyperarousal. SMD is distinguished from bipolar disorder on the basis of familial aggregation,(6) physiological responses to frustration,(7) and neural responses to social stimuli.(8) A re-analysis of longitudinal data from the Great Smoky Mountains Study found associations between SMD and later depression.(9) A relationship between early chronic irritability and later depressive

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disorders is consistent with findings that ODD symptoms of irritability (i.e., loses temper, easily annoyed) in childhood are predictive of depressive symptoms.(10–12)

This work provided the foundation for the establishment of Disruptive Mood Dysregulation Disorder (DMDD), and its placement among the DSM-5 “Depressive Disorders.” This placement also emphasizes the disorder’s mood component and its distinction from the Bipolar Disorders. The core feature of DMDD is “chronic, severe persistent irritability.” (p. 156; 13) accompanied by severe temper outbursts, at least three times per week. Outbursts must be out of proportion to provocation, and inconsistent with developmental level. They are pervasive in the sense that they characterize the child’s comportment across multiple settings. Minimum duration of symptoms is one year (without interruption for more than 3 months), with required onset by age 10. These symptoms are consistent with those of SMD with one exception: SMD includes symptoms of hyperarousal that are not included in DMDD. The diagnosis cannot be made: before age 6, or after 18 (an age range that approximates that of children in studies of SMD), if there is more than a day of manic or hypomanic symptoms, and if not explained by another disorder. These diagnostic criteria indicate that DMDD, correctly, is not designed to include all children with severe outbursts. For example, in a cohort of children with a long history of frequent severe temper outbursts, we found that only half had persistent irritability and thus would meet DMDD criteria.(14) When DMDD was proposed, objections reflected concerns that it had insufficient empirical support, in part because studies of SMD were conducted by a single group, with adolescents temporarily hospitalized for research purposes. Despite this, it was added to DSM-5 to preclude assigning bipolar disorder to children with chronic, irritable mood.

Differential Diagnosis

Bipolar disorder (BD): The differentiation from DMDD rests on the fact that DMDD is characterized by chronic irritability, whereas, irritability in BD is episodic, representing a change from the person’s usual state. Thus, the typical mood of DMDD is consistently irritable or angry, while that of BD varies across euthymia, depression, and mania.

Intermittent explosive disorder (IED): As shown in the Table, the two disorders differ in frequency of outbursts (2/week for IED for 3 months versus 3/week for DMDD). Critically, there is no requirement of persistent irritability in IED although it may be present. Since criteria may be met for both disorders, DSM-5 stipulates that DMDD takes precedence over IED. However, IED is appropriate when the duration is below one year. *Oppositional*

Defiant Disorder (ODD): As shown in the Table, both DMDD and ODD criteria include irritability and temper outbursts. The two disorders differ in 1) severity: in DMDD, outbursts must occur 3 times/week, but only once a week in ODD; 2) duration: 12 months for DMDD, and 6 months for ODD; and 3) pervasiveness and impairment: DMDD must impair function in two of three settings, and be severe in one setting; there is no such requirement for ODD. Thus, more children with DMDD will meet criteria for ODD, than the reverse. Indeed, in two large community samples, approximately 70% of children with DMDD met criteria for ODD, but less than 40% with ODD met DMDD criteria.(15)

Reliability and Validity

The ultimate goal of establishing a new diagnosis such as DMDD is to guide treatment. However, a necessary first step is reliable assessment. It is a particular challenge for DMDD as clinicians have conceptualized these children in different ways, resulting in a multiplicity of diagnoses. For example, in the DSM-5 Field Trials there was extreme variation in inter-clinician reliability.(16) Reliability was acceptable ($k = 0.49$) in inpatient settings, but it was unacceptable in outpatients (k 's = 0.06–0.11). Similarly, significant differences in rates of DMDD have been reported between parent reports and inpatient observations. In 82 consecutive inpatient admissions, irritability and explosiveness were more frequently endorsed by parents (68.3%), than by hospital staff (39%).(17) However, this may also reflect a diminution of aggression upon admission to an inpatient setting.

