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ORIGINAL CONTRIBUTION

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Childhood onset neuropsychiatric disorders in adult eating disorder patients

A pilot study

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Abstract *Background* Autism spectrum disorders (ASD) have been suggested to be overrepresented in anorexia nervosa. This study aimed to explore the comorbidity of ASD and other childhood onset neuropsychiatric disorders (COND) [attention-deficit/hyperactivity disorder (AD/HD) and tic disorders] in a group of severe eating disorder (ED) patients. *Method* Thirty female ED patients from a specialist hospital clinic were examined on measures tapping into COND and personality disorders. *Results* In our group of longstanding ED, 53 % had at least one COND diagnosis; 23 % had ASD, 17 % had AD/HD, and 27 % had a tic disorder. *Conclusions* These preliminary data suggest that COND may be common in patients with severe ED and should be kept in mind when treating these patients.

Key words eating disorders – autism spectrum disorders – AD/HD – tic disorders

Abbreviations

AD/HD	attention deficit/hyperactivity disorder
AN	anorexia nervosa
ASD	autism spectrum disorder
BN	bulimia nervosa
COND	childhood onset neuropsychiatric disorders
ED	eating disorder
PD	personality disorder
TD	Tourette's disorder

Introduction

Autism spectrum disorders (ASD) [11], attention-deficit/hyperactivity disorder (AD/HD) [1] and Tourette's disorder (TD) [1] are perhaps the most pertinent examples of childhood onset neuropsychiatric disorders (COND). The prevalence ranges from 1.1 % in TD [18], 1.2 % in ASD [17] and 3–5 % in AD/HD [1] in school-age children. ASD are pervasive disorders which persist throughout life. The symptoms of AD/HD can decline during adolescence and early adulthood. Nevertheless, a recent population-based study from the United States has reported an adult AD/HD prevalence of 4.4 % [19]. In terms of TD, Burd and co-workers put forward that the prevalence is ten times greater in children and adolescents than in adults [4], suggesting an adult TD prevalence of about 0.1 %.

Problems with social interaction, attention, hyperactivity and impulse control are typical behavioural manifestations of COND. Functional impairment is considerable, being a requisite for diagnosis, and disabling conditions commonly persist into adulthood [11]. There is a considerable comorbidity across the various COND [9]. Over the past 15 years, our group has performed a longitudinal, prospective, controlled, community-based

study of teenage-onset anorexia nervosa (AN) in Sweden, *"the Göteborg AN study"* [14, 27, 33]. Early problems with social interaction and obsessive behaviour were considerable [28] and 16 % of the AN group showed persistent problems with ASD from childhood into early adult years [32]. This subgroup had a very poor psychosocial outcome. The aim of the present study was to analyse the rate of a childhood history and current symptomatology indicating COND in an adult clinical sample with eating disorders (ED).

Subjects and methods

Subjects

The subjects were 30 female ED patients who were recruited from a specialist hospital clinic in south-west London. They were either inpatients (n = 21) or outpatients (n = 9) and all were secondary or tertiary referrals from all parts of the United Kingdom. Only female ED patients meeting diagnostic criteria for AN or bulimia nervosa (BN) according to the DSM-IV [1] were invited to take part. There were 21 AN (8 restricting, 13 bingeing-purging) and 9 BN patients. At the time of the study, five of the AN and four of the BN patients were in partial remission of their ED. The age range was 18.0–56.0 years. Table 1 gives details of age, age of ED onset, duration of ED, weight, height and BMI of the ED group.

Inpatients

All 24 inpatients with AN or BN staying at the clinic between 5/3/2002 and 11/6/2002 were invited to take part in the study. Three cases (AN: n = 2, BN: n = 1) declined participation after being informed about the study. Altogether 21 inpatients accepted to take part in the study. Seventeen had current AN and 4 had current BN. One of the BN patients had a history of AN and 2 AN patients had previously suffered from BN. Eleven (4 BN, 7 AN) out of the 21 inpatients were on a "multi-impulsive treatment programme". This intervention has been developed to treat a subgroup of ED patients with "multi-impulsivity", a combination of impulsive behaviours such as self-injury, shoplifting, alcohol- and drug abuse, and sexual disinhibition [20].

