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ORIGINAL RESEARCH

Clinical features of tic-related obsessive-compulsive disorder: results from a large multicenter study

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Objective. To evaluate the clinical features of obsessive-compulsive disorder (OCD) patients with comorbid tic disorders (TD) in a large, multicenter, clinical sample.

Method. A cross-sectional study was conducted that included 813 consecutive OCD outpatients from the Brazilian OCD Research Consortium and used several instruments of assessment, including the Yale-Brown Obsessive-Compulsive Scale, the Dimensional Yale-Brown Obsessive-Compulsive Scale, the Yale Global Tic Severity Scale (YGTSS), the USP Sensory Phenomena Scale, and the Structured Clinical Interview for DSM-IV Axis I Disorders.

Results. The sample mean current age was 34.9 years old (SE 0.54), and the mean age at obsessive-compulsive symptoms (OCS) onset was 12.8 years old (SE 0.27). Sensory phenomena were reported by 585 individuals (72% of the sample). The general lifetime prevalence of TD was 29.0% ($n = 236$), with 8.9% ($n = 72$) presenting Tourette syndrome, 17.3% ($n = 141$) chronic motor tic disorder, and 2.8% ($n = 23$) chronic vocal tic disorder. The mean tic severity score, according to the YGTSS, was 27.2 (SE 1.4) in the OCD + TD group. Compared to OCD patients without comorbid TD, those with TD (OCD + TD group, $n = 236$) were more likely to be males (49.2% vs. 38.5%, $p < .005$) and to present sensory phenomena and comorbidity with anxiety disorders in general: separation anxiety disorder, social phobia, specific phobia, generalized anxiety disorder, post-traumatic stress disorder, attention-deficit hyperactivity disorder, impulse control disorders in general, and skin picking. Also, the "aggressive," "sexual/religious," and "hoarding" symptom dimensions were more severe in the OCD + TD group.

Conclusion. Tic-related OCD may constitute a particular subgroup of the disorder with specific phenotypical characteristics, but its neurobiological underpinnings remain to be fully disentangled.

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Keywords: Comorbidity, obsessive-compulsive disorder, tic disorder, Tourette syndrome.

FOCUS POINTS

- Tic disorders (TD) affect approximately 30% of obsessive-compulsive disorder (OCD) patients.
- Compared to OCD individuals without TD, the comorbid group (OCD + TD) shows male preponderance, more sensory phenomena, and higher severity of some symptom dimensions, as well as a different pattern of psychiatric comorbidities.
- Tic related-OCD may constitute a particular subgroup of this heterogeneous condition, with specific phenotypical features.

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Introduction

Obsessive-compulsive disorder (OCD) is a chronic and disabling psychiatric disorder[1,2] with a lifetime prevalence of 2–2.5% in the general population.[3–5]

OCD is currently viewed as a highly heterogeneous psychiatric disorder, with different clinical phenotypes, which probably reflect different subtypes. Evidence from

phenomenological, family, genetic, neuroimaging, and treatment studies have suggested that tic-related OCD could be described as a putative OCD subtype, possibly involving differential pathophysiological mechanisms.[6–8] For instance, previous studies have shown that approximately 30% of OCD patients also present with Tourette syndrome (TS) or other tic disorders (TD).[9] Other studies have consistently reported particular characteristics in OCD patients with co-occurring TD, such as an earlier age of symptom onset; a predominance of males; higher frequency and severity of specific symptom dimensions; higher comorbidity with mood, anxiety, and attention deficit and hyperactivity disorders; trichotillomania; body dysmorphic disorder; and a higher prevalence of sensory phenomena (disturbing sensations, perceptions, feelings, or urges) preceding their repetitive behaviors, when compared to OCD patients without TD.[10,11]

