

Clinical Comparison of Tourette's Disorder and Obsessive-Compulsive Disorder

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The authors report on 16 outpatients with Tourette's disorder, 16 outpatients with obsessive-compulsive disorder, and 16 normal control subjects who underwent structured interviews and psychological testing. Previous findings of a high incidence of obsessive-compulsive disorder in patients with Tourette's disorder were confirmed. There was a significantly greater incidence of tics in the patients with obsessive-compulsive disorder and their relatives. Both patient groups had high rates of unipolar depressive and generalized anxiety disorders. Panic and phobic disorders were frequent in the patients with obsessive-compulsive disorder but not in the patients with Tourette's disorder. The patients with obsessive-compulsive disorder showed less coprolalia, echo phenomena, self-destructive behavior, and childhood attention deficit.

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The relationship between tics and obsessions and compulsions has been of interest at least since the turn of the century (1). Recent studies (2) have found rates of obsessive-compulsive disorder in patients with Tourette's disorder (the most prominent tic disorder) ranging from 55% to 74%. The occurrence of tics in obsessive-compulsive disorder has occasionally been noted (3-5). Rasmussen and Tsuang (6) reported a 5% incidence of Tourette's disorder in patients with obsessive-compulsive disorder. The occurrence of other tic disorders and of associated features of Tourette's

disorder, such as coprolalia, echo phenomena (echolalia, echopraxia, palilalia), attention deficit, and self-destructive behavior (7), in obsessive-compulsive disorder does not appear to have been examined.

DSM-III recognizes that Tourette's disorder may be accompanied by obsessive doubting thoughts and compulsive impulses to touch things or to perform complicated movements. DSM-III uses the criterion of purpose to distinguish compulsions from tics, defining compulsions as "designed to produce or prevent some future event or situation" (p. 235) and tics as "purposeless" and "involuntary" (p. 77). In a departure from its atheoretical stance with regard to the etiology of mental disorders, DSM-III excludes the diagnosis of obsessive-compulsive disorder if it is due to Tourette's disorder.

Despite a good deal of published commentary regarding the relationship between the two disorders, we are aware of no previous studies systematically comparing patients with obsessive-compulsive disorder and patients with Tourette's disorder.

METHOD

Subjects with Tourette's disorder were recruited from the Behavioral Neurology Clinic of the Beth Israel Hospital in Boston, and subjects with obsessive-compulsive disorder were recruited from the Obsessive-Compulsive Disorders Clinic of the Massachusetts General Hospital in Boston. Letters were sent to current and former adult patients of both clinics soliciting their participation. Patients were told that the study would involve a psychiatric interview and psychological testing but not that the relationship among Tourette's disorder, tics, and obsessions and compulsions would be explored. From the patients who responded to the letter, subjects were selected on the basis of scheduling convenience and an attempt to include equal numbers of men and women.

Of 49 patients with Tourette's disorder contacted, 20 expressed interest and 16 were interviewed. Fifteen of these met DSM-III criteria for Tourette's disorder. The sixteenth deviated only in that she denied having the ability to suppress her movements voluntarily. Because her signs and symptoms were typical of

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Tourette's disorder in all other respects, she was retained in the Tourette's disorder group. Of 32 patients with obsessive-compulsive disorder contacted, 22 expressed interest and 16 were interviewed. Fifteen met *DSM-III* criteria for obsessive-compulsive disorder. The sixteenth met criteria for not only obsessive-compulsive disorder but also Tourette's disorder. Because this subject was ascertained as an obsessive-compulsive patient, he was retained in the obsessive-compulsive group. Sixteen control subjects were recruited from the staff of a Veterans Administration (VA) Medical Center. None met *DSM-III* criteria for obsessive-compulsive disorder, Tourette's disorder, or any other psychiatric illness (excluding adjustment disorders), except for one who had a history of major depressive disorder.

