Diagnostic Comorbidity in Hospitalized Adolescents With Conduct Disorder

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We compared the diagnostic comorbidity of DSM-III-R axis I and axis II disorders in a sample of hospitalized adolescents with conduct disorder (CD) and a comparison group of hospitalized adolescents without conduct disorder (non-CD). Of 138 consecutively evaluated adolescents, 76 patients met criteria for CD and 62 did not. On axis I, CD was significantly comorbid with attention-deficit hyperactivity disorder (ADHD) and substance use disorders (SUDs). None of the personality disorders assessed showed differential association with CD. The comorbid relationships found within this sample suggest a strong association between CD, ADHD, and SUD in hospitalized teenagers. This finding underscores the clinical importance of conducting a thorough developmental assessment and, when indicated, of treating ADHD and SUD in conduct-disordered adolescents.

CONDUCT DISORDER (CD) is a prevalent, pervasive, and serious disorder that has significant impact on the lives of the individuals thus afflicted and on the families, communities, and societies in which they live. However, as a diagnostic entity, CD is a relatively heterogeneous disorder and poorly understood in terms of diagnostic specificity. Previous research has found significant diagnostic co-occurrence between CD and other psychiatric disorders. Studies with community and clinic samples[1-4] and with inpatient samples[5-7] have reported high rates of co-occurrence between CD and attention-deficit hyperactivity disorder (ADHD), mood disorders, anxiety disorders, and substance use disorders (SUDs). Similarly, in the few studies that assessed personality disorders, CD has been found to frequently co-occur with passive-aggressive, histrionic, and antisocial personality disorders.[7-8] However, previous studies either have failed to include relevant comparison groups,[2-3] have not used reliable, standardized diagnostic procedures,[2-3] or have relied on small[5] or preadolescent[1] samples.

Previous studies have also treated diagnostic co-occurrence (i.e., the presence of ≥two disorders) as "comorbidity." Conceptually, such a view is problematic, since comorbidity is often meant to imply some shared psychopathological relationship between disorders. We believe diagnostic co-occurrence should not be interpreted as diagnostic comorbidity unless the co-occurrence is greater than that expected by chance, given a relevant control group.[9] Accordingly, we define comorbidity statistically as a frequency of co-occurrence significantly greater than that observed in an appropriate comparison group drawn from the same overall sample ascertained by the same recruitment procedures.[10] To our knowledge, previous comorbidity studies conducted on psychiatrically hospitalized adolescents with CD have not used this conservative definition. However, one study[11] examined co-occurring DSM-III-R axis I disorders in a sample of hospitalized adolescent substance abusers and a sample of non–substance-abusing adolescents with either CD or oppositional defiant disorder (ODD). Although high rates of anxiety and mood disorders were found to coexist in the CD/ODD group, the frequencies were lower than those observed in the substance abuse group. This study demonstrates the utility of a comparison group for providing a context within which to interpret diagnostic co-occurrence. In the present study, we examine the diagnostic co-occurrence of CD with other DSM-III-R axis I and axis II personality disorders in hospitalized adolescents.

METHOD

Subjects

Subjects were 138 adolescents consecutively admitted to an inpatient adolescent unit of a private, not-for-profit, university-affiliated psychiatric hospital. A detailed description of the overall series of patients and procedures is provided elsewhere.[12] Data have also been reported from this consecutive sample concerning SUD comorbidity.[13]

Patients were between 12 and 18 (mean, 15.5) years old.

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Sixty-two were female, and 76 were male. One hundred fourteen (82.6%) patients were white, 11 (7.9%) were African-American, six (4.3%) were Asian, and seven (5.0%) were of other ethnicity. All patients were single and predominantly middle-class based on the Two-Factor Index of Social Position.[14] All patients were insured by third-party payers.

Procedures

On admission, each patient received a systematic clinical evaluation conducted by doctoral- and master's-level clinicians trained to a high level of reliability and supervised by one of the authors (W.S.E.). To determine current axis I diagnoses, patients were administered the Schedule for Affective Disorders and Schizophrenia for School-Aged Children–Epidemiologic Version[15] and the Personality Disorders Examination (PDE)[16] to assess for current axis II personality disorders. Specific PDE criteria were considered present if they had been pervasive and persistent for at least 3 years. Antisocial personality disorder was not assessed due to the age criterion.

Interrater reliability of structured interview diagnoses was assessed via independent simultaneous ratings by pairs of raters on 45 patients for axis I diagnoses and on 26 patients for axis II diagnoses. Diagnoses were reliable, with κ coefficients[17] ranging from .65 to 1.0 (mean κ for axis I and axis II, .77 and .84, respectively).

Final research diagnoses were established for all current axis I and axis II disorders by the "best-estimate" method using information from the admission notes, hospital charts, clinician descriptions, and structured interviews. This method is in accord with the Longitudinal, Expert, All Data (LEAD) standard advanced by Spitzer[18] and others.[19]

Patients were also assigned a Global Assessment of Functioning rating reflecting the severity of current functional and symptomatic impairment.[20]

Statistical analysis consisted of chi-square (χ^2) analyses and calculation of phi coefficients to determine significant diagnostic co-occurrence. The phi coefficient is an effect-size measure for contingency table analyses that reflects the strength of association between diagnostic domains.[21] A low phi value suggests that two domains are distinct, and a higher phi value suggests that two domains are associated.