The objective of the present study was to compare OCD associated with TD (i.e., TS and chronic tic disorders—OCD + TD) to OCD without TD (OCD – TD) regarding demographic data, several clinical measures such as the presence and severity of obsessive-compulsive symptom (OCS) dimensions, sensory phenomena, and Axis I psychiatric comorbidity in a large sample of OCD patients. Our main hypotheses were that OCD patients with TD would be more likely than those without TD to present the following: an age and gender distribution resembling the early onset OCD group, sensory phenomena, more severe symptoms of the aggression and symmetry dimensions, and a pattern of comorbid disorders previously described in other countries.[10,11]

Methods

This is a cross-sectional study that includes data on 813 consecutive OCD outpatients from the Brazilian OCD Research Consortium (C-TOC)[12]; the data were obtained from seven different Brazilian sites between August 2003 and August 2008. Patients with schizophrenia, organic mental disorders, or any other clinical condition that would interfere with the quality of the data collected were excluded. The study was approved by all the university hospital ethics committees involved in the study, and all participants signed a written informed consent. Interviewers were clinical psychologists or psychiatrists with expertise in OCD and were properly trained to apply the complete research protocol.

The following instruments of assessment were applied: the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I),[13] the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS),[14] the Dimensional Yale-Brown Obsessive-Compulsive Scale (DY-BOCS),[15] the Yale Global Tic Severity Scale (YGTSS),[16] the USP Sensory Phenomena Scale (USP-SPS),[17] the Beck Depression Inventory,[18] and the Beck Anxiety Inventory.[19] Additional questionnaires investigating other clinical aspects and medical conditions[12] were also included in the protocol. Detailed information about the C-TOC, as well as training and reliability among interviewers, can be found elsewhere.[12]

Demographic and clinical features of the two study groups (OCD + TD and OCD – TD) were compared using the Pearson's chi-square test for categorical data, with Yates correction when necessary. Continuous variables were investigated by nonparametric tests (Mann–Whitney), as appropriate. All tests were two-tailed, with p values lower than .05 being considered significant. Statistical analyses were conducted using the SPSS version 16.0 software (SPSS Inc., Chicago, IL) and R: A Language and Environment for Statistical Computing, version 2.9.1.

Results

Social and demographic data are shown in Table 1. A total of 813 patients were recruited, 338 (41.6%) of which were males and 674 (83%) Caucasians. The sample mean current age was 34.9 years old (SE 0.45) and the mean age at of OCS onset was 12.8 years old (SE 0.27). Sensory phenomena were reported by 585 individuals, which is 72% of the total sample. The general prevalence of TD (including TS and other chronic TD) in the sample was 29.0% ($n = 236$), with 8.9% ($n = 72$) presenting TS, 17.3% ($n = 141$) presenting chronic motor tic disorder, and 2.8% ($n = 23$) presenting chronic vocal tic disorder. The mean tic severity score, according to the YGTSS, was 27.2 (SE 1.4) in the OCD + TD group.

Among subjects without TD, only 38.5% were males, compared with 49.2% in the OCD + TD group ($p = 0.005$). There were no differences between the two study groups regarding ethnicity and educational level. The mean age of OCS onset of was 13.1 years old in the OCD – TD group and 12.0 among the OCD + TD group—a difference that did not reach statistical significance. Current mean age was significantly lower (32.3 years) among patients in the OCD + TD group compared to patients with OCD – TD (35.9 years).

Current severity of OCS, measured with the Y-BOCS and the DY-BOCS global scores, did not differ between the groups (Table 2). The severity of the following symptom dimensions was higher in the OCD + TD group: "aggressive" ($p = 0.027$), "sexual/religious" ($p = 0.03$), "hoarding" ($p = 0.005$), and "others" ($p = 0.007$). This group also showed a higher rate of sensory phenomena (80.1% vs. 68.6%, $p = 0.001$), but the difference in severity (USP-SPS score) was

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Table 1. *Demographic data of the OCD sample (N = 813) and mean age of obsessive-compulsive symptoms onset, according to the presence or absence of co-occurring tic disorders*