There were eight male and eight female subjects in the obsessive-compulsive disorder and control groups. The Tourette's disorder group contained nine men and seven women. The mean \pm SD age for the patients with Tourette's disorder was 31.0 ± 7.8 years; for the patients with obsessive-compulsive disorder it was 40.0 ± 12.1 years; and for the control subjects it was 39.0 ± 9.2 years. The difference in age between patients with Tourette's disorder and patients with obsessive-compulsive disorder was significant ($t=2.4$, $df=30$, $p=.02$); so was the difference in age between patients with Tourette's disorder and the control subjects ($t=2.7$, $df=30$, $p=.01$). There were no significant differences between the groups in level of education. The mean \pm SD number of years of education for the patients with Tourette's disorder was 14.0 ± 2.9 years; for the patients with obsessive-compulsive disorder it was 13.6 ± 2.3 years; and for the control subjects it was 14.8 ± 2.7 years.

After one of us (R.K.P.) explained the nature of the procedure and obtained informed consent, he interviewed each subject using the Yale Schedule for Tourette and Other Behavioral Syndromes-R (adult version) (unpublished 1985 manuscript of Pauls and Hurst, available on request through R.K.P.). This 113-page instrument contains detailed questions regarding lifetime history of tics, obsessions, compulsions, echolalia, echopraxis, palilalia, coprolalia, and childhood attention deficit and hyperactivity. It also includes the Diagnostic Interview Schedule (8), which incorporates *DSM-III* criteria for mental disorders. Subjects were also interviewed by using a supplementary interview schedule (unpublished 1985 form developed by R.K.P., available on request) concerning subjective experiences of Tourette's disorder and obsessive-compulsive disorder, pathological doubt, slowness, depersonalization, and self-destructive behaviors. Subjects also completed the following self-administered psychometric instruments: the Maudsley Obsessive Compulsive Inventory (9), the Eysenck Personality Inventory (10), and the trait portion of the State-Trait Anxiety Inventory (11).

Following the interview regarding the subjects' own history, the descriptions of tics, obsessions, and com-

pulsions from the Yale schedule were reviewed with the subjects and they were asked whether to their knowledge any of their first-degree relatives (parents or siblings) had ever suffered from any of these symptoms. When the answer was positive, details were requested and the corresponding diagnostic criteria were applied. Family history was confirmed by telephone interview with a family member designated by the patient as a good historian whenever one was available, which was in 75% of the families (evenly distributed across the three groups).

All disorders and symptoms reported here for subjects and relatives are in terms of lifetime incidence. Except where indicated otherwise, results were analyzed for significance by means of one-tailed Fisher's exact tests.

RESULTS

Obsessive-Compulsive Disorder in Patients With Tourette's Disorder

Table 1 presents the numbers of subjects in the Tourette's disorder, obsessive-compulsive disorder, and control groups who met criteria for obsessive-compulsive disorder, Tourette's disorder, and any tic disorder, as well as the numbers of subjects with associated symptoms and other mental disorders. Four men and six women with Tourette's disorder met criteria for obsessive-compulsive disorder (we disregarded the criterion of exclusion of the obsessive-compulsive disorder diagnosis in the presence of Tourette's disorder). Four of the five patients with Tourette's disorder with coprolalia met criteria for obsessive-compulsive disorder. For the patients with Tourette's disorder who also had obsessive-compulsive disorder, the mean \pm SD age at onset of tics was 8.3 ± 3.3 years and the mean \pm SD age at onset of obsessions/compulsions was 17.4 ± 6.6 years. The symptoms of obsessive-compulsive disorder in these patients with Tourette's disorder were mixed and characteristic of patients with obsessive-compulsive disorder in general (6, 12). Their obsessions involved forbidden sexual and aggressive images and impulses; their compulsions included checking, washing, and counting as well as magical attempts to ward off feared events.

Table 2 presents the number of probands' parents and siblings with a history of obsessive-compulsive disorder or any tic disorder.