RESULTS

Seventy-six (55%) of 138 patients met criteria for CD. Sixty-two patients without CD (non-CD) were used as the comparison group. Patients' demographic characteristics are summarized in Table 1. There were no differences between CD and non-CD groups with respect to age, ethnicity, social class, or functional impairment. There was a significant difference between groups in sex distribution, with the CD group having a higher proportion of males than the non-CD group.

Axis I Comorbidity

Table 2 summarizes the distribution of major categories of co-occurring current axis I disorders in the two groups. Mood disorders were the most frequently diagnosed co-occurring disorders for all patients, followed by SUD and ADHD. SUD and ADHD were diagnosed significantly more frequently in the CD group than in the comparison group. Psychotic disorders and eating disorders (EDs) were diagnosed significantly less frequently in the CD group.

Given the preponderance of males within the CD group, separate χ^2 analyses and phi coefficients were used for patients with co-occurring CD-ADHD, CD-SUD, and CD-ED to assess for the effects of gender. In the overall sample, significantly more males had ADHD than females (43% *v* 16%, χ^2 (1, N = 138) = 11.86, $P < .001$). However, there was no difference in the frequency of co-occurring ADHD between CD males and females. On the other hand, CD females had significantly more co-occurring ADHD than non-CD

Table 1. Comparison of Groups With Respect to Demographic Characteristics and Severity

Parameter	CD (n = 76) No.	CD (n = 76) %	Non-CD (n = 62) No.	Non-CD (n = 62) %	t/χ^2
Mean age (yr)	15.4		15.6		1.11
Sex					12.18*
Male	52	68.4	24	38.7	
Female	24	31.5	38	61.2	
Ethnicity					0.54
White	64	84.2	50	80.6	
African-American	5	6.5	6	9.6	
Asian-American	3	3.9	3	4.8	
Other	4	5.2	3	4.8	
SES					
Father	2.68		2.77		0.39
Mother	3.24		3.44		0.87
Mean current GAF	37.90		38.20		0.19

Abbreviations: SES, socioeconomic status; GAF, Global Assessment of Functioning.
*$P < .001$.

Table 2. Comparison of Groups With Respect to Frequency of Axis I Diagnoses

Diagnosis	CD (n = 76) No.	CD (n = 76) %	Non-CD (n = 62) No.	Non-CD (n = 62) %	χ^2	Phi
Psychotic disorder	2	2.6	8	11.3	4.20*	.17*
Mood disorder	52	68.4	43	69.4	0.01	.01
Anxiety disorder	17	22.4	13	21.0	0.04	.02
ADHD	33	43.4	10	16.1	11.86†	.29†
ED	4	5.3	10	16.1	4.42*	.18*
SUD	51	67.1	17	27.4	21.52†	.39†

*$P < .05$.
†$P < .001$.

females (33% *v* 5%, χ^2 (1, n = 62) = 8.57, $P < .01$). In contrast, CD males were no more likely to have co-occurring ADHD than non-CD males. There was no difference in the distribution of SUD between males and females in the overall sample. In the CD group, both males and females had significantly more SUD than the comparison group of non-CD males and females (64% *v* 33%, χ^2 (1, n = 76) = 6.00, $P < .01$; 75% *v* 24%, χ^2 (1, n = 62) = 15.76, $P < .001$, respectively). Finally, significantly more females received a diagnosis of ED than males (18% *v* 4%, χ^2 (1, N = 138) = 7.13, $P < .01$), and consequently, CD females had significantly more co-occurring ED than males with CD (17% *v* 0%, χ^2 (1, n = 76) = 9.15, $P < .01$).

Axis II Personality Disorder Comorbidity

Table 3 summarizes the distribution of co-occurring current axis II personality disorders. In the overall sample of 138 patients, 88 (63.7%) met diagnostic criteria for at least one personality disorder. Borderline personality disorder and passive-aggressive personality disorder were the most frequently diagnosed. However, none of the personality disorders assessed showed differential association with CD.

DISCUSSION

The study of comorbidity is important in that it contributes to our knowledge of psychiatric syndromes and helps us to better understand the potential psychopathological relationships between comorbid conditions.[9] In addition, studies of comorbidity may enhance our ability to conceptualize the course and treatment of specific disorders.[22] The present study contributes to our understanding of CD by using a conservative statistical definition of comorbidity, a large sample, structured diagnostic procedures reliably performed, and a relevant control group. A potential limitation of the study concerns our reliance on analysis of only inpatient adolescents, thus possibly limiting the generalizability of our findings with respect to nonhospitalized adolescents. We also note that rapidly changing trends in the mental health field may further complicate generalizability to current inpatient samples. In this regard, the present study examined a sample of predominantly white, middle-class teenagers whose hospital costs were funded by private insurance. A more contemporary sample drawn from an institution driven by current managed-care standards may yield a more ethnically and socioeconomically diverse sample. In addition, our analysis of axis II disorders is limited to personality disorders, and does not include developmental disorders. We note that CD is frequently associated with neurodevelopmental problems and learning disabilities, which may have implications for diagnosis and treatment.[23] Nonetheless, our finding—that CD had significant comorbidity with ADHD and SUDs on axis I—is of some interest.