Table 1 Mean age, age of ED onset, duration of ED, weight, height and BMI of the ED patients

	ED group (n = 30)
Age, years (SD)	27.4 (8.4)
95 % CI	24.3–30.6
Age of ED onset, years (SD)	18.0 (4.2)
95 % CI	16.4–19.5
Duration of current ED, years (SD)	9.5 (8.8)
95 % CI	6.2–12.8
Duration of any ED, years (SD)	9.9 (8.7)
95 % CI	6.7–13.1
Weight, kg (SD)	55.0 (20.6)
95 % CI	47.4–62.7
Height, m (SD)	1.65 (0.06)
95 % CI	1.63–1.67
BMI, kg/m^2 (SD)	20.2 (7.4)
95 % CI	17.4–23.0

SD standard deviation; *ED* eating disorder; *BMI* body mass index; *CI* confidence interval

Outpatients

Sixteen ED outpatients were invited to take part in the study. There was an attrition of 7 individuals (5 patients refused, 1 had an acquired brain damage with severe memory loss, 1 did not show up for the appointments). The outpatients were either recruited at their first assessment at the clinic (n = 7) or during ongoing therapy at the clinic (n = 2) between 9/4/2002 and 30/5/2002. In all, the outpatient group consisted of 9 ED patients (4 AN, 5 BN). One of the BN outpatients had a history of AN.

Procedure

All interviews were conducted by the first author (EW), a child and adolescent psychiatrist with several years of clinical and research experience of neuropsychiatry (both in child and in adult psychiatry) and ED. The eating disorders section of the Structured Clinical Interview for DSM-IV Axis I Psychiatric Disorders (SCID-I) [7] was used to assign current and previous ED diagnoses according to the DSM-IV and to discriminate primary BN from BN secondary to AN. EW performed the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II) [8] to assign comorbid personality disorder (PD) diagnoses. The SCID-II was used to compare specific predictions from the ASD/AD/HD/tics models against predictions from the PD literature. Diagnoses of ASD, AD/HD and TD can be made with confidence on the basis of clinical interviews well into adult age, but depend on taking a careful childhood history. According to the local medical ethics committee's recommendations, the duration of the examination of the subjects was not allowed to exceed 1.5 hours. Therefore, in-depth interviews regarding all types of COND were not possible. An in-depth interview, the ASDI (Asperger Syndrome Diagnostic Interview) [12], was used by EW to assign diagnoses within the autism spectrum. The ASDI is an interview based on the criteria by Gillberg and Gillberg [13] and covers the typical symptoms of Asperger's disorder. The interview also

elicits information that together with results obtained on the other measures allows diagnosis of other disorders within the autism spectrum. In addition, the first author used a symptom checklist on which all participants were scored with regard to pervasive developmental disorders (PDD) criteria for autism as outlined in the DSM-IV [1]. PDD NOS was diagnosed in participants showing severe impairment in social interaction in combination with restricted communication and/or behaviour meeting four or more, but not all, of the DSM-IV criteria for autistic disorder. A checklist covering the Asperger's disorder criteria by Gillberg and Gillberg [13] was also used. The ADHD-RS interview [6], which is based on the DSM-IV criteria for AD/HD, was used to assign current (in adulthood) and previous (during childhood) diagnoses of AD/HD. The ADHD-RS is a widely used instrument to assess the degree of AD/HD symptomatology. The 18 AD/HD symptoms in that interview were rated as "never or rarely" (0), "sometimes" (1), "often" (2) and "very often" (3), and only the two latter ratings were considered as positive symptoms. The checklist for tics and Tourette's disorder (Revised TSSL) [21] was used to assign diagnoses of TD/chronic tic disorder as outlined in the DSM-IV [1] and to examine the rate and type of motor- and vocal tics.