Tic Disorders in Patients With Obsessive-Compulsive Disorder

Five men and one woman with obsessive-compulsive disorder met criteria for any tic disorder (three chronic motor, two transient, one Tourette's disorder) (for the male-female difference, $p=.06$). Only one control subject (a man) met criteria for tic disorder (chronic

TABLE 1. Lifetime Occurrence of Psychiatric Disorders and Symptoms in 16 Patients With Tourette's Disorder, 16 Patients With Obsessive-Compulsive Disorder, and 16 Normal Control Subjects

Disorder or Symptom	Subjects With Lifetime Occurrence			Difference Between Groups (p) ^a		
	Tourette's Disorder	Obsessive-Compulsive Disorder	Control	Tourette's vs. Obsessive-Compulsive	Tourette's vs. Control	Obsessive-Compulsive vs. Control
Disorders of main interest						
Obsessive-compulsive disorder	10	16	0	n.s.	<.001	<.001
Tourette's disorder	16	1	0	<.001	<.001	n.s.
Any tic disorder	16	6	1	<.001	<.001	<.05
Associated symptoms						
Pathological doubt	11	14	1	n.s.	<.001	<.001
Slowness	10	13	1	n.s.	<.01	<.001
Depersonalization	10	6	1	n.s.	<.01	<.05
Compulsive touching	14	4	0	<.001	<.001	n.s.
Self-destructive behavior	8	2	0	<.05	<.01	n.s.
Coprolalia	5	0	0	<.05	<.05	n.s.
Echo phenomena	10	2	0	<.01	<.001	n.s.
Childhood attention deficit	7	2	0	n.s.	<.05	n.s.
Symmetry behavior	10	4	0	<.05	<.001	n.s.
Other disorders						
Unipolar depression	7	11	1	n.s.	<.05	<.001
Generalized anxiety	7	14	0	<.05	<.01	<.001
Panic	1	9	0	<.01	n.s.	<.001
Phobic	2	10	0	<.01	n.s.	<.001

^aFisher's exact test; criterion for significance: $p < .05$, one-tailed.

TABLE 2. Lifetime Occurrence of Obsessive-Compulsive Disorder and Tic Disorders in Parents and Siblings of 16 Patients With Tourette's Disorder, 16 Patients With Obsessive-Compulsive Disorder, and 16 Normal Control Subjects^a

Disorder	Lifetime Occurrence					
	Relatives of Probands With Tourette's Disorder (N=74)		Relatives of Probands With Obsessive-Compulsive Disorder (N=75)		Relatives of Control Subjects (N=86)	
	N	%	N	%	N	%
Obsessive-compulsive disorder	5	7	6	8 ^b	1	1
Tourette's disorder	2	3	1	1	0	0
Any tic disorder	11	15 ^c	7	9 ^b	1	1

^aThe family history method, which is likely to provide underestimates, was used.

^bSignificantly higher than relatives of control subjects ($p < .05$, Fisher's exact test, one-tailed).

^cSignificantly higher than relatives of control subjects ($p < .001$, Fisher's exact test, one-tailed).

motor). Although one might imagine that tics would be more closely related to compulsions than to obsessions, the only patient with obsessive-compulsive disorder who reported obsessions in the absence of compulsions had a history of tic disorder. As in the patients with Tourette's disorder, the appearance of tics in the patients with obsessive-compulsive disorder generally preceded the development of the obsessive-compulsive disorder: for patients with obsessive-compulsive disorder with a tic disorder, the mean \pm SD age at onset was 14.0 ± 7.8 years for tics and 18.8 ± 8.2 years for obsessions/compulsions. The types of tics reported by patients with obsessive-compulsive disorder included eye blinking, squinting, "snapping" the nose, humming, repeating words, throat clearing, and sniffing—symptoms not unlike those of patients with Tourette's disorder (7), although less severe and of later onset. Three patients with obsessive-compulsive disorder reported that their tics persisted into the present, and three reported that they had abated.