With regard to the relationship of CD with other axis I disorders, the finding that CD was comorbid with ADHD is consistent with previous studies.[1,3] ADHD has long been viewed as a neurologically based disorder associated with developmentally inappropriate degrees of attention, impulsivity, and hyperactivity.[24-26] In fact, a growing body of evidence suggests that biological, genetic, and neurochemical factors can be identified in many cases of ADHD.[27] Moreover, the high rate of co-occurring ADHD among CD females compared with non-CD females in this sample is consistent with the findings of Szatmari et al.[3] In their Ontario Child Health Study, females with ADHD were 40 times more likely to have co-occurring CD than females without ADHD. As such, the comorbid relationship between CD and ADHD may support a developmental or neurobiological perspective for understanding the etiology of at least some cases of CD.[28-29] Consequently, this finding underscores the clinical importance of conducting a thorough developmental assessment—and when indicated, of treating

Table 3. Comparison of Groups With Respect to Frequency of Axis II Personality Disorders

	CD (n = 76)		Non-CD (n = 62)			
Diagnosis	No.	%	No.	%	χ^2	Phi
Any PD	53	69.7	35	56.5	2.61	.14
Cluster A	11	14.5	5	8.1	1.37	.10
Paranoid PD	5	6.6	3	4.8	0.19	.04
Schizoid PD	1	1.3	0	0.0	0.82	.08
Schizotypal PD	6	7.9	2	3.2	1.36	.10
Cluster B	44	57.9	26	41.9	3.48	.16
Borderline PD	43	56.6	25	40.3	3.61	.16
Histrionic PD	3	3.9	6	9.7	1.84	.12
Narcissistic PD	4	5.3	2	3.2	0.34	.05
Cluster C	24	31.6	14	22.6	1.39	.10
Avoidant PD	6	7.9	4	6.5	0.11	.03
Dependent PD	4	5.3	3	4.8	0.01	.01
Passive-aggressive PD	19	25.0	8	12.9	3.17	.15
Obsessive-compulsive PD	2	2.6	2	3.2	0.04	.02
PD NOS	11	14.5	6	9.7	0.73	.07

Abbreviation: PD, personality disorder.

ADHD in conduct-disordered adolescents. In addition, future studies may wish to examine whether males and females show differential response patterns to psychopharmacological intervention, and whether medical treatment of ADHD has any beneficial effect in reducing conduct-disordered behaviors in adolescent girls in particular.

CD has also been viewed as a risk factor for later psychopathology30.[29-32] For instance, Robins and McEnvoy[32] found that the presence of CD in adolescence was associated with substance abuse in adulthood. As such, the comorbidity between CD and SUDs implies that accurate assessment and treatment is critical in this population, and that drug education and other proactive interventions aimed at prevention may be particularly worthwhile, even in the absence of a clear SUD.

Our finding that CD is inversely associated with psychotic disorders is likely a methodological/diagnostic confound. Specifically, CD is typically not diagnosed by clinicians and researchers when a patient is psychotic. Rather, the delinquent behavior in such patients is viewed as symptomatic of the psychosis, and an additional diagnosis of CD is not made.

In contrast to previous studies,[1-4,6,7] CD was not comorbid with mood disorders, anxiety disorders, or personality disorders. Although CD patients in this sample had high rates of mood disorder and many personality disorders, the rates were no higher than in the comparison group. Likewise, anxiety disorders, although not absent in our sample, were observed at approximately equal rates for CD and non-CD subjects. This suggests that CD and mood or anxiety disorders are separate psychopathologic entities, such that CD alone is not likely to respond to treatments designed for depression or anxiety. However, when such disturbances are noted alongside CD, specific treatment for the co-occurring disorder is indicated.

The differences found within this sample (compared with previous research) might potentially be attributable to sampling and population differences, in that inpatients typically possess multiple axis I and II diagnoses and therefore may have different base rates of certain disorders than the adolescents seen in outpatient-clinic or community samples. Again, we stress that the nature of comparison groups can indeed lead to different interpretations of diagnostic co-occurrence.[10]

Summary

In conclusion, the comorbid relationships found within this sample suggest a strong association between CD, ADHD, and SUD. Together, our findings underscore the importance of conducting a through developmental assessment when working with CD adolescents to assess the presence of ADHD and SUD. Future studies should continue to examine the psychopathological relationships between CD and its associated conditions. Studies to examine the factors that contribute to the development of CD and either predict or influence its course and outcome are especially needed. In addition, studies that examine the longitudinal comorbidities[33] of CD would extend recent findings regarding the longitudinal course and stability of CD.[34]

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