All inpatients were weighed not more than 4 days before the evaluation. Height was measured at admission. All outpatients were asked about their current weight and height.

The study was approved by the local medical ethics committee. The subjects participated voluntarily after written informed consent was obtained. All participants received a 10-pound voucher after the interviews were completed.

Statistical analysis

The SPSS package was used to analyse data. The primary outcome variable was the presence of a lifetime diagnosis of ASD, AD/HD and/or tics.

Results

Child neuropsychiatry

Table 2 illustrates the rate of COND. Four cases had two or more COND. Seven of the ED patients, all with AN (33 % of this group), had an ASD (Asperger's disorder: n = 3; atypical autism [Pervasive Developmental Disorder (PDD NOS) (American Psychiatric Association 1994): n = 4]. Five ED patients, all binge-eating/purging AN cases, had AD/HD during childhood. Three of these also met criteria for AD/HD in adulthood. In terms of AD/HD subtypes, there were two cases of the mainly inattentive type, one case of mainly hyperactive-impulsive type and two cases of combined type in childhood. No BN cases met criteria for neither ASD nor AD/HD. Eight ED patients had TD (n = 2) or chronic tic disorder (n = 6) – 5 of these had AN and 3 had BN.

Table 2 Childhood onset neuropsychiatric disorders in ED patients

Type of COND	ED group (n = 30)
ASD	7 (23 %)
AD/HD	5 (17 %)
TD/chronic tic disorder	8 (27 %)
Any COND	16 (53 %)

COND childhood onset neuropsychiatric disorders; *ED* eating disorder; *ASD* autism spectrum disorder; *AD/HD* attention deficit/hyperactivity disorder; *TD* Tourette's disorder

Ten out of the 21 inpatients (48 %) and 6 out of the 9 outpatients (67 %) were assigned at least one childhood onset neuropsychiatric diagnosis. Among the 11 inpatients who were part of a multi-impulsive treatment programme, 6 had COND (1 with ASD only, 1 with chronic tic disorder only, 2 with AD/HD only, 1 with ASD and AD/HD, and 1 with AD/HD and chronic tic disorder). Thirteen out of 21 AN (62 %) (2 out of 8 restrictors, 11 out of 13 binge-eaters/purgers), compared to 3 out of 9 BN (33 %) were assigned at least one COND (n. s.). The 3 BN patients with COND all had a tic disorder (2 cases of TD, 1 case of chronic tic disorder).

According to the Revised TSSL there was no single motor- or vocal tic, which was remarkably common among the ED patients.

Personality disorders

All but two in the ED group were assigned at least one diagnosis of PD. The most common PDs were avoidant PD, depressive PD, paranoid PD, borderline PD and obsessive-compulsive PD (Table 3). Seven out of the 30 ED patients had a schizoid PD and 6 of these also fulfilled a diagnosis of ASD. Only one ASD case did not meet criteria for schizoid PD. Twelve out of 16 ED patients with at least one COND were assigned a diagnosis of borderline PD (10 AN, 2 BN). All cases with AD/HD and TD also met criteria for a borderline PD.

Discussion

COND in individuals with ED

This controlled pilot study reports on high rates of COND among a group of females with severe ED. More than half the patients had COND. There was a tendency

Table 3 PDs in ED patients

Type of PD	ED group (n = 30)
Avoidant	23
Dependent	5
Obsessive-compulsive	18
Passive-aggressive	6
Depressive	23
Paranoid	20
Schizotypal	3
Schizoid	7
Histrionic	4
Narcissistic	2
Borderline	19
Antisocial	3
Any PD	28

PD personality disorder; *ED* eating disorder

towards more COND diagnoses among the AN cases compared to the BN cases. In respect of ASD and AD/HD, these diagnoses only occurred among the AN individuals; one in three had ASD and one in four had AD/HD. Tic disorders were observed in both AN and BN cases, but the BN patients did not exhibit non-tic disorder COND. There were no differences across in- and outpatients in respect of rate of COND diagnoses. The COND diagnoses were overrepresented among our ED patients compared to the general population [1, 17, 18].