As indicated in table 2, parents and siblings of probands with obsessive-compulsive disorder and probands with Tourette's disorder had significantly higher incidences of tic disorder than did relatives of control subjects, but they did not significantly differ from each other. Not shown in the table, three (13%) of the 24 relatives of probands with obsessive-compulsive disorder and a tic disorder had a tic disorder, compared with four (8%) of the 51 relatives of obsessive-compulsive disorder probands without a tic disorder, not a significant difference. Five (11%) of the 47 relatives of women with obsessive-compulsive disorder had a tic disorder, compared with two (7%) of the 28 relatives of men with obsessive-compulsive disorder, also not a significant difference. The tic symptoms in the relatives of patients with obsessive-compulsive disorder included eye blinking, squinting, head and neck jerking, tongue protrusion and biting, coughing, throat clearing, humming, and making noises. (The nephew of one patient with obsessive-compulsive dis-

order had been given the diagnosis of Tourette's disorder at another center.)

Eleven patients with obsessive-compulsive disorder had either a tic disorder or a family history of tic disorder, compared with only one control subject ($p < .001$). Furthermore, the control subject with tics may have represented the "exception that proves the rule." This man, who reported an eye blinking tic when nervous, as did his father, spent 20 minutes a day checking the doors and windows of his home, a behavior that was not counted as a compulsion due to the absence of senselessness, resistance, or interference but that nevertheless stood out in contrast to the other control subjects.

Purpose and Volition

The criterion of purpose was examined as a means of distinguishing compulsions from tics. Nine patients with obsessive-compulsive disorder identified compulsions aimed at preventing some dreaded consequence, e.g., checking that the apartment building door was locked "so that a draft doesn't come in and give one of the old people pneumonia." However, seven patients with obsessive-compulsive disorder identified compulsions that were not related to the prevention of any dreaded consequence but were performed for vaguer reasons, e.g., repeatedly dressing and undressing "until I get the right feeling" or "the need to write down the thoughts in my mind." Those patients with obsessive-compulsive disorder whose compulsions were clearly purposeful were not immune to tics: of the six patients with obsessive-compulsive disorder with a positive history for tics, four reported typical compulsions designed to prevent the occurrence of dreaded consequences.

Sense of purpose was also not consistently absent in patients' reports of tics. Although prevention was generally not reported as a subjective motive behind tics, one Tourette's disorder patient stated that she performed a jumping tic "in order to prevent something bad from happening to my family." Tics were often performed in a typically compulsive manner. For example, a Tourette's disorder patient was observed to sniff in five times and then sniff out five times in rapid succession. When asked about this, he responded "I do everything in fives." Several patients in both the Tourette's and obsessive-compulsive disorder groups identified in their eye-blinking or throat-clearing tics the purpose of ridding themselves of irritating sensations in the eyes or throat. Sensory precursors to tics were reported by 14 patients with Tourette's disorder. Ten patients with Tourette's disorder (five men and five women) reported behaviors that were designed to maintain a sense of right-left bodily symmetry. For example, one of these patients explained that if she accidentally brushed a tree with her right hand, she then needed to intentionally brush another tree with her left hand "in order to balance it." Four patients with obsessive-compulsive disorder (three men and

one woman) but no control subjects reported the same phenomenon.

The *DSM-III* characterization of tics as involuntary also did not appear to be universally applicable. A Tourette's disorder patient maintained, "My tics are not involuntary. I do it because I feel a tension in the area that I need to release." This opinion was sustained by several other patients with Tourette's disorder, but several of the patients with obsessive-compulsive disorder reported that their compulsions were outside their voluntary control. Patients were more likely to describe a mounting sense of tension before performing tics, as opposed to anxiety before performing compulsions, but this distinction did not uniformly apply.