	OCD without TD 577 (71.0%)		OCD with TD 236 (29.0%)		Total N = 813		
	N	%	*N*	%	*N*	%	*p*-value
Gender							0.005
Males	222	38.5%	116	49.2%	338	41.6%	
Females	355	61.5%	120	50.8%	475	58.4%	
Ethnic groups							0.70
Caucasian	474	82.1%	200	84.7%	674	82.9%	
Afro-Brazilians	27	4.7%	7	3.0%	34	4.2%	
Asian	8	1.4%	2	0.8%	10	1.2%	
Mulatto	67	11.6%	26	11.0%	93	11.4%	
Other	1	0.2%	1	0.4%	2	0.2%	
Education level							0.44
Illiterate	43	7.5%	12	5.1%	55	6.8%	
*Elementary**	79	13.7%	36	15.3%	115	14.2%	
*High school***	272	47.2%	117	49.6%	389	47.9%	
College undergraduate	154	26.7%	55	23.3%	209	25.7%	
College graduate	28	4.9%	16	6.8%	44	5.4%	
	Mean	s.e.	Mean	s.e.	Mean	s.e.	*p*-value
Mean age	35.89	0.54	32.35	0.78	34.86	0.45	< 0.001
Mean age of onset of OCS	13.08	0.32	11.97	0.46	12.76	0.27	0.06

TD, tic disorders = Tourette syndrome + motor/vocal chronic tic disorders.
OCD = obsessive-compulsive disorder.
s.e. = standard error.
*Up to 8 years of formal education.
*9–12 years of formal education.

Table 2. *Current severity of obsessive-compulsive, sensory phenomena, and depressive and anxious symptoms in OCD patients with and without tic disorders*

	OCD without TD 577 (71%)	s.e.	OCD with TD 236 (29%)	s.e.	Total N = 813	s.e.	*p*-value
Y-BOCS global score (mean)	25.19	0.33	25.63	0.53	25.32	0.28	0.56
DY-BOCS aggression score (mean)	5.02	0.21	5.84	0.32	5.26	0.17	0.027
DY-BOCS sexual/religious score (mean)	3.94	0.20	4.72	0.32	4.17	0.17	0.03
DY-BOCS symmetry/ordering score (mean)	7.18	0.20	7.52	0.30	7.28	0.16	0.26
DY-BOCS contamination/cleaning score (mean)	6.37	0.22	6.28	0.33	6.34	0.18	0.10
DY-BOCS hoarding score (mean)	2.92	0.17	3.67	0.27	3.13	0.14	0.005
DY-BOCS other symptoms score (mean)	7.25	0.20	8.26	0.28	7.55	0.16	0.007
DY-BOCS global score (mean)	20.89	0.26	21.04	0.45	21.0	0.23	0.72
USP-SPS score (mean)	36.32	6.41	38.94	11.01	37.08		0.13
Beck Depression Inventory score (mean)	16.19	0.48	16.41	0.72	16.25	0.40	0.70
Beck Anxiety Inventory score (mean)	15.24	0.47	16.96	0.81	15.74	0.41	0.11

Y-BOCS = Yale-Brown Obsessive-Compulsive Scale; DY-BOCS = Dimensional Yale-Brown Obsessive-Compulsive Scale; USP-SPS = University of São Paulo Sensory Phenomena Score.
TD, tic disorders = Tourette syndrome + motor/vocal chronic tic disorders.
OCD = obsessive-compulsive disorder.
s.e. = standard error.

not significant. The depressive and anxiety symptom scores (Beck inventories) also did not differ between the two study groups (Table 2).