In this study, only those cases of AN belonging to the subgroup of binge-eaters/purgers had a history of AD/HD. Binge-eating and purging behaviour are both examples of impulse dyscontrol. In these cases with AN and comorbid AD/HD, the lack of impulse control could possibly be explained by the underlying AD/HD with childhood onset.

Multi-impulsivity

Individuals with ED, AD/HD and TD all exhibit impulse dyscontrol problems. Multi-impulsive behaviours including self-injury, shoplifting, alcohol- and drug abuse, and sexual disinhibition have been observed in a subgroup of ED patients [20]. Criminality, alcohol- and drug abuse have been reported among adolescents and adults with childhood onset AD/HD [3, 26]. Half the inpatients of the present study were on a multi-impulsive treatment programme. Six out of the 11 multi-impulsive inpatients had one or more COND. All types of COND were represented among these 6 cases. Since only about half the multi-impulsive group was assigned a COND diagnosis, the multi-impulsivity problems in these inpatients could not be explained only by an underlying COND. However, multi-impulsivity has been reported as an antecedent in some cases of ED, and is not only a consequence of chaotic eating behaviours [24].

Comorbidity

The comorbidity of ED with other psychiatric and personality disorders, especially obsessive compulsive PD [28] and borderline PD (BPD) [31], dissociation [5] and multi-impulsivity [20] is well-established. These disorders are believed to be characterised by onset in adolescence or early adulthood. However, AD/HD and TD emerge early in childhood, often in preschool children. In ED cases with a comorbid childhood onset AD/HD/TD, the binge-eating and purging behaviour could be at least partially explained by the impulse dyscontrol typical of AD/HD/TD. This does not exclude a comorbid diagnosis of BPD, dissociation or multi-impulsivity. AD/HD and TD do not appear to be artefacts of symptoms shared with other psychiatric disorders [23].

PDs

PDs were extremely common among the ED patients, affecting all but two in the ED group. Similar rates have been reported in other studies of ED inpatients [25]. All cases of AD/HD and TD also fulfilled the criteria of BPD, but there were also cases of BPD that did not meet criteria for any COND diagnosis. The overlap between ASD and schizoid PD was almost complete. The great similarities between Asperger's disorder, a syndrome belonging in the autism spectrum, and schizoid PD have previously been put forward by other researchers (2, 35). In a study by Anckarsäter and co-workers on PDs in adult patients with AD/HD and ASD, 75 % fulfilled criteria for at least one PD. Borderline PD was the most common PD among patients with AD/HD and obsessive-compulsive and schizoid PDs dominated in the ASD group of patients [2]. A patient with COND, particularly if previously undiagnosed, might well be diagnosed as having a "primary" PD when assessed in adult age. Such a diagnosis is clearly "correct" according to the diagnostic manuals, but whether or not it contributes to furthering the understanding of the particular problems faced by the individual suffering from COND is arguable. "The use of DSM-IV personality disorder criteria is difficult in such complex patients because of the frequent overlap between DSM-IV categories and the difficulty of making etiological judgements (e. g. not better accounted for by . . .)" [2].

A possible association between AN and ASD was first put forward by Gillberg [10]. "*The Göteborg AN study*", a longitudinal prospective controlled and partly com-

munity-based AN study, showed that at 10-year follow-up a subgroup consisting of 16% of the AN cases had persistent problems within the autism spectrum from childhood into early adult years [32]. In the present study, the occurrence of ASD was even higher. However, the present study group is not representative of ED cases in the general population, the majority being tertiary referrals with long ED duration, and a high rate of multi-impulsivity problems.