Associated Symptoms

Pathological doubt, slowness, and depersonalization were significantly more common in patients with Tourette's disorder and patients with obsessive-compulsive disorder than in control subjects, but the frequency of these did not differ significantly between the Tourette's disorder and obsessive-compulsive disorder groups (table 1). A Tourette's disorder patient described her depersonalization as follows: "It was very scary. I'd be sitting there talking with you and I'd doubt that I was really there, or that you were really there, or that we were really in the world. Then I'd wonder, 'What's the world?' 'What's a human being?'" Another Tourette's disorder patient ascribed the performance of some of her tics to the need to reassure herself that she really existed.

Compulsive touching, self-destructive behaviors, echo phenomena, and childhood attention deficit were more common in the patients with Tourette's disorder than in the patients with obsessive-compulsive disorder but were shown by none of the control subjects. In the patients with Tourette's disorder, the self-destructive behaviors included biting mouth and fingers, gnashing and grinding teeth, pulling out chunks of hair, sticking a toothpick in the hand, and inching a foot into a running lawn mower.

Psychodynamics

Psychodynamic features commonly described in obsessive-compulsive disorder were sometimes evident in patients with Tourette's disorder. One Tourette's disorder patient demonstrated intellectualization and isolation of affect when, after making reference to a thought of killing himself, he qualified this by stating, "What I was really trying to do just now was get the structure of the sentence exactly. I wasn't really worried about killing myself." Another Tourette's disorder patient reported being troubled by thoughts of "having sex with my mother and sucking my father's rear end hole." He made long lists of things that he "didn't want to do," presented these lists to his parents, and asked that they punish him should he try to do them.

TABLE 3. Scores on Self-Administered Psychometric Tests of 16 Patients With Tourette's Disorder, 16 Patients With Obsessive-Compulsive Disorder, and 16 Normal Control Subjects

Test	Score						Difference Between Groups					
	Tourette's Disorder		Obsessive-Compulsive Disorder		Control Subjects		Tourette's vs. Obsessive-Compulsive		Tourette's vs. Control		Obsessive-Compulsive vs. Control	
	Mean	SD	Mean	SD	Mean	SD	t (df=30)	p	t (df=30)	p	t (df=30)	p
Maudsley Obsessive Compulsive Inventory	8.4	6.7	15.2	6.1	4.3	3.4	3.0	<.01	2.2	<.05	6.3	<.001
Eysenck Personality Inventory												
Neuroticism	14.0	4.6	15.6	4.1	6.8	4.0	1.1	n.s.	4.8	<.001	6.2	<.001
Extraversion	12.2	4.1	11.3	5.0	14.1	3.0	<1	n.s.	1.5	n.s.	1.9	n.s.
State-Trait Anxiety Inventory												
Trait anxiety	47.6	13.0	58.4	10.4	30.2	5.4	2.6	.01	5.0	<.001	9.7	<.001

Psychological factors were sometimes evident in the development of the tics themselves. One of the patients with Tourette's disorder had a dramatic punching tic in which he would vigorously extend his fist, sometimes to within inches of the interviewer's face. He described how this tic originated in a frustrated impulse to reach out and smear his girlfriend's makeup, which intensified at the time of their angry breakup and persisted long afterward.

Other Mental Disorders

The rates of affective disorders (all either unipolar major depressive or dysthymic) and generalized anxiety disorder among patients with Tourette's disorder and patients with obsessive-compulsive disorder (table 1) were well in excess of those reported for the general population (13, 14). A high rate of panic and phobic disorders significantly distinguished patients with obsessive-compulsive disorder from both patients with Tourette's disorder and control subjects. However, these lifetime incidences may have been underestimated more in the Tourette's disorder group than in the other two groups because of its lower mean age.

The results of the self-administered psychometric tests appear in table 3.