Attempts have been made to assess the clinical validity of DMDD using retrospective examination of previously acquired datasets. Axelson and colleagues (18) generated DMDD diagnoses from previously administered K-SADS interviews of children in the Longitudinal Assessment of Manic Symptoms (LAMS) study. Two groups were selected, one with elevated parent ratings of mania ($n=621$), the other without ($n=86$). DMDD was twice as prevalent in children with manic symptoms than in those without, although in practice, these children would not meet criteria for DMDD because manic symptoms are exclusionary. Children with DMDD had significantly higher rates of ADHD, ODD, and conduct disorder (CD) than those without DMDD. Specifically, 96% of the DMDD youth had ODD/CD, and 77% had ADHD and ODD/CD. Only 19% of children initially diagnosed with DMDD maintained the disorder across a 12 and 24-months follow-up, suggesting that DMDD has relatively low stability, but is chronic in a small proportion. This finding is consistent with retrospective examination of SMD in the Great Smoky Mountains study which found that 82.5% of children only met criteria for SMD in one of four waves of data collection.(9) Prevalence of SMD dropped dramatically when SMD criteria had to be met for two consecutive waves. In three large previously ascertained community samples, Copeland et al.(15) found DMDD prevalence estimates of about 1% in children over 6. Comorbidity was the rule and DMDD was associated with high levels of social impairment, service use, and school suspensions, as well as family poverty, which highlights the clinical importance of DMDD.

Treatment Considerations

Since DMDD is a new diagnosis, there are no informative clinical trials from which to establish judicious practice. However, rational clinical guidelines may be distilled from treatment studies in disorders that share main inclusion criteria with DMDD, ignoring exclusion criteria. Following this approach, some indirect recommendations are possible based on treatment studies of children with severe mood dysregulation (SMD), ODD, or aggressive behavior, for whom a range of treatments, psychopharmacological and psychosocial, have been examined.

Several psychosocial interventions that focus on positive parenting have demonstrated efficacy in children with oppositional behavior. Specifically, parent-training approaches are

most effective for younger children.(19) In adolescents, these treatments provide limited benefit; instead, individualized cognitive-behavioral treatments are indicated. These interventions are systematized, but allow for variation to accommodate specific clinical problems. Recently, a novel behavioral intervention aimed at mood regulation has shown promise in children with SMD and ADHD (20), and awaits further double-blind testing.

The frequent co-occurrence of irritability and severe temper outbursts with ADHD (14, 15) has fostered the testing of stimulants on these symptoms. Meta-analyses report moderate to large effects of stimulants on aggression in children with and without ADHD. (21, 22) For example, positive stimulant effects have been found on aggression in children with conduct disorder, regardless of ADHD comorbidity.(23) A cross-over study (24) tested differential effects of three intensities of combined behavioral management and methylphenidate, in children with ADHD and SMD (n = 33), and only ADHD (n = 68). The two clinical groups had identical responses on ADHD symptoms and children with SMD exhibited reductions in “manic” symptoms. Results suggest that combined stimulant/behavioral treatment may lead to improvement in mood dysregulation in children with ADHD. Another compound approved for ADHD, atomoxetine, has not shown significant reductions in aggressive symptoms in children with ADHD.(22)

Divalproic acid (DVPX), an antimanic compound, has limited support for treating DMDD-type mood dysregulation. Two double-blind, placebo controlled studies have been reported. In a study of 20 outpatients with ODD/CD, mostly adolescents, with symptoms closely reminiscent of DMDD, (i.e., mood lability, a history of pervasive, severe, explosive, temper outbursts), 8/10 on DVPX responded, whereas none of those on placebo (0/10) responded (25). Blader et al. (26) investigated the efficacy of DVPX as an adjunctive treatment to stimulants and behavioral treatment for children with ADHD and aggression. Compared to the placebo group, significantly more children in the DVPX group were classified as remitters at the end of the 8-week trial (57 vs. 15%). Of note, aggression remitted in approximately 42% of children during the lead-in period when they were receiving stimulants and behavior therapy only, suggesting that, in a significant proportion, this combination is effective in reducing aggression that occurs in the context of ADHD, as described earlier. Because DVPX is an antimanic compound, it is tempting to conjecture that its effect is targeting behaviors reminiscent of mania. However, in a placebo controlled trial, lithium was not found to have beneficial effects for children (ages 7–17) with SMD.(27) Of note, similar to the study of Blader et al. (26), 45% of participants made significant improvement during the two-week placebo run-in portion of the study, to the point that they no longer qualified for the trial. This suggests that hospitalization or behavioral interventions alone may lead to significant improvements in these children.

Antipsychotic compounds have a very long history of treatment efficacy for dysregulated behavior at all ages. A meta-analysis reported that risperidone, compared to placebo, has a strong effect on aggression, often considered a proxy for dysregulated behavior.(19) Moreover, it has been shown to shorten the duration of rages in hospitalized children.(28) The only uncontrolled trial in SMD reports reductions of irritability, ADHD and depression with risperidone.(29) Thus, there is evidence of efficacy for atypical neuroleptics for

symptoms of DMDD such as irritability and aggression; however, side effects, even with short-term treatment, may limit their widespread use.

In sum, treatment decisions in DMDD are complicated by its high comorbidity. Most often, a first step would be a trial of stimulant treatment since it often enhances children's resilience and frustration tolerance, and reduces aggression. Psychosocial interventions such as parent-training for young children and individualized cognitive-behavioral therapy for older children, seem indicated. If insufficient improvement occurs with combined stimulant and psychosocial interventions, it is reasonable to consider a mood stabilizer such as divalproic acid or an atypical neuroleptic, keeping in mind their significant side effects. Given the complex clinical picture of children with DMDD, and the negative ramifications it has on family function and parent-child relationships, a combination of therapeutic approaches will likely be required to achieve meaningful improvement.

Summary

DMDD has just recently entered the nosology and only approximate recommendations can be made. We do not know whether DMDD will reduce diagnoses of pediatric bipolar disorder. However, it is hoped that it will lead to the identification of a group of highly impaired children for whom targeted interventions can be established.

Case Vignette

Dillon, an 8-year-old boy living with his biological parents and younger brother, was brought in for an evaluation because his parents were, "at their wits end" regarding how to handle his explosive outbursts, which were occurring several times a day. Mrs. A stated, "It has gotten to the point where I dislike my child."

At the time of the evaluation, Dillon was exhibiting temper outbursts several times a day that lasted approximately 10 minutes, and more intense 30-minute outbursts multiple times a week. During outbursts, Dillon became physically aggressive. For example, prior to the evaluation, Dillon kicked and punched holes in his bedroom door, causing destruction that warranted the door's removal. Additionally, Mrs. A. reported that she always had bruises on her body from her attempts to block Dillon's strikes. Dillon's parents described him as irritable and cranky for the better part of the day, on most days. When irritable, Dillon appeared agitated, and restless and often expressed that he wanted to be left alone. Attempts to cheer him up were typically unsuccessful, and sometimes worsened his irritability.

Dillon was in the second grade in a restrictive classroom environment, classified under Special Education as Emotionally Disturbed. In the past school year, Dillon had been suspended three times- for physical aggression toward school personnel, for throwing a chair in the classroom, and for knocking over a bookcase. Despite having cognitive abilities that ranged from average to superior, he struggled academically, partly due to large amount of time spent out of the classroom because of disruptive behavior. Teachers noted that Dillon often appeared to be in an irritable, agitated mood, and that they were pleasantly surprised when he smiled or appeared happy. They often felt they were walking on eggshells to avoid his rageful outbursts.

History of presenting illness

Mrs. A reported that Dillon had always been a difficult child. As a baby, he was colicky, and cried incessantly for several hours each day. As a toddler, Dillon threw tantrums multiple times per day, which Mrs. A attributed to the “Terrible Two’s.” Unfortunately, as Dillon grew, his outbursts escalated. By the time Dillon was five, his temper tantrums included hitting and kicking his parents, and throwing breakable objects. Dillon’s emotional and behavioral difficulties were also manifest outside the home as evidenced by his expulsion from Pre-K because of unmanageable behavior.

Dillon’s tantrums and non-compliance at home increased once he entered school as homework added another source of frustration and negative interactions. He was highly distractible, and exhibited strong opposition when asked to do homework. He was constantly restless, fidgeting, and getting out of his seat, and was difficult to control. Dillon also tried to avoid daily routines, such as picking up his clothes, brushing his teeth, and threw tantrums regularly to avoid them. During this time, Dillon’s irritability worsened as well. Around first grade, he began to appear constantly “on-edge” and easily bothered by little things, such as others sitting too close to him. His mood remained cranky for most of the day, sometimes several days at a time. When Dillon’s parents tried to cheer him up by suggesting a fun activity, he would snap, demanding to be left alone. Dillon also started to make hostile attributions regarding peers’ intentions. For example, when playing tag, Dillon would get angry, believing they had hit him on purpose, when they were merely tagging him. He also expressed negative thoughts that no one liked him, he did not have friends, and his parents did not love him. At times, Dillon had difficulty controlling these thoughts, which; Mrs. A referred to as “mind spirals.” She reported that Dillon would bring up an angering event out of nowhere, such as being yelled at by his teacher a few days prior, and remain upset for several hours.

Dillon’s outbursts at school led to a classification of Emotionally Disturbed and he was moved to a smaller classroom setting. Despite this more supportive environment, Dillon continued to be disruptive, and to have difficulty focusing, following instructions, and completing classwork. He became bored very easily, and refused to do work. With time, Dillon’s academic progress declined. Teachers eventually placed fewer academic demands on him to avoid outbursts.

In Dillon’s early schooling, he made friends and enjoyed interacting with peers. However, because of his temper tantrums and hostile attributions, peers began to avoid him. His parents restricted family outings. They stopped attending mass when Dillon was in second grade because he could not sit still, and would throw tantrums in church. They cut back on family gatherings, and avoided including Dillon on errands, because of the embarrassment caused by his tantrums.

Conceptualization

A comprehensive diagnostic interview that included the parent K-SADS, a clinical child interview, and teacher rating scales, confirmed that Dillon’s behaviors and mood symptoms were consistent with DMDD. His temper outbursts were frequent (at least 3 per week),

severe, and explosive, causing impairment at home and school. Between explosive episodes, Dillon's mood was chronically irritable. These symptoms had been present for several years without periods of amelioration. In addition, Dillon met criteria for ADHD-Combined type, as well as ODD. However, according to DSM-5, when criteria for DMDD and ODD are met, only DMDD is assigned. Mania symptoms were not reported, and Dillon's irritable mood was chronic, ruling out bipolar disorder.

Treatment

Dillon's parents were first provided with an overview of DMDD and ADHD and their impact on Dillon's functioning. Second, Mr. and Mrs. A and Dillon consulted with a child psychiatrist to discuss pharmacological treatments. Dillon was prescribed methylphenidate, with the hope that it would improve Dillon's restlessness and frustration tolerance, thus reducing his tantrums. Third, Dillon's outbursts at home had become means of avoiding demands, and his parents were unsure exactly how to manage them. Therefore, they were referred for parent management training, which offers specific strategies that enhance effective communication and discipline. At the same time, Dillon received individual cognitive behavior therapy (CBT) aimed at teaching him how to more effectively regulate his mood and improve his tolerance for frustration. He was taught coping skills to regulate his anger, and to identify and relabel distortions that contributed to his hostile reactions. Finally, a school behavior daily report card was developed that functioned like a token economy through which Dillon was rewarded for specific positive behaviors in the classroom.

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