Data on Axis I comorbidity are shown in Table 3. The OCD + TD group showed increased rates of anxiety disorders in general ($p = 0.005$), social phobia

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Table 3. *Lifetime comorbid Axis I disorders in OCD patients with and without tic disorders*

Comorbid disorders	OCD without TD $n = 577$ (71.0%)	OCD with TD $n = 236$ (29.0%)	Total $n = 813$	P
Eating disorders	65 (11.3%)	27 (11.4%)	92 (11.3%)	0.94
Mood disorders	405 (70.2%)	170 (72%)	575 (70.7%)	0.6
Post-traumatic stress disorder	98 (17%)	61 (25.8%)	159 (19.6%)	0.004
Generalized anxiety disorder	178 (30.8%)	97 (41.1%)	275 (33.8%)	0.005
Social phobia	182 (31.5%)	104 (44.1%)	286 (35.2%)	< 0.001
Specific phobia	177 (30.7%)	91 (38.6%)	268 (33%)	0.04
Panic disorder	34 (5.9%)	12 (5.1%)	46 (5.7%)	0.65
Agoraphobia	27 (4.7%)	14 (5.9%)	41 (5%)	0.46
Anxiety disorders (in general)	178 (30.8%)	97 (41.1%)	275 (33.8%)	0.005
Attention-deficit/hyperactivity disorder	59 (10.2%)	38 (16.1%)	97 (11.9%)	0.019
Separation anxiety disorder	139 (24.1%)	81 (34.3%)	220 (27.1%)	0.003
Trichotillomania	32 (5.6%)	19 (8.1%)	51 (6.3%)	0.18
Skin picking	87 (15.2%)	51 (21.8%)	138 (17.1%)	0.025
Impulsive control disorders	200 (35%)	100 (42.7%)	300 (37.3%)	0.04
Somatoform disorders	14 (2.4%)	9 (3.8%)	23 (2.8%)	0.28
Body dysmorphic disorder	66 (11.4%)	31 (13.1%)	97 (11.9%)	0.5

($p < 0.001$), specific phobia ($p = 0.04$), generalized anxiety disorder ($p = 0.005$), and posttraumatic stress disorder (PTSD) ($p = 0.004$). The presence of separation anxiety disorder was also associated with OCD + TD ($p = 0.003$). Attention-deficit/hyperactivity disorder (ADHD) ($p = 0.019$), skin picking ($p = 0.025$), and impulse control disorders in general ($p = 0.04$) were also more frequent in the OCD + TD group when compared to the OCD – TD group. The prevalence of other lifetime Axis I disorders did not differ between groups (Table 3).

Discussion

To our knowledge, this is the largest systematic study that has compared clinical characteristics of OCD patients with and without comorbid TD. This comprehensive, multicenter study used structured assessment instruments applied by OCD experts. It is innovative in its use of specific and standardized instruments to assess the occurrence and severity of obsessive-compulsive symptom dimensions (DY-BOCS) and sensory phenomena (USP-SPS). As expected, the general prevalence of TS and chronic motor/vocal tics in the whole OCD sample was 8.9% and 20.1%, respectively, which is a finding that resembled early reports.[11] Moreover, consistent with previous studies, one-third of the subjects with TD presented a TS diagnosis.[20]

Regarding the age at onset of OCS, the OCD + TD group tended to present earlier onset, as observed in several previous studies.[11,20–25] As expected, the proportion of males was greater in the OCD + TD group.[11,20,26]

Regarding the overall clinical severity scores, obsessive-compulsive, depressive, and anxiety symptoms were similar in both groups. This is an intriguing finding that goes against the traditional view that OCD patients with TS have more severe psychopathology that can lead to a worse treatment response.[27,28] However, there were significant differences in the severity of specific symptom dimensions ("aggression," "sexual/religion," and "hoarding"), which were more severe in the OCD + TD group, giving support to previous findings.[11,29] These same dimensions have been reported as more frequent in the early onset OCD group,[11,30,31] and "hoarding" has also been considered as a special OCD subtype, with specific features including a more chronic course and worse treatment response.[32] Since OCD has been considered a developmental disorder,[29] it is possible that early insults in the cortico-striatal circuits may impact several others neural circuits, leading to the manifestation of diverse clinical pictures.