COND seem to complicate the course in a subgroup of EDs, resulting in higher figures of psychiatric comorbidity in a tertiary referral sample. The present study as well as our longitudinal controlled study of a community-based AN sample seem to support this notion, but the findings need to be replicated and extended in other cohorts. No other systematic studies of COND in ED have been published to date.

Limitations

This study cannot make claims of representativeness, but may cast some light on the frequency of COND in chronic ED cases. The ED sample consisted of a small group of severely ill patients, a mixture of selected inpatients and outpatients and also a mixture of AN and BN with a long duration of their ED. They were all second or tertiary referrals. In comparison with the general population, all types of COND were highly overrepresented in the ED group. Furthermore, ASD, AD/HD and TD in the general population exhibit a deviant distribution according to sex with a male preponderance [16–18], which makes the rates of COND in our female ED group even more sensational. However, in the present study, it would have been appropriate with a control group consisting of patients with another psychiatric disorder to rule out an overrepresentation of COND in other samples of psychiatric patients.

In child neuropsychiatry, diagnoses are usually based upon information from parents and teachers as well as from observing the child. In this study, the only informants were the patients themselves and the information collected was retrospective regarding problems during childhood and adolescence. The ED diagnosis per se can amplify the symptoms of attention problems, hyperactivity and poor social skills, especially in severe cases with long ED duration. However, in the present study, the subjects were asked retrospectively about symptoms of COND with a childhood onset, often before the age of 7 years. Therefore, in those cases where a diagnosis of COND was assigned, these symptoms had emerged long before the onset of the ED per se. If one bears in mind that one of the limitations in this study was that the patients were affected by a severe ED at the time of the examination, it must still be of interest to investigate this group in respect of background factors. A premorbid diagnosis of COND will give a hint of the prognosis, which is of importance in a group of patients where the illness implies a great social and economic burden for the individual, the family and the society.

The examiner was not blind to diagnostic group status, which may have biased the results. The limited examination of the subjects due to the ethics committee's recommendations prevented us from conducting in-depth interviews concerning all COND. We therefore focused primarily on ASD diagnoses. Briefer interviews were used regarding AD/HD and TD/other tic disorders. However, the ADHD-RS, the instrument used in the present study to assign AD/HD diagnoses, is a validated instrument which is widely used in studies pertaining to pharmacological treatment of AD/HD. In the present study, the AD/HD and ASD diagnoses could have been made with more confidence if information on childhood development was obtained from a parent or other informant and not only from the ED patient per se. For collateral interview, the Diagnostic Interview for Social and Communication Disorders (DISCO) pertaining to ASD diagnoses has shown good validity and reliability [22, 34]. However, this interview is estimated to require between 2 and 4 hours, which was not possible to achieve in the present study.

Further, the limited examination prevented us from conducting a systematic assessment of Axis I psychiatric disorders. Information on comorbid psychiatric syndromes would have enabled us to decide whether impulsivity was primary or secondary to, for instance, a bipolar disorder; and if social interaction problems could be secondary to a depressive disorder. However, the ED patients assigned with COND admitted to having had their impulsivity and social interaction problems since early childhood, which implies a chronic course from childhood and onwards, generally not typical for Axis I disorders.

Clinical implications

The occurrence of COND must be taken into consideration in the treatment of ED patients. This would seem to be particularly important in severe cases with a long ED duration, among whom as many as one out of two may have a history of premorbid COND. In these cases, a diagnosis of COND must be excluded since the COND can obstruct the treatment and recovery of the ED.

Individuals with an ED and comorbid ASD will in most cases probably exhibit lifelong ASD symptoms even after recovering from the ED per se. These individuals do not benefit from psychodynamic psychoanalysis. Instead psychoeducational therapies should be the treatment of choice [15].

AD/HD and TD may be mediators of impulsive behaviour in some AN and BN patients. In fact, some case

reports have shown methylphenidate, a psychostimulant, well known for its efficacy in AD/HD, to decrease the rate of bingeing and purging behaviour in BN patients with symptoms of AD/HD [29, 30].

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