DISCUSSION

Design limitations in this study require discussion. Because subjects were not randomly ascertained, it is conceivable that the subjects who volunteered to participate were not typical of the general populations with Tourette's disorder or obsessive-compulsive disorder. However, the specific questions posed by the study were not communicated to subject candidates in advance, which rules out the possibility of intentional self-selection. The 63% incidence of obsessive-compulsive disorder in the subjects with Tourette's disorder studied here is reassuringly close to previously reported estimates, as is the 6% incidence of Tourette's disorder in the subjects with obsessive-compulsive

disorder. Systematic data on the incidence of other tic disorders in subjects with obsessive-compulsive disorder are not available for comparison with the data obtained here, but we can think of no reason why subjects with obsessive-compulsive disorder and tic disorders would have been more likely to volunteer for interview than subjects with obsessive-compulsive disorder without tic disorders.

Comparison of our family history data with data obtained from direct interviews of family members of subjects with Tourette's disorder (2) indicates that our sensitivity for obsessive-compulsive disorder and tic disorders in relatives was lower by more than 50%. The family history method has generally been found to have high specificity but low sensitivity (15). Accurate estimates of the rate of tic disorders in relatives of probands with obsessive-compulsive disorder compared with the rate in the general population are needed. Although a portion of the data was beyond subjective interpretation (e.g., documentation of a facial tic was found in the child psychiatry clinic records of one of the subjects with obsessive-compulsive disorder, and tics were directly observed in some other subjects), it is possible that expectations of the nonblind interviewer introduced bias into the findings. The results should therefore be regarded as tentative until they can be replicated in more elaborate studies incorporating (as far as possible) blind interview design as well as larger sample sizes, random ascertainment of probands, age matching of groups with Tourette's disorder and obsessive-compulsive disorder, and direct interviewing of family members.

In patients with both tics and compulsions, it was sometimes impossible to tell where one ended and the other began, supporting the notion of a symptomatic continuum from simple tic through complex tic to compulsion. Certain kinds of compulsive behavior, such as touching and symmetry behavior, occurred more often in Tourette's disorder than in obsessive-compulsive disorder. Rasmussen and Tsuang (6) observed "symmetry obsessions" in 36% of their patients with obsessive-compulsive disorder (including one with concomitant Tourette's disorder), finding them

(as did we) to be more common in men with obsessive-compulsive disorder. Schilder (3) suggested that the occurrence of symmetry symptoms in obsessive-compulsive disorder pointed to an organic etiology. Our patients with Tourette's disorder showed a high rate of pathological doubt and slowness, psychopathology generally understood to be obsessional. Depersonalization, whose role in obsessional disorders Janet (16, 17) emphasized, also figured prominently in the psychopathology of patients with Tourette's disorder. The patients with Tourette's disorder were more anxious, neurotic, and compulsive according to the self-administered psychometric tests than were the control subjects but did not score as high on these measures as did the patients with obsessive-compulsive disorder, a finding reported elsewhere (18).

The most novel results of this study pertain to the high rate of tic symptoms in the patients with obsessive-compulsive disorder and their relatives. In fact, tics were more useful in distinguishing relatives of patients with obsessive-compulsive disorder from relatives of control subjects than were obsessions or compulsions. Only a few patients with obsessive-compulsive disorder, however, shared the echo phenomena, self-destructive behavior, symmetry behavior, and history of childhood attention deficit found in a substantial number of the patients with Tourette's disorder, and none had coprolalia.

The results suggest symptomatic overlap tending to blur the two disorders as well as symptomatic poles tending to distinguish them. With this pattern, the ease of differential diagnosis of a given patient would depend on his or her proximity to one of the poles. The arbitrary exclusion in *DSM-III* of the obsessive-compulsive disorder diagnosis in the presence of Tourette's disorder does not seem supportable. Pauls et al. (2) have presented data suggesting that the same genetic factor may be manifested as tics in some individuals and obsessions and compulsions in others, with penetrance in males weighted toward tics and penetrance in females toward obsessive-compulsive disorder (19). Our data are consistent with that formulation.

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