"Sensory phenomena" is a broad term that is used to define uncomfortable or disturbing sensations, perceptions, feelings, or urges that either precede or accompany repetitive behaviors such as compulsions or tics.[17,21,22] OCD patients might feel driven to repeat the compulsions until they experience a sense of relief from these uncomfortable sensations. Examples include sensations in the skin, "just-right" perceptions, and feelings of incompleteness.[17] Sensory phenomena have been strongly associated with tic-related OCD, and they may have a particular role in behavioral treatments in this group of patients.[33] The so called "tic-like" compulsions, which were previously associated

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with TD comorbidity in OCD,[34] may be related to these sensory phenomena, as these patients present repetitive behaviors motivated by uncomfortable physical or emotional feelings, but not by specific cognitions or fears.

Some Axis I disorders co-occurred more frequently in the OCD + TD group, especially anxiety disorders (separation anxiety, specific and social phobias, generalized anxiety disorder, and PTSD), as well as ADHD, impulse control disorders, and other repetitive behaviors, such as skin picking.

Previous studies[35] have reported that impulsivity and some repetitive behaviors are more frequent in OCD + TD and in TD patients, when compared to OCD patients without TD and other clinical controls. In fact, the involuntary nature of the majority of tics makes them resemble impulsions more than compulsions, but tics can also be considered semivoluntary, in the sense that they can be postponed most of the time or be performed in response to urges or sensory phenomena. This may also be the case of certain compulsions and nonfunctional repetitive behaviors, such as hair pulling and skin picking, which are performed with a very specific "grooming" purpose.[26,36] Thus, it has been proposed that TD, OCD, and these repetitive nonfunctional behaviors belong to an impulsive-compulsive spectrum of disorders,[37,38] which implicates the need for the development of specific pharmacological and behavioral therapies tailored to each one of these phenotypes. The OCD + TD group presented with a higher rate of ADHD—a condition associated with impulsivity and motor disinhibition, which has been frequently described in both TD and early-onset OCD.[38,39] Nevertheless, several other conditions characterized by impulsivity are not related to the OCD spectrum. Moreover, the prevalence of trichotillomania was not significantly different between groups in this study. This was an unexpected finding, but may be due to the small number of subjects with this specific comorbidity (type II error).

The higher frequency of anxiety disorders, especially social phobia and generalized anxiety disorder, has been reported in previous studies that have assessed TD and OCD + TD.[11,21,24,26,40,41] The association between the tic-related OCD group and PTSD is a new finding, since previous studies reported no significant association of traumatic experiences or PTSD with OCD + TD.[26,42] Psychological trauma may play an etiological role not only in PTSD and tic disorders, but also in OCD,[43,44] and these conditions may share the same moderator agents. Moreover, the high prevalence of impulsivity and ADHD in this population might also have increased the chance of exposure to traumatic situations.

The main limitations of our study include possible recall bias in the retrospective information that was collected using a cross-sectional design and uncertainty about the extent of the external validity of this information, considering that all participants were attending tertiary health services.

Conclusion

Our findings, which originated from a large sample of Brazilian outpatients, support the pattern that, compared to OCD without TD, OCD plus TD is a particular subgroup with some specific clinical features, such as male preponderance, more sensory phenomena, and higher severity of some symptom dimensions, as well as a different pattern of psychiatric comorbidities. Nevertheless, its neurobiological underpinnings remain to be fully disentangled. Future prospective studies to assess pre-morbid, "at risk" subjects for developing OCD and TD should correlate genetic, neuroimaging, and neuropsychological findings with different OCS dimensions in order to clarify their roles in the final phenotypical expressions. Further studies are also warranted to investigate possible implications of TD comorbidity for treatment approaches and response.

Disclosures

Pedro de Alvarenga, Maria Alice de Mathis, Anna Cláudia Dominguez Alves, Maria Conceição do Rosário, Victor Fossaluza, Ana Gabriela Hounie, Euripedes Constantino Miguel, and Albina Rodrigues Torres do not have anything to disclose.

Maria Conceição do Rosário has been a speaker for the companies Novartis and Shire in the past year.

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