

Rages—What Are They and Who Has Them?

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Abstract

Objective: The purpose of this study was to examine rages and define their associated clinical and diagnostic conditions systematically. Children's severe anger outbursts, sometimes called "rages," have been associated with many disorders, including mania, "severe mood dysregulation," and oppositional defiant/conduct disorder. Although reactive aggression has been studied extensively, there are almost no data on this important and disabling clinical phenomenon.

Method: A total of 130 different 5–12 year olds were hospitalized over 151 consecutive admissions were evaluated diagnostically with information from parents, children, doctors, nursing staff, and teachers. Rages were operationally defined as agitated/angry behaviors requiring seclusion or medication because the child could not be verbally redirected to "time out." Rage behaviors were categorized as they occurred with the specially designed Children's Agitation Inventory. Hypotheses were that rages would be associated with prior treatment failure, and that children with rages would have the most co-morbidities, including learning/language disorders. We did not expect narrow-phenotype bipolar disorder to be specifically associated with rages.

Results: Of 130 children, 71 (54.6%) were admitted for rages. Preadmission rages and admission taking an atypical antipsychotic significantly predicted the subsequent number of in-hospital rages. Attention-deficit/hyperactivity disorder with learning/language disorder significantly predicted the occurrence and number of rages. Bipolar disorder was the referring diagnosis in 17/49 (34.7%) admissions with rages and 15/102 (14.7%) of admissions without rages (odds ratio [OR] 3.05, confidence interval [CI] 1.36, 6.80). However, a consensus diagnosis of bipolar disorder occurred in 5 (9.1%) of the sample with rages and 5 (5.8%) in the rest of admissions.

Conclusions: Psychiatrically hospitalized children with multiple rages have complex, chronic neuropsychiatric disorders and have failed prior conventional treatment. One third of children with rages had been given a bipolar diagnosis prior to admission. However, only 9% of children with rages were given that diagnosis after careful observation.

Introduction

CHILDREN WHOSE ANGRY, AGITATED OUTBURSTS are so severe that they pose a danger to themselves and others also pose both a diagnostic and therapeutic challenge. Diagnostically, the outbursts, sometimes called "rages," have been increasingly associated with mania (Mick et al. 2005) and "severe mood dysregulation" (Leibenluft et al. 2003), but they may occur in many other psychiatric illnesses (Budman et al. 2000; Campbell et al. 1992; Connor et al. 2006; Kessler et al. 2006) or are associated with domestic violence (Connor et al. 2003) or compromised language and cognitive function (Gilmour et al. 2004; Sukhodolsky et al. 2005; Nigg and

Nikolas 2008). Indeed, generic emotion dysregulation (Cole and Hall, 2008) and affective/overt/hot/reactive/impulsive aggression may be a dimension that cuts across a number of diagnoses, including attention-deficit/hyperactivity disorder (ADHD), autism, posttraumatic stress disorder, and bipolar disorder (BPD) (Jensen et al. 2007). Therapeutically, the seriousness of these outbursts has often necessitated the use of seclusion (closed door in quiet, safe room) or medication for emergency management in hospitals and schools (Masters et al. 2002).

In spite of the large clinical and developmental literature on overt, reactive, impulsive aggression (Connor 2002; Tremblay et al. 2005, for review), there is surprisingly little information

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on characteristics of the children whose rages require treatment with seclusion or restraint (S/R), physical or medical (Masters et al. 2002), or the behaviors they demonstrate during a rage. Inpatient studies addressing S/R have described the frequency and course of outbursts or the targets of aggression (Garrison et al. 1990; Vivona et al. 1995; Sukhodolsky et al. 2005) but not diagnosis. Outpatient studies (e.g., Bambauer and Connor 2005; Connor and McLaughlin 2006) address a less impaired population, give no indication of how outbursts were managed, and rely on caregivers or teachers as informants rather than using direct observation.

Recent years have evidenced a steep increase in a hospital discharge diagnosis of BPD (Blader and Carlson 2007), and there is considerable focus in the media on what some feel is inappropriate medication use in children designated as "bipolar" because of rages (Carey, NY Times, September 4, 2007). However, to the best of our knowledge, there have been neither specific observations of rages nor an analysis of how such behaviors might relate to any particular psychiatric disorder, including BPD.

The present study, then, uses direct observation to define rages operationally in a sample of psychiatrically hospitalized children to address the relationship of diagnosis and preadmission treatment variables to rages. We hypothesized that "rages" would be a frequent cause of hospitalization because of prior treatment failure, but occur less often in hospital than at home. We expected that children with rages in-hospital would be the most co-morbid, with both psychiatric and learning/language impairment. We did not expect that narrow phenotype mania would explain the majority of rages, however. This study was approved by the University's Institutional Review Board, the Committee on Research Involving Human Subjects (CORIHS).

Methods

Sample

Consecutive admissions ($n=151$) of 130 children, ages 4–12, to a 10-bed university hospital unit were studied. The unit operates with a behavioral system similar to that described by Dean and colleagues (Dean et al. 2007), a multidisciplinary treatment team and an inpatient school operated by the Board of Cooperative Educational Services (B.O.C.E.S.). All parents/caregivers consented at admission to permit observations and ratings of a possible rage episode, as well as for permission to use liquid risperidone instead of intramuscular injections if needed. No one refused, but 3 children were not included in the medication aspect because they had had previous dystonic reactions on risperidone.

Assessment

A semistructured psychiatric interview with parents/caretakers of all admissions was administered based on a prior parent-completed version of the combined Child Symptom Inventory (CSI) and Adolescent Symptom Inventory (ASI). These *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV)-based (American Psychiatric Association 1994) rating scales (Grayson and Carlson, 1991; Sprafkin et al., 2002) assess disorders using a Likert format (never, sometimes, often, very often) for each symptom and are completed by the parent in advance so that conditions

most clinically relevant to hospitalization are explored first, unlike the usual semistructured interview that follows the same format regardless of presenting problem.

A history of rages, other physical and/or verbal aggression, exposure to domestic violence/abuse, number of prior hospitalizations, prior treatment and educational status, and referring clinician diagnoses were also ascertained. Nursing staff and teachers completed a short version of the CSI weekly as a focus for treatment planning. For this study, a best-estimate diagnosis (Leckman et al. 1982), made by the first author (G.A.C.) and the inpatient medical director (Z.G.), was used to incorporate hospital course, nurse, and inpatient teacher observations, parent-provided history, and child mental status. Because 141 (93.4%) admissions lasted more than a week, adequate observation of children after admission was possible in most cases. Diagnostic reliability was assessed in a random subsample of 25% of cases (between authors G.A.C. and D.M.) using the procedure of Klein et al. (1994). Cohen kappa values for the seven diagnostic categories described below were as follows: for mania, learning and language disorders, and psychosis, $\kappa=1.0$; ADHD, $\kappa=0.94$; pervasive developmental disorder (PDD), $\kappa=0.91$; anxiety $\kappa=0.85$; depression, $\kappa=0.83$; oppositional defiant/conduct disorder (ODD/CD), $\kappa=0.74$.

Best-estimate diagnoses were done blind to rages status by the first author (G.A.C.) and while the unit clinicians (Z.G., D.M.) as treating clinicians knew the specific patients, diagnoses were done long enough after discharge that precise recollection of presence or number of rages was unlikely.

Diagnoses, based on *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition, Text Revision (DSM-IV-TR) (American Psychiatric Association 2004) were "current" (i.e., afflicting the child at the time) rather than "lifetime" (conditions occurring in the past). Besides parent history and mental status, ADHD and ODD/CD diagnoses specifically required nurse- and teacher-rated inattentive and/or hyperactive ADHD symptoms on the CSI. Separation anxiety, generalized anxiety, and posttraumatic stress disorder were combined as anxiety disorders; major depression, dysthymia, and depression not otherwise specified (NOS) were combined as depression. PDD included autism, Asperger disorder, and PDD NOS. Psychotic disorder included schizophrenia and psychosis NOS. The diagnosis of "narrow-phenotype" mania/BPD) was made using unmodified DSM-IV criteria and required a clearly defined current episode as well as symptoms of mania described by parents and concurrent symptoms observed by the child psychiatrist, child psychologist, or nursing staff as occurring most of the day. The diagnosis of BPD NOS/possible mania was made if symptoms of mania were transient, i.e., periods of behavior that lasted an hour or less. The current operationalization of BPD NOS (Birmaher et al. 2006) was not available when this study began. Clinical examples of children with rages are described elsewhere (Carlson 2009).

Scheduling permitted 118 of 130 children to be tested on the Wechsler Intelligence Scale for Children (WISC-III or -IV) intelligence quotient (IQ) and Kaufman Tests of Educational Achievement (KTEA) (Kaufman and Kaufman 1985). Test scores were available by history in 6 children. Severe learning disorder was diagnosed by the testing psychologist based on performance below the 20th percentile on three subtests of the KTEA. Children were diagnosed with a language disorder if language had been delayed (only single words after 2 years),

or the child had been classified as speech impaired, or prior language testing documented a phonological or language disorder. Learning and language disorders were combined because of their high rate of overlap.

The Children's Agitation Inventory (CAI) was developed for systematic observation of the behaviors occurring during the rage outburst. Initially, nurses and teachers provided a list of behaviors observed when children needed S/R. Specific symptoms of mania (elation, statements reflecting grandiosity, apparent flight of ideas, evidence of psychosis) and behaviors typical of young children's tantrums were added to determine whether rages were manifestations of mania. Observational items were refined over the first 6 months of the study to include only those that were observable, easy to quantify, and reliable.

Behaviors ultimately monitored on the CAI (available from the first author) were: (1) physical aggression which included hitting, kicking, pushing and pulling, biting and scratching, throwing objects, kicking or throwing the time-out chair, and punching the wall; (2) verbal aggression which consisted of cursing, yelling and screaming, making threats, and whining; (3) other behaviors which included biting self, throwing self on the floor, and stamping feet; (4) mood and psychiatric symptoms that identified sad and tearful appearance, looking and sounding fearful and anxious, pacing, being withdrawn and unresponsive, reporting or appearing to be having hallucinations; (5) cooperative behavior that was evidenced by the child's willingness to take a time out, being calm, quiet, and able to process. Also noted was whether the child was sedated or asleep. Manic behaviors were never observed during the 6 months of testing the CAI and were not included in the final form.

Four highly experienced day and evening nursing "shift leaders" were trained to use the CAI to reliability of >0.8 and recorded the child's behaviors at 5 and 15 minutes from rage onset, and then at 15-minute intervals to 120 minutes. Reliability ranged from $\kappa = 0.66$ for pacing/psychomotor agitation to $\kappa = 1.0$ for physical and verbal aggression.

A "rage" was defined as sufficient agitation and loss of control such that the child was unable to "time out" (i.e., sit in a chair for 10 minutes on being told to do so) or was a danger to himself or others and a higher level of intervention was needed. Behaviors illustrative of this level of loss of control and verbal and physical aggression are described below in the Results section. If this occurred, the responsible staff member placed the child in an isolation room. The door was left open if the child was able to take the time out inside the room; it was closed if the child was not. A strategically placed mirror allowed a child to be monitored unobtrusively. If there was a second episode of agitation during the hospitalization, the child was given the option to take liquid risperidone to avoid an intramuscular injection of rescue medication (usually diphenhydramine).

For every occasion in which a child was unable to sit in the time out chair, the time to behavioral control (10 minutes after the child was quiet and able to process why the intervention was necessary, and need for rescue medication if the rage continued for more than an hour) was documented. As part of New York State Office of Mental Health policy, all episodes receiving any kind of isolation and restraint are recorded in a log along with the duration of the entire outburst. This additionally served to verify rage duration.

Statistics

Hypothesized relevant historical and diagnostic variables were examined by calculating the odds ratios (OR) with 95% confidence intervals (CI) for each individual variable between children with and without inpatient rages. Variables included a prior history of rages, types of prior intervention, and diagnoses of ADHD and ODD/CD, learning and language disorders, mood (mania and depression) and anxiety disorders, and developmental disorders (PDD and mental retardation). Because there were extensive overlaps (e.g., comorbidities) across variables, those with significant ORs were combined and compared in two analyses to determine which were the most significant. The first analysis was an ordinal regression of the number of rages on the chosen variables; the second was a Cox proportional hazards model of the time to first rage. Behaviors occurring during a rage were quantified but more specific analyses are described in another paper (Potegal et al., 2009).

Results

Sample

Between January, 2003, and June, 2004, 130 children had 151 admissions (i.e., 21 children were readmitted). Of 130 children, 102 (78.5%) were male, 102 (78.5%) were white, 13 (10%) African American, and 15 (11.5%) were Hispanic. One hundred children (76.9%) were living with at least one biological parent; the remainder were in foster care, adopted, or had been in residential treatment. Fifty six children (43.0%) were known to have been exposed to significant domestic violence, including physical and/or sexual abuse. Mean age at the time of admission was 9.7 ± 2.1 years. On the WISC-III or -IV, mean Verbal IQ was 100.7 ± 17.2 , Performance IQ (or Perceptual Reasoning) was 102.4 ± 22.2 , and Full Scale IQ 101.9 ± 19.5 . Four children (3.4%) had a verbal IQ less than 70. None of these demographic or admission variables was significantly ($p < 0.05$) related to occurrence or frequency of rages. Length of stay was very variable because this unit functions in part as an acute unit and in part as an intermediate care unit. The mean length of stay was 35.9 ± 30.8 days; median length of stay was 27 days with 10 admissions (6.6%) lasting less than a week, 20 (13.2%) for 1–2 weeks, 28 (19.5%) for 2–3 weeks, 37 (24.5%) for 3–5 weeks, and 56 (37.1%) for more than 5 weeks.

Children with rages

Of 130 children, 71 (54.6%) were admitted for rages, although only half ($n = 37$, 52.1%) had a rage while hospitalized (Table 1). In fact, most children admitted for rages at home (52/71, 73.2%) had none or only one while hospitalized. Ultimately, a total of 44 (33.8%) children had at least one rage outburst during hospitalization. Using ORs, these youths were 7.7 (CI 3.08, 19.2) times more likely to have been admitted for rages, 3.97 (CI 1.39, 11.3) times more likely to be in special education, twice as likely to have been previously hospitalized (OR 2.15, CI 1.09, 4.59) or had prior ADHD treatment (OR 2.34, CI 1.09, 5.00), 5.23 (CI 2.38, 11.48) times more likely to have been admitted taking an atypical antipsychotic, and 3.04 (CI 1.27, 7.26) times more likely to have a bipolar disorder diagnosis from the referring clinician than those without in-hospital rages.

TABLE 1. SAMPLE CHARACTERISTICS IN 130 CHILDREN

	No rages in hospital (n = 86, 66.2%)		Any rages in hospital (n = 44, 33.8%)		OR	CI
	n	%	n	%		
Clinical history						
Rages as admission reason	35	40.7	37	84.1	7.70	3.08, 19.2***
Bipolar diagnosis by referring clinician	12	13.9	15	34.1	3.04	1.27, 7.26**
Prior intervention						
Any special education	49	64.5	36	87.8	3.97	1.39, 11.3**
More than 1 hospitalization	24	27.9	20	45.5	2.15	1.09, 4.59*
Prior ADHD treatment	58	56.9	37	75.5	2.34	1.09, 5.00*
Admitted taking an atypical antipsychotic	25	29.1	30	68.2	5.23	2.38, 11.48***
Best estimate discharge diagnosis						
Three or more diagnoses	45	52.3	33	75.0	2.73	1.22, 6.10**
Any diagnosis of ADHD	41	47.7	36	81.8	4.94	2.01, 11.85***
Any diagnosis of ADHD and/or ODD/CD	53	61.6	41	93.2	8.50	2.44, 29.71***
Any diagnosis anxiety disorder	29	33.7	7	15.9	.37	0.15, 0.94*
Any diagnosis of autism spectrum disorder	28	34.6	13	31.0	.85	0.382, 1.87
Any diagnosis depression	18	20.9	10	22.7	1.11	0.46, 2.27
Any mania/bipolar disorder	4	4.7	4	9.1	2.05	0.49, 8.62
Any diagnosis of psychosis	10	11.6	8	18.2	1.69	0.615, 4.64
Any learning/language disorder (n = 124)	39	46.7	35	83.3	5.51	2.20, 13.83***

*** < 0.001.

** < 0.01.

* < 0.05.

OR, odds ratio; CI, confidence interval; ADHD, attention-deficit/hyperactivity disorder; ODD/CD, oppositional defiant disorder/conduct disorder.

Using the best estimate diagnosis, 33 (75%) children with in-hospital rages had three or more diagnoses compared to 52.3% without rages (OR 2.73, CI 1.22, 6.10). ADHD-combined type, any externalizing disorder (either or both ADHD and ODD/CD), and any learning and/or language disorder occurred five to eight times more often in children with rages, and anxiety disorders occurred 2.7 (CI 1.06, 6.7) times more often in children without rages. There were also no significant differences in the rates of pervasive developmental disorder, psychosis, or depression in children with and without rages (see Table 1).

Community clinicians had previously diagnosed BPD in 15 (34.1%) children who ultimately had in-hospital rages compared to those without (n = 12, 13.9%). However, careful observation for several weeks, with weekly staff ratings and daily discussion at rounds with nurses and teachers (including sleep information from the night shift), yielded a consensus diagnosis of any mania/bipolar disorder in only 4 children (9.1%) with rages versus 4 (4.7%) without rages (p = not significant [N.S.]). This included 4 children with BPD NOS, i.e., children with "manic" symptoms (silly behavior, talking excessively, irritability, and hyperactivity) observed singly at one time or another during hospitalization. Episodic co-occurrence of manic behaviors simultaneously was observed much less frequently. Lifetime bipolar disorder occurred in 4 children but they were depressed at the time of hospitalization.

Rages

Duration of rages. The mean \pm SD duration of the first outburst was 50.8 \pm 22.9 minutes, although rages in children

taking an atypical antipsychotic at the time of the first outburst were marginally shorter (43.3 \pm 27.2 vs. 62.1 \pm 37.4 minutes, df_{42, 43}, F = 3.701, p = 0.061) than rages of unmedicated or other medicated children.

Number of rages. Because the distribution of the number of rage outbursts per child was highly skewed, (many zeros and a few high values), ordinal (ordered logistic) regressions were used to determine which of the variables in Table 1 were associated with the presence and number of outbursts. Children were grouped into those having no rages (n = 86), one (n = 23), or more than one rage (n = 21). Variables showing no effect in Table 1 (e.g., number of hospitalizations) or which involved dual or triple diagnoses or which had high inter-correlations and/or sparse matrices (e.g., special education) were dropped. The number of rages was regressed onto the remaining significant variables of clinical history (prehospitalization rages), prior intervention (antipsychotic medication), and best estimate diagnoses (language, ADHD with ODD/CD) as shown in Table 2, left columns. This model fit the data well χ^2 (7) = 52.6, p < 0.001 and this set of variables explained 42% of the variance in the number of outbursts (Nagelkerke Pseudo R-Square = 0.42). Admission on an atypical antipsychotic was significant, with a trend for pre-admission outbursts to predict subsequent in-hospital number of rages. Diagnostically, language disorder and ADHD significantly predicted occurrence and number of rages with a trend for depression to do so as well.

Onset of rages. The median time to the first or only rage was 6 days (interquartile range, 1–14 days) for first admissions. Survivor plots of time to the first rage suggested three

TABLE 2. REGRESSIONS OF TIME TO ONSET AND NUMBER OF RAGES ON CLINICAL VARIABLES

Clinical history diagnosis	Number of rages: Ordinal regression			Days to first rage: Cox regression model		
	B (\pm SE)	Wald statistic (df=2)	p value	B (\pm SE)	Wald statistic (df=1)	p value
History of rages	1.02 (0.54)	3.54	0.06	0.84(0.48)	3.08	0.08
Atypical antipsychotic at admission	1.65 (0.47)	12.21	<0.001	0.99(0.36)	7.54	<0.01
Language disorder	1.51 (0.56)	7.28	<0.01	0.66(0.45)	2.20	N.S.
ADHD	1.07 (0.54)	3.86	<0.05	0.48(0.44)	1.19	N.S.
Depression	1.02 (0.55)	3.54	0.07	-0.05(.40)	0.01	N.S.

N.S., Not significant; ADHD, attention-deficit/hyperactivity disorder.

stages of progressively decreasing risk. The highest risk stage was in the first 2 days when 19 (44%) of children with rages had their first, or only, outburst. The second stage ran from day 3 through day 29, when 22 (50%) of children with rages had their first, or only, one. The third stage continued from 30 days to the end of stays during which time 3 (6.8%) of children with rages had their only one. There was no relationship between the number of rages and when in hospitalization they first occurred ($r = 0.147$, N.S.).

A Cox proportional hazards model was used to determine which of the variables in Table 1 influenced rage onset. The resulting model fit the data well ($\chi^2(2) = 26.9$, $p < 0.001$). Admission on an atypical antipsychotic predicted a significantly earlier rage; a prehospitalization history of rages was associated with a trend in the same direction (see Table 2, right columns). In this model, clinical diagnoses had no effect on rage onset. If clinical diagnoses are entered alone, having a language disorder hastened in-hospital rage onset ($B = 1.1[0.43]$, Wald statistic [$df = 1$] = 6.66, $p \leq 0.02$). The disappearance of the effect of learning/language disorder when prehospitalization history is also entered suggests a considerable overlap between language disorder and a prior history of rages.

Behaviors during rages. No manic behaviors were observed during rages and those symptoms/behaviors were eliminated from the final CAI. Expressions of verbal and physical aggression were the most common behaviors expressed during a rage. Yelling/screaming, violent threats, cursing, or whining occurred in 92.7% of outbursts; kicking, hitting, pushing/pulling, throwing objects, biting, or spitting also occurred in 92.7% of rages. Behaviors like kicking the chair or punching the wall were seen in 80.7% of rages; foot-stamping, head banging, or throwing oneself on the floor happened in 77.1% of outbursts. Affect other than anger (e.g., apparent anxiety, tearful/sad behavior, or withdrawn and unresponsive behavior) was seen in nearly half the rages (45.9%). Pacing was seen only in 28.2% of rages.

Admissions

Rages precipitated 82 of 151 admissions (54.3%). After hospitalization, no outburst occurred in 102 admissions (67.5%), one rage occurred in 25/151 admissions (16.8%), and more than one in 24/151 (16.1%) admissions. In fact, 14 admissions were characterized by at least three rages, and four admissions by six or more outbursts. Length of stay was significantly longer in admissions with outbursts (47.59 ± 33.46 days vs. 31.15 ± 27.4 days, $t_{df=149} = -3.206$, $p = 0.002$). The

number of rages correlated positively with length of stay ($r = 0.32$, $p > 0.001$), number of co-morbid diagnoses ($r = 0.16$, $p = 0.04$) and negatively with age ($r = -0.16$, $p = 0.05$). Significantly more classes of medications had been used prior to admissions with outbursts (1.86 ± 1.26 vs. 1.33 ± 1.19 , $t_{149} = -2.49$, $p = 0.014$) and significantly fewer children with rages had been medication-free on that admission (11.1% vs. 28.3%, $p = 0.032$).

Discussion

As hypothesized, rages accounted for many admissions, but only half the children with rages necessitating hospitalization had another rage while hospitalized. These children were a younger, diagnostically complex group with even more co-morbidity and prior treatment failure (i.e., had more medications, special education classification, or prior psychiatric hospitalization) than their hospitalized peers. The fact that treatment with an atypical antipsychotic predicted in-hospital rage was a testimony to failed treatment in these difficult children, not to the medication causing rages. Other medication trials had also failed. The fact that 21 of 130 children (16.2%) had more than one rage while hospitalized and could not gain self-control with the structure and support of the hospital and school staff further suggests that more than nonmedical interventions are needed for some children with rages. A future publication will examine treatment during hospitalization. However, the extended stays necessitated by children with rages attest to the fact that their treatment is not simple.

ADHD complicated by co-morbid ODD/CD and language/learning disorders were the major diagnoses in children with any rages, and externalizing disorders occurred in 100% of children with multiple rages. Because intact attentional systems are important to shifting focus away from distress to decrease negative emotion, serious deficits like the ones experienced by these children will certainly impair their ability to self-regulate (Cole and Hall 2008). The added academic failure, poor social skills, adversity, and neurodevelopmental delays such as those that occur with ADHD compromise these children even further. Given the developmental importance of language in mediating self control and moderating aggression in young children (Beitchman et al. 1996; Brownlie et al. 2004), it is not surprising that deficits in this critical sphere would be associated with rages. The occurrence and frequency of outbursts was likely to result from the inability to understand what was being asked, articulate needs and wants, or verbally negotiate the frustrations and/or provocations that eventually triggered the rages.

Unfortunately, the co-morbidity with learning/language impairment is rarely acknowledged, let alone measured or controlled for, in studies of children with rages (Cohen 1996; Greene and Ablon 2005).

BPDI, currently manic, was diagnosed in 4 children; 4 more children were given a BPD NOS diagnosis. Although a pre-admission diagnosis of BPD (type not specified) occurred three times more often in children with in-hospital rages versus those without rages, subsequent observation confirmed episodes of mania or "narrow-phenotype BPD" (co-occurring expansive and irritable mood, grandiosity and other symptoms of acute mania) in very few children with or without rages. Overall, children with rages were clearly irritable, i.e., highly reactive as well as disproportionately responsive. However, these explosive children were not generally elated, creative, grandiose, or especially pleasure-seeking nor were those behaviors "mixed" with depression in a sustained way. "Severe mood dysregulation" with sadness as well as anger, frequent marked reactivity to negative stimuli, and ADHD symptoms (restlessness, distractibility rapid speech, intrusiveness) (Leibenluft et al. 2003), better characterized these children than narrow-phenotype mania. Instead, the DSM diagnoses likely to be associated with the rage behaviors in children include ADHD (with low frustration tolerance), ODD/CD (with irritability and loss of temper), and learning/language disorder (difficulty understanding the sequence of events or appropriately explaining them verbally). We suggest that the recent seven-fold increased rate of discharge diagnoses of BPD that has been reported elsewhere (Blader and Carlson 2007) is at least partially accounted for by clinicians for whom rages are synonymous with BPD rather than narrow phenotype bipolar disorder.

With regard to the rages themselves, their duration was highly variable both across and within each child but was almost an hour long on average and could last up to 2 hours. The protracted nature of rages has been described in inpatients (Garrison et al. 1990) and some outpatients (Bambauer and Connor 2005). Both duration and extreme behaviors are what make rages so problematic at home, school, and in hospital. Nevertheless, it appeared that half the children with intolerable rages at home cease this behavior in hospital. Of those with in-hospital rages, half gain control of these behaviors over the first few weeks of hospitalization. Two conclusions can be drawn, in accord with other studies (Garrison et al. 1990; Malone et al. 1997). First, some children responded either to leaving home or being placed in a structured setting. These children were not well adjusted and easy to manage but were capable of self-control in hospital with considerable medication, educational therapy, behavioral therapy, and psychotherapy. However, the other half (21, 16.2%) of children had repeated outbursts in spite of expert management psychopharmacologically and psychotherapeutically. Such children pose ongoing, serious problems in terms of understanding etiology, treatment, and placement. The best diagnosis for these children has yet to be determined.

Limitations

Our sample includes very disturbed children who had rages both at home and in the hospital. This study is unique in providing a definition and direct observation of a phenomenon that is usually only obtained by history. However, tra-

ditional structured interviews were not used for diagnosis. In previous studies from this site, the Kaufman Schedule for Affective Disorders and Schizophrenia-Epidemiologic version (K-SADS E) (Orvaschel et al. 1982) was used to obtain specific information from parents and children (Carlson and Kelly 1998; Carlson and Youngstrom 2003) and this information then contributed to an overall clinical diagnosis made based on added hospital information. Data from past studies using both the K-SADS and the CSI (Grayson and Carlson 1991) elicited similar information from parents. Diagnosis was based primarily on current psychopathology and observations, and a reliable multiinformant approach was used. A history of past psychopathology might have been overlooked, but as the emphasis was on diagnostic information observed concurrent with rage behaviors, this was felt to be less germane.

Best-estimate diagnoses were done only partially blind to information about frequency of rages (one author was blinded, the others were not), although diagnoses were done long enough after hospitalization that the specifics regarding number of rages were unlikely to be recalled. Diagnoses were made completely blind to specific behaviors and rage duration.

While this study did not find that explosive, raging children had classically defined BPD, it does not solve the problem of whether children with such outbursts constitute a subtype of mania/BPD. The point is only that when behavior is observed by a trained staff, day in and day out for more than a month for children who were felt to have BPD by others, criteria-meeting mania were not observed. Triggers or antecedents to the rages were not systematically recorded for this study. Why a child has rages may have diagnostic significance and future studies should address this question.

As noted earlier, a standardized language assessment was not part of the inpatient evaluation. However, it is more likely that the assessment missed children with subtle communication disorders rather than overdiagnosing them.

Conclusions

In summary, although children with rages in hospital had been treated for these outbursts prior to admission, only about half the children admitted for rages had them in hospital. Thus, on the positive side, half of the children did not have rages in hospital, suggesting for some that rages are "context specific." Children who did have rages in the hospital had been treated previously with multiple medications, including atypical antipsychotics. They had the most co-morbidities, with complicated ADHD/ODD/CD and language and learning disorders. Narrow-phenotype BPD did not occur disproportionately in children with rages. The conclusion from these data is that the combination of impulsivity and low frustration tolerance from severe ADHD and the inability to process and express frustration because of learning and language problems initiate and perpetuate rages. Although medications can sometimes dampen the behaviors, they have not yet proven sufficient to eliminate them, at least quickly, in many children. More effective treatments are clearly needed.

Disclosures

Dr. Carlson receives/has received grant money from Otsuka/Bristol Myers Squibb and Eli Lilly. She